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THERMODYNAMIC PROPERTIES TO

6000° K FOR 210 SUBSTANCES

INVOLVING THE FIRST 18 ELEMENTS

McBRIDE • HEIMEL • EHLERS • GORDON

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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By

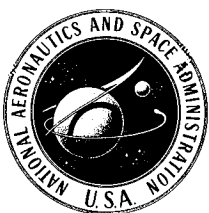
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THERMODYNAMIC PROPERTIES TO 6000° K

FOR 210 SUBSTANCES INVOLVING

THE FIRST 18 ELEMENTS

By Bonnie J. McBride, Sheldon Heibel,
Janet G. Ehlers, and Sanford Gordon

SUMMARY

Consistent tables of thermodynamic properties at temperatures from 0° to 6000° K were compiled for 210 gaseous and condensed species involving the elements with atomic numbers of 1 to 18 (i.e., hydrogen, helium, lithium, beryllium, boron, carbon, nitrogen, oxygen, fluorine, neon, sodium, magnesium, aluminum, silicon, phosphorus, sulfur, chlorine, and argon). The tables give the following thermodynamic functions for the standard state: heat capacity at constant pressure C_p^0 , sensible enthalpy $H_T^0 - H_0^0$, entropy S_T^0 , sensible free energy $-(F_T^0 - H_0^0)$, and H_T^0 , the sum of sensible enthalpy and chemical energy at 0° K, as well as values of the enthalpy changes and the logarithms of the equilibrium constants. The latter two functions are given for the reactions of formation of the substances from a set of assigned reference elements ($(\Delta H_T^0)_f$ and $\log_{10} K_f$) and from these elements in their atomic gaseous state (ΔH_T^0 and $\log_{10} K$). The functions for most of the gases were generated from molecular data, whereas the functions of most of the condensed species are based on selected experimental data that were smoothed and made self-consistent.

INTRODUCTION

Since publication of reference 1, the Lewis Research Center has maintained a constantly revised and up-to-date file of thermodynamic data for use in theoretical rocket and aircraft analysis. Most of the data for ideal gases currently being used have been calculated at Lewis from spectroscopic data by means of several programs for an IBM 7090 computer. Experimental data from the literature for a number of condensed species have been smoothed and the thermodynamic functions made consistent. The results of these calculations are given in a set of consistent tables of thermodynamic properties at temperatures from 0° to 6000° K for 210 gaseous and condensed species involving the elements with atomic numbers of 1 to 18 (i.e., hydrogen (H), helium (He), lithium (Li), beryllium (Be), boron (B), carbon (C), nitrogen (N), oxygen (O), fluorine (F), neon (Ne), sodium (Na), magnesium (Mg), aluminum (Al), silicon (Si), phosphorus (P), sulfur (S), chlorine (Cl), and argon (Ar)).

The thermodynamic functions included in these tables are heat capacity at constant pressure C_p^0 , sensible enthalpy $H_T^0 - H_0^0$, entropy S_T^0 , sensible free energy $-(F_T^0 - H_0^0)$, and H_T^0 , the sum of sensible enthalpy and chemical energy at 0° K, as well as the values of the enthalpy changes and the logarithms of the equilibrium constants for the reactions of formation of the substances from a set of assigned reference elements ($(\Delta H_T^0)_f$ and $\log_{10} K_f$) and from these elements in their atomic gaseous state (ΔH_T^0 and $\log_{10} K$). For the ideal gases, these data are given from 0° to 6000° K at 100° intervals; for the solids, from 0° to the melting point (or if the substance sublimes, to a temperature somewhat beyond the sublimation point); and for the liquids, from the melting point to a point somewhat beyond the normal boiling point. The values for $(\Delta H_T^0)_f$ and $\log_{10} K_f$ of any substance with reference to condensed elements are given, however, only in the temperature range in which the condensed elements are tabulated.

Also included herein are a discussion of the methods and equations used to obtain various forms of the partition function, tables of molecular constants and heats of formation, polynomial coefficients for C_p^0/R , H_T^0/RT , and S_T^0/R obtained by the method of reference 2, and, when necessary, discussions of individual species.

Other compilations of thermodynamic data have become available in recent years (e.g., refs. 3 to 11). The data herein may differ from those in other investigations for one or more of the following reasons: different form for the partition function, different spectroscopic data, inclusion of excited-state data, inclusion of isotopic effects, different heats of formation, and different smoothing techniques for condensed species.

THERMODYNAMIC FUNCTIONS OF IDEAL GASES

The thermodynamic functions for all except five of the gases considered in this report were calculated at the Lewis Research Center on an IBM 7090 computer. Equations for evaluating thermodynamic functions from the partition function and its first and second derivatives can be found in references such as reference 12 (ch. V). In a form slightly modified from that in reference 12, these equations are

$$\frac{C_p^0}{R} = \frac{T^2}{Q} \frac{d^2Q}{dT^2} - \left(\frac{T}{Q} \frac{dQ}{dT} \right)^2 + \frac{2T}{Q} \frac{dQ}{dT} + \frac{5}{2} \quad (1)$$

$$\frac{H_T^0 - H_0^0}{RT} = \frac{T}{Q} \frac{dQ}{dT} + \frac{5}{2} \quad (2)$$

$$\frac{S_T^{\circ}}{R} = \frac{T}{Q} \frac{dQ}{dT} + \ln Q + \frac{3}{2} \ln M + \frac{5}{2} \ln T - 1.16511 \quad (3)$$

$$\frac{-(F_T^{\circ} - H_T^{\circ})}{RT} = \frac{S_T^{\circ}}{R} - \frac{H_T^{\circ} - H_0^{\circ}}{RT} = \ln Q + \frac{3}{2} \ln M + \frac{5}{2} \ln T - 3.66511 \quad (4)$$

(Symbols are defined in appendix A.) The internal partition function Q contains vibrational, rotational, and electronic contributions. The terms in equations (1) to (4) that do not contain Q are the translational contributions.

Internal Partition Function for Diatomic and Polyatomic Molecules

Numerous references (e.g., refs. 12 to 19) discuss calculations of thermodynamic functions by using equations the same as or equivalent to equations (1) to (4). The form used to represent the internal partition function in these references, however, varies considerably. The following sections discuss some of these forms and indicate which molecules were calculated with the various forms.

General form. - A general expression for the vibrational and rotational contributions for the ground-state electronic level is given in reference 12 (p. 502). If this expression is slightly modified to include possible contributions of higher electronic states, the following equation is obtained:

$$Q^m = g_e^m e^{-T_0^m hc/kT} \sum_v g_v^m e^{-G_0^m(v_1, v_2, \dots) hc/kT} \sum_r g_r^m e^{-F_v^m(J, \dots) hc/kT} \quad (5)$$

where g_e , g_v , and g_r are the electronic, vibrational, and rotational statistical weights, respectively, T_0 is the electronic excitation energy between the lowest vibrational levels of the ground state and of the excited state, and the superscript m indicates the m^{th} electronic state. For diatomic molecules,

$$\left. \begin{aligned}
 G_0(v) &= \omega_e \left(v + \frac{1}{2}\right) - \omega_e x_e \left(v + \frac{1}{2}\right)^2 + \omega_e y_e \left(v + \frac{1}{2}\right)^3 + \dots \\
 &\quad - \frac{1}{2} \omega_e + \frac{1}{4} \omega_e x_e - \frac{1}{8} \omega_e y_e + \dots \\
 F_v(J) &= \left[B_e - \alpha_1 \left(v + \frac{1}{2}\right) + \alpha_2 \left(v + \frac{1}{2}\right)^2 + \dots \right] J(J+1) \\
 &\quad - D_v J(J+1)^2 + H_v J^3 (J+1)^3 + \dots
 \end{aligned} \right\} \quad (6)$$

For polyatomic molecules, corresponding expressions for G and F are given in reference 12.

The total internal partition function for all electronic states is then

$$Q = \sum_m Q^m \quad (7)$$

Equation (5) is seldom used to calculate partition functions because the spectroscopic data available for most molecules are limited to a few low-lying levels. The resulting spectroscopic constants often give a poor representation of the higher levels.

Thermodynamic data for H_2 (from ref. 8) are the only data in this report based on partition functions of the form of equation (5).

Closed form for rotation. - The rotational stretching factor $e^{-F_v^m(J, \dots)hc/kT}$ in equation (5) for diatomic molecules can be conveniently expanded into a rapidly convergent series either by a power-series expansion (ref. 17) or by inversion of F_v^m (ref. 20). The Euler-Maclaurin summation formula may then be used to obtain a closed form of the rotational part of the partition function. With a closed form for rotation, it is necessary only to sum over the various vibrational and electronic states.

Two alternative forms for the rotational part of the partition function may be obtained, depending upon whether a finite or an infinite number of rotational levels is used (refs. 13 and 17). The first alternative was used in reference 21 to obtain data for CH. These data are given herein. The second alternative was used to calculate the thermodynamic data for O_2 and HF in this report. It is felt that the considerable spectroscopic data available for these molecules justify the use of this method.

The formulas used for O₂ and HF are exactly those of reference 13 and thus are not repeated herein.

Closed form for rotation and vibration. - By a further expansion of the anharmonic and the vibration-rotation interaction terms, a closed form of the partition function may be obtained for vibration as well as for rotation.

This treatment leads to the following form of the partition function, which is similar to those given in references 14 and 19 for $m = 1$:

$$Q^m = (Q_e Q_V Q_R Q_a Q_{RV} Q_\rho Q_\theta)^m \quad (8)$$

The quantities Q_e , Q_V , and Q_R are the electronic, harmonic-oscillator, and classical-rotation contributions, respectively, as given in standard texts (see refs. 12, 15, 16, and 17). The remaining quantities Q_a , Q_{RV} , Q_ρ , and Q_θ are correction factors for anharmonicity, vibration-rotation interaction, rotational stretching, and low-temperature rigid rotation, respectively, as given by references such as 14, 17, and 19.

With the exception of H₂, CH, O₂, and HF, which were discussed previously, a partition function of the form of equation (8) was used for the remaining gaseous molecules considered in this report. The detailed expressions for the quantities in equation (8) that were used to calculate the partition function for most of these remaining molecules are given in appendix B. Those molecules for which any expression used was different from those of appendix B are discussed in the following paragraphs.

For those diatomic hydrides with a ground state of $^2\Pi$, the rotational partition function should be modified to account for the effect of split rotational levels. Data for CH were taken from reference 21 as discussed previously, and the data for OH, SH, and SiH were taken from reference 9. Techniques used in interpolating and extrapolating these data are discussed in appendix C.

For the polyatomic molecules CO₂, COS, CS₂, ClCN, HCN, H₂O, H₂S, NO₂, N₂O, and SO₂, the method described in reference 19 was used. This method uses equation (8) for the partition function but includes higher-order corrections for the individual correction factors than are given in appendix B. Further details are given in reference 22.

For some of the polyatomic molecules, some or all of the correction factors as given in equation (8) were included; for CF₂, CF₄, CH₄, and ClO₂, corrections included Q_a and Q_θ ; for C₂N₂ and NH₃, corrections included Q_ρ and Q_θ ; for C₂H₂, all of the corrections were included.

The thermodynamic properties calculated for the remaining polyatomic gaseous molecules given herein were based on the assumption of harmonic oscillation and classical rotation only. Also, excited states were not considered for any of the polyatomic molecules. In this case, the partition function given by equations (7) and (8) reduces to

$$Q = Q^1 = (Q_e Q_V Q_R)^1 \quad (9)$$

Contributions of higher electronic states. - Considerable spectroscopic data exist for excited electronic states of diatomic molecules (e.g., refs. 16 and 23). An excited state was omitted from the calculations, however, if either ω_e or B_e for the state was not available or if the state was so high above the ground state that its contribution would be negligible. In some cases, even when excited-state data were available and their contribution to thermodynamic functions was not negligible, the data were not used if equation (8) was considered to be a poor representation of the excited-state partition function. Equation (8) can give poor results when the potential-energy curve of the excited state is shallow and the fundamental frequency is low or the anharmonic constant is large. As an example, consider the Cl_2 molecule. The following table compares specific-heat values for Cl_2 obtained from data for one state with that for two states (excited-state data from ref. 16):

| Temperature, T, °K | Heat capacity at constant pressure, C_p^0 , cal/mole °K | |
|--------------------------|--------------------------------------------------------------------|------------|
| | One state | Two states |
| 298.15 | 8.1116 | 8.1116 |
| 1000 | 8.9615 | 8.9510 |
| 3000 | 9.2999 | 9.9543 |
| 4000 | 9.4281 | 13.2094 |
| 5000 | 9.5536 | 17.9621 |

For Cl_2 at high temperatures specific-heat data are unreasonably high when obtained by means of equation (8) for two states.

In table I, which represents molecular data for diatomic molecules, excited-state data are given only if they were used in the calculations. Table II presents polyatomic molecular data for the ground state only, inasmuch as excited states were not included in the calculations for polyatomic molecules.

Internal Partition Function for Monatomic Gases

For monatomic molecules, the internal energy consists of electronic energy only, and thus the internal partition function is given by

$$Q = \sum_{m=1}^L g_m e^{-\epsilon_m/kT} \quad (10)$$

where g_m and ϵ_m are the statistical weight and electronic energy of the m^{th} state, respectively. This partition function diverges if all possible energy states are included because there is an infinite number of bound states that are theoretically possible below the ionization limit ($L = \infty$), and while the exponential factor in equation (10) approaches a finite limit, the statistical weight g_m increases without limit.

Various schemes have been used to overcome this difficulty in the calculation of the partition function. The simplest method is to use a fixed number of terms in the series of equation (10), as was done in the case of lithium in reference 1, where energy levels for principal quantum numbers of 2 and 3 only were used. A fixed number of terms is also used in references such as 4 or 24. The rationalization for this method is, as pointed out in reference 24, that below some temperature (for example, 5000° to $10,000^\circ$ K) the first few terms give approximately the same answer as the first hundred. The higher terms can be omitted on the arguments that at ordinary densities the high levels would not exist because of interference of adjacent atoms, and that at low densities it is more probable that an electron is free rather than in a high level.

Another simple method is to halt the summation where the binding energies are of the order of kT (ref. 25). The justification is that collisions involving an atom, the outer electron of which is bound with less than kT energy, will likely result in the release of the electron. The higher the temperature, the fewer the number of higher levels that the electron is permitted to occupy.

Other methods exist that consider volume or density as well as temperature in the calculation of the partition function. References 26 and 27, for example, are early works using a covolume equation of state for the calculation of the properties of hydrogen. In reference 28, this method is used for the calculation of the properties of lithium. With this method, the gas is no longer ideal, but rather an imperfect gas with thermodynamic properties that depend on both temperature and pressure.

The consideration of the effect of volume on the calculation of monatomic properties is perhaps more rigorous than the methods that use a fixed number of levels or a varying number of levels depending on temperature only. The covolume method was not used for this report, however, since only one set of tables of the ideal gas properties was desired for each substance. The method used herein was the temperature-dependent cutoff technique of reference 25. The values of the energy levels used were taken from reference 29 and include the additions or corrections to these values given in references 30 and 31.

For 16 of the 18 elements considered herein, the thermodynamic properties of the monatomic gases for the temperatures tabulated are the same, to at least two or three significant figures, whether calculated

with a fixed number of terms or a varying number depending on temperature. The two exceptions are lithium and sodium. Compared with the data in reference 4, the data herein agree to about 4000° K for lithium and to about 3000° K for sodium and then become increasingly different as the temperature increases. The following table for C_p° illustrates the difference:

| Temperature, °K | Li | | Na | |
|--------------------|-------------|--------------------|-------------|--------------------|
| | Reference 4 | This investigation | Reference 4 | This investigation |
| 3000 | 5.209 | 5.209 | 5.089 | 5.088 |
| 4000 | 5.818 | 5.813 | 5.604 | 5.564 |
| 5000 | 6.886 | 6.717 | 7.147 | 6.546 |
| 6000 | 8.787 | 7.940 | 10.716 | 8.098 |

THERMODYNAMIC FUNCTIONS OF CONDENSED SUBSTANCES

Thermodynamic functions are given for the following condensed substances: (1) the elements Li, Be, B, C, Na, Mg, Al, Si, P, and S and (2) the compounds Li_2O , $LiOH$, LiF , $LiCl$, BeO , B_2O_3 , BN , MgO , MgF_2 , Al_2O_3 , and AlF_3 .

For a few of these substances, C_p° , $H_T^{\circ} - H_O^{\circ}$, and S_T° were all taken from the literature for all or part of the temperature range tabulated herein. In most cases, however, C_p° data were integrated to obtain enthalpy and entropy. The C_p° data either were the only data available, or were derived from enthalpy data, or were estimated.

Two methods of integration were used. For low temperatures (between the limits of 0° and approximately 5° to 50° K), one of the following equations was used:

$$C_p^{\circ} = AT^n \quad (11)$$

$$C_p^{\circ} = AT + BT^3 \quad (12)$$

(In eq. (11), the value of n for different substances varied from 2 to 3.) Values of $H_T^{\circ} - H_O^{\circ}$ and S_T° above these initial temperatures were obtained by the second integration method, which analytically fitted a quadratic equation to each set of three successive points (i.e., the first three points and then the second, third, and fourth points, etc.). Each equation was used to calculate enthalpy and entropy increments between the first pair of points in each set. Detailed discussion of the

treatment of data for individual substances is given in appendix C.

DISCUSSION OF TABLES

Tables I and II contain the molecular constants used to calculate thermodynamic functions for the diatomic and the polyatomic gases, respectively. Table III contains the thermodynamic properties of the 210 gaseous and condensed species from 0° to 6000° K. Table IV is a summary of heats of formation at 0° and 298.15° K. Table V lists temperature coefficients for polynomial equations (given subsequently) representing the thermodynamic functions. Each kind of data will be discussed in detail.

Molecular Constants

Molecular constants of diatomic gases are given in table I, of polyatomic gases assumed to be harmonic oscillators in table II(a), and of polyatomic gases with anharmonic constants in table II(b). When available, these constants were taken from the literature; otherwise, the constants were estimated.

Estimation techniques. - Two general techniques were used to estimate molecular constants when they were not available. These are (1) estimation based on known data of the molecule and (2) estimation based on trends evidenced in similar molecules.

Some of the ways that missing constants were estimated from known data of the molecule are

- (1) Using the Birge-Sponer linear extrapolation equation (ref. 32):

$$D_0^o = \frac{\omega_e^2}{4\omega_e x_e} - \frac{1}{2} \omega_e \quad (13)$$

- (2) Assuming the proportionality of upper-state to lower-state data (ref. 16):

$$\frac{\omega_e''}{B_e''} = \frac{\omega_e'}{B_e'} \quad (14)$$

$$\frac{\omega_0'' x_0''}{\omega_0''} = \frac{\omega_0' x_0'}{\omega_0'} \quad (15)$$

$$\frac{\alpha_e''}{B_e''} = \frac{\alpha_e'}{B_e'} \quad (16)$$

- (3) Using relations involving vibrational, rotational, and correction constants (ref. 16):

$$\alpha_e = \frac{6\sqrt{\omega_e x_e B_e^3}}{\omega_e} - \frac{6B_e^2}{\omega_e} \quad (17)$$

$$D_e = \frac{4B_e^3}{\omega_e^2} \quad (18)$$

$$\omega_e = \nu + 2\omega_e x_e \quad (19)$$

The trends apparent in molecules with similar structures or with the same atoms include the following:

- (1) The variation of ω_e or α_e/B_e with atomic number
- (2) The variation of force constants with interatomic distances or ionization potentials
- (3) The approximate equality of frequencies or structural parameters (bond lengths and angles) in molecules containing the same atoms

Specific estimating techniques for individual species are given in appendix C and in the footnotes to tables I and II.

Adjustment for isotopes. - The spectroscopic constants of the diatomic molecules were adjusted for the presence of the more abundant isotopes. If the constants for the isotopic molecules were not available, these constants were calculated according to the methods described in reference 16 (pp. 141 to 144). The abundances were taken from reference 33. When it was necessary to estimate the constants, no adjustment was made.

Most of the spectroscopic constants for the polyatomic molecules were not adjusted for the presence of isotopes. Occasionally, adjustments were made when separate data for the isotopic molecules were available. The atomic weights (ref. 34) used in the calculation of the molecular weights and the moments of inertia were based on the assumption of an isotopic mixture of the elements.

Moments of inertia. - When the rotational constants A_e , B_e , and C_e were not available from spectroscopic data, they were calculated from the principal moments of inertia I_A , I_B , and I_C by means of the usual definitions; for example,

$$B_e = \frac{h}{8\pi^2 c I_B} = \frac{2.79889 \times 10^{-39}}{I_B} \quad (\text{cm}^{-1}) \quad (20)$$

The principal moments of inertia about the center of mass were calculated with the atoms assumed to be at their equilibrium positions. For most molecules, the center of mass and the principal axes are easily located from considerations of symmetry. For diatomic molecules, for example,

$$I_B = \mu r_e^2 \quad (21)$$

where μ is the reduced mass and r_e is the equilibrium interatomic distance.

In some cases, however, the molecules are unsymmetric or otherwise structurally complex. The calculation of the moments of inertia was simplified by the method described in reference 35, which was programmed for an IBM 7090 computer. Any convenient set of orthogonal axes may be chosen. The program then calculates the moments of inertia and the products of inertia, corrected for displacement of the coordinate system from the center of mass. The symmetric matrix, the diagonal elements of which are the moments of inertia and the off-diagonal elements of which are the products of inertia, was diagonalized to obtain the principal moments.

A systematic technique was employed to minimize the necessary input to the moments-of-inertia program. General equations were derived for each atom coordinate in terms of the corresponding bond lengths and angles. Incorporating these equations into the moments-of-inertia program reduced the input to bond lengths and angles. This technique minimized hand calculations and eliminated consideration of symmetry. In addition to reducing the possibility of error, this method also facilitated the incorporation of refined structural data as they became available. The moments of inertia are listed together with the spectroscopic constants in table II(a).

Thermodynamic Properties

The thermodynamic properties C_p° , $H_T^\circ - H_0^\circ$, S_T° , $-(F_T^\circ - H_0^\circ)$, H_T° , $(\Delta H_T^\circ)_f$, $\log_{10} K_f$, ΔH_T° , and $\log_{10} K$, are given in table III. Data are tabulated at 100° intervals from 0° to 6000° K for the ideal gases. Data for the solids extend up to the melting point, or if the solid sublimates, usually to a temperature somewhat beyond the sublimation point. Data for the liquids are tabulated from the melting point to a temperature somewhat beyond the normal boiling point.

The thermodynamic functions C_p° , $H_T^\circ - H_0^\circ$, S_T° , and $-(F_T^\circ - H_0^\circ)$ have previously been discussed. The remaining quantities are discussed in

the following sections. Since the quantities involve assigned reference elements, a discussion of assigned reference elements is given first.

Assigned reference elements. - The assigned reference elements are the following: the inert gases, He, Ne, and Ar; the diatomic gases, H₂, N₂, O₂, F₂, and Cl₂; and the condensed elements, Li(c,l), Be(c,l), B(c,l), C(graphite), Na(c,l), Mg(c,l), Al(c,l), Si(c,l), P(c IV,c III,l), and S(c II,c I,l) where c is the crystal phase and l is the liquid phase. For the condensed elements with only one crystal phase, the indicated solid phase is the reference element up to the melting point, and the liquid phase is the reference element above the melting point. For phosphorus, the white crystal IV is the reference element up to 195.4° K, and the white crystal III is the reference element from 195.4° K to the melting point. For sulfur, the rhombic II crystal is the reference element up to 368.54° K, and the monoclinic I crystal is the reference element from 368.54° K to the melting point. When a reaction involves formation from condensed elements, the heat of formation and the logarithm of the equilibrium constant are given only in the temperature range in which functions for the condensed elements are tabulated.

Assigned enthalpy values. - For some applications (see ref. 36) it is convenient to combine sensible enthalpy and chemical energies into one numerical value. An arbitrary base may be adopted for assigning values to the enthalpy of the various substances, inasmuch as only differences in enthalpy are measurable. The arbitrary base selected in this report was a value of zero at 298.15° K for the assigned reference elements given in the previous section. This selection was made so that the H_{298.15}^o values of the various substances would be equal to their heats of formation from the assigned reference elements.

Heats of formation. - Two sets of values for heats of formation are given in table III: one set is for the formation of the various substances from elements in the assigned reference state (ΔH_{T}°)_f, and the other set is for the formation from elements in an atomic gas state ΔH_{T}° . For CO at 298.15° K, for example,

$$(\Delta H_{298.15}^{\circ})_f = (H_{298.15}^{\circ})_{CO(g)} - (H_{298.15}^{\circ})_{C(\text{graphite})} - \frac{1}{2} (H_{298.15}^{\circ})_{O_2(g)} \quad (22)$$

$$\Delta H_{298.15}^{\circ} = (H_{298.15}^{\circ})_{CO(g)} - (H_{298.15}^{\circ})_{C(g)} - (H_{298.15}^{\circ})_{O(g)} \quad (23)$$

For convenience, the heats of formation at 0° and 298.15° K are summarized in table IV.

For most molecules, heats of formation were obtained from experimental measurements reported in the literature. In some cases, the experimental values of heats of formation were obtained directly from reactions involving the reference elements or gaseous atoms. In other cases, they were obtained indirectly from thermochemical measurements involving the substance together with substances of known heats of formation. Experimental data appear in such forms as heats of formation, dissociation, vaporization, sublimation, fusion, polymerization, and solution. It was often necessary to correct the data from the reaction temperature to the convenient temperatures 298.15° or 0° K.

When heats of formation were not available from either direct or indirect measurements, they were estimated from related substances. Heats of formation were estimated, in general, by assuming that the same bonds in similar molecules have equal bond energies. The heat of formation of BOCl, for example, can be estimated by assuming that the B=O bond energy in BOCl is the same as that in BOF and that the B-Cl and the B-F bond energies are one-third of the heat of atomization of BCl₃ and BF₃, respectively. Therefore,

$$(\Delta H_T^{\circ})_{\text{BOCl}} = (\Delta H_T^{\circ})_{\text{BOF}} - \frac{1}{3} (\Delta H_T^{\circ})_{\text{BF}_3} + \frac{1}{3} (\Delta H_T^{\circ})_{\text{BCl}_3} \quad (24)$$

Specific techniques for estimation or calculation of heats of formation are discussed for individual molecules in appendix C.

Equilibrium constants. - Two sets of logarithms of the equilibrium constants for the two formation reactions discussed in the previous section are also listed in table III. The equilibrium constant K_f for formation from the assigned reference elements is obtained from the standard free-energy change by means of the equation

$$\log_{10} K_f = \frac{-\left(\Delta F_T^{\circ}\right)_f}{2.3025851 RT} \quad (25)$$

where, for example, for CO at 298.15° K,

$$\left(\Delta F_{298.15}^{\circ}\right)_f = \left(F_{298.15}^{\circ}\right)_{\text{CO}(g)} - \left(F_{298.15}^{\circ}\right)_{\text{C}(\text{graphite})} - \frac{1}{2} \left(F_{298.15}^{\circ}\right)_{\text{O}_2(g)} \quad (26)$$

Values of F_T° may be obtained from table III by means of the equation

$$F_T^{\circ} = H_T^{\circ} - TS_T^{\circ}$$

The equilibrium constant K , for formation from the atomic gases, is obtained from a similar equation:

$$\log_{10} K = \frac{-\Delta F_T^{\circ}}{2.3025851 RT} \quad (27)$$

where, for example, for CO at 298.15° K,

$$\Delta F_{298.15}^{\circ} = (F_{298.15}^{\circ})_{CO(g)} - (F_{298.15}^{\circ})_{C(g)} - (F_{298.15}^{\circ})_{O(g)} \quad (28)$$

Physical constants. - Atomic weights were taken from reference 34. The value of $R = 1.98726$ calories per mole per °K, which was used to convert equations (1) to (4) to dimensional form, and the constants used in the evaluation of the entropy constant were taken from reference 37.

The atomic weights, as well as R , are based on the chemical scale of natural oxygen, $O = 16.0000$. The more recent 1961 Table of Atomic Weights (ref. 38) is based on the exact weight of 12 for carbon 12. In the 1961 table, natural oxygen has an atomic weight of 15.9994, which implies a revised value of R of 1.98718 calories per mole per °K.

The 1961 atomic weights and the corresponding value of R of 1.98718 calories per mole per °K were not used herein because the calculation of the thermodynamic functions was essentially complete at the time the new weights became available; the effect on the thermodynamic functions is small (of the order of 0.004 percent).

Temperature Coefficients for Thermodynamic Functions

For some applications, the expression of thermodynamic data in functional form may be convenient. The program described in reference 36 for the calculation of equilibrium compositions and rocket performance, for example, uses thermodynamic data in functional form. Coefficients have been obtained and are presented in table V for the following polynomial equations in T :

$$\frac{C_p^{\circ}}{R} = a_1 + a_2 T + a_3 T^2 + a_4 T^3 + a_5 T^4 \quad (29)$$

$$\frac{H_T^{\circ}}{RT} = a_1 + \frac{a_2}{2} T + \frac{a_3}{3} T^2 + \frac{a_4}{4} T^3 + \frac{a_5}{5} T^4 + \frac{a_6}{T} \quad (30)$$

$$\frac{S_T^{\circ}}{R} = a_1 \ln T + a_2 T + \frac{a_3}{2} T^2 + \frac{a_4}{3} T^3 + \frac{a_5}{4} T^4 + a_7 \quad (31)$$

$$\frac{F_T^{\circ}}{RT} = a_1(1 - \ln T) - \frac{a_2}{2} T - \frac{a_3}{6} T^2 - \frac{a_4}{12} T^3 - \frac{a_5}{20} T^4 + \frac{a_6}{T} - a_7 \quad (32)$$

A set of coefficients was obtained for each of two temperature intervals, 300° to 1000° K and 1000° to 5000° K. Each set was forced to give the same values for the functions at the common point, 1000° K.

Except for a few atomic gases and condensed species, the coefficients were obtained by means of a simultaneous least-squares fit of C_p°/R , H_T°/RT , and S_T°/R , as described in reference 2. For the atomic gases, Ar, H, He, and Ne, $C_p^{\circ}/R = 2.5000$ for all temperatures tabulated and, therefore, $a_1 = 2.5000$ and $a_2 = a_3 = a_4 = a_5 = 0$. The least-squares method was not used to obtain coefficients for a temperature range over which a condensed substance had a constant or linear heat capacity.

Table V is the direct output of an IBM 7090 program. For this reason, the numerical parts of the chemical formulas are not printed as subscripts. In addition, in order to accommodate the chemical-equilibrium program of reference 36, numerical coefficients of 1 are also included, whereas in the conventional notation they are not. For example, $H_2O(g)$ appears in table V as H2O1(G). The values of the coefficients are given in floating-point notation, where the decimal number given by the first sign and the first eight digits is to be multiplied by 10 raised to the power of the sign and the two digits following the letter E; for example, -1.0000000E-03 is $-1.0000000 \times 10^{-3} = -0.001$. If the number or the exponent is positive, a blank, rather than a plus sign, is used. Some additional examples are as follows: -1.0000000E 03 is $-1.0000000 \times 10^3 = -1000.0$ and 1.0000000E 00 is $1.0000000 \times 10^0 = 1.0$.

Lewis Research Center
National Aeronautics and Space Administration
Cleveland, Ohio, March 22, 1963

APPENDIX A

SYMBOLS

| | |
|-----------------------|--------------------------------------------------------------------------------------------------|
| A_e, B_e, C_e | rotational constants corresponding to equilibrium separation of atoms, cm^{-1} |
| A_0, B_0, C_0 | rotational constants for lowest vibrational state, cm^{-1} |
| $a_i (i=1,2,\dots,7)$ | temperature coefficients for polynomial equations of thermodynamic functions |
| C_p^0 | heat capacity at constant pressure for standard state, cal/mole $^{\circ}\text{K}$ |
| c | velocity of light, 2.997930×10^{10} cm/sec; or crystal phase of chemical substance |
| c_2 | second radiation constant, hc/k , 1.43880 (cm)(deg) |
| D_e, D_v | spectroscopic constants for rotational stretching, cm^{-1} |
| D_T^0 | bond dissociation energy, cal/mole |
| D_0, D_{000} | rotational stretching constants for lowest vibrational state, cm^{-1} |
| D_0^0 | dissociation energy measured from lowest vibrational energy level ($v = 0$) |
| d_i | degeneracy associated with ν_i |
| F_e | spectroscopic constant for rotational stretching, cm^{-1} |
| F_T^0 | Gibbs free energy for standard state, cal/mole |
| $F_T^0 - H_0^0$ | sensible free energy for standard state, cal/mole |
| g | gas phase of substance |
| g_e | electronic statistical weight |
| g_{ii} | anharmonicity constant for doubly degenerate vibrations in linear molecules, cm^{-1} |
| H_e, H_v | spectroscopic constants for rotational stretching, cm^{-1} |
| H_T^0 | sum of sensible enthalpy and chemical energy at 0°K for standard state, cal/mole |

| | |
|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| H_0^0 | chemical energy at 0° K for standard state, cal/mole |
| $H_T^0 - H_0^0$ | sensible enthalpy for standard state, cal/mole |
| ΔH_T^0 | enthalpy change for formation of substance from elements in atomic gas state, cal/mole |
| $(\Delta H_T^0)_f$ | enthalpy change for formation of substance from elements in assigned reference state, cal/mole |
| $(\Delta H_T^0)_s$ | heat of sublimation, cal/mole |
| $(\Delta H_T^0)_v$ | heat of vaporization, cal/mole |
| h | Planck's constant, 6.62517×10^{-27} (erg)(sec) |
| I_A, I_B, I_C | principal moments of inertia, (g)(cm ²)/molecule |
| J | rotational quantum number |
| K | equilibrium constant for reaction of formation from elements in atomic gas state |
| K_f | equilibrium constant for reaction of formation from elements in assigned reference state |
| k | Boltzmann constant, 1.38044×10^{-16} erg/deg |
| $k_i, k_\delta/l^2, k_\delta/l_1 l_2, k_\Delta/l^2, k_\Delta/l_1 l_2$ | force constants, dynes/cm |
| l | liquid phase of substance; or bond length, cm |
| M | molecular weight based on chemical scale of natural oxygen |
| n | number of unique frequencies |
| p | partial pressure, atm |
| Q | internal partition function |
| Q_a | anharmonic correction factor to partition function |
| Q_e | electronic partition function |
| Q^m | internal partition function for m^{th} electronic state |
| Q_R | classical-rotation partition function |

| | |
|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Q_{RV} | vibration-rotation interaction correction factor to partition function |
| Q_V | harmonic-oscillator partition function |
| Q_θ | low-temperature rotational correction factor to partition function |
| Q_ρ | rotational-stretching correction factor to partition function |
| R | universal gas constant, 1.98726 cal/mole $^\circ\text{K}$ |
| r | internuclear distance, A |
| r_e | equilibrium internuclear distance, A |
| S_T° | entropy for standard state, cal/mole $^\circ\text{K}$ |
| T | temperature, $^\circ\text{K}$ |
| T_e | electronic energy transition between potential curve minimums of ground and excited state, cm^{-1} |
| T_0 | electronic excitation energy between lowest vibrational states ($v = 0$) of ground and excited state, cm^{-1} |
| u_i | $c_2\nu_i/T$ |
| v | vibrational quantum number |
| W_0 | Fermi resonance constant, cm^{-1} |
| $x_{ij}, y_{ijk}, x_{ll}, y_{333}^O, y_{ill}, z_{3333}$ | } anharmonicity constants for polyatomic molecules, cm^{-1} |
| | |
| α_e, α_i | vibration-rotation interaction constants for diatomic molecules, cm^{-1} |
| $\alpha_i^A, \alpha_i^B, \alpha_i^C$ | vibration-rotation interaction constants for polyatomic molecules, cm^{-1} |
| β_i | rotational-stretching - vibration interaction constant, cm^{-1} |
| γ_{ij} | vibration-rotation interaction constants, cm^{-1} |
| ν_i | observed fundamental frequency, cm^{-1} |

ρ rotational-stretching spectroscopic constant, $^{\circ}\text{K}^{-1}$
 σ symmetry number
 ω_e zero-order vibrational frequency for diatomic molecule,
 cm^{-1}

$\omega_e x_e, \omega_e y_e, \omega_e z_e$ anharmonicity constants for diatomic molecules, cm^{-1}

$$\omega_0 = \omega_e - \omega_e x_e + \frac{3}{4} \omega_e y_e + \frac{1}{2} \omega_e z_e$$

$$\omega_0 x_0 = \omega_e x_e - \frac{3}{2} \omega_e y_e - \frac{3}{2} \omega_e z_e$$

Superscripts:

' upper electronic state

" lower electronic state

APPENDIX B

PARTITION FUNCTIONS AND THEIR DERIVATIVES FOR
DIATOMIC AND POLYATOMIC MOLECULES

The general form of the partition function used for most of the gases considered herein is given by equation (8), which is repeated for convenience:

$$Q^m = (Q_e Q_V Q_R Q_a Q_{RV} Q_\rho Q_\theta)^m \quad (8)$$

The first three factors Q_e , Q_V , and Q_R are finite quantities. The other four factors in equation (8) are actually nonconvergent infinite series, but for the practical purpose of numerical evaluation they must be terminated at some point. For Q_θ , four terms are used. The series for any one of the remaining three factors can be represented by Q_ϕ as follows:

$$Q_\phi = 1 + \phi + \frac{\phi^2}{2} + \frac{\phi^3}{6} + \dots + R_n \quad (B1)$$

where R_n contains the remaining terms (not all of them simple powers of ϕ).

From equation (B1), Q_ϕ may be approximated as

$$\left. \begin{array}{l} Q_\phi = e^\phi \\ \ln Q_\phi = \phi \end{array} \right\} \quad \text{or} \quad (B2)$$

The form of the partition function in (B2) is used herein for Q_a , Q_{RV} , and Q_ρ , inasmuch as it is a better approximation to equation (B1) than a truncated form of equation (B1), such as

$$Q_\phi = 1 + \phi + \frac{\phi^2}{2} \quad (B3)$$

Detailed expressions for the seven factors in equation (8) and their derivatives are given as follows:

Electronic partition function:

$$Q_e = g_e \exp\left(\frac{-c_2 T_0}{T}\right) \quad (B4)$$

$$T \frac{d(\ln Q_e)}{dT} = \frac{c_2 T_0}{T} \quad (B5)$$

$$T^2 \frac{d^2(\ln Q_e)}{dT^2} = \frac{-2c_2 T_0}{T} \quad (B6)$$

where

g_e electronic statistical weight

$c_2 = hc/k = 1.43880 \text{ (cm)(deg)}$

T_0 excitation energy, cm^{-1}

Harmonic oscillator partition function:

$$Q_V = \prod_{i=1}^n \left(1 - e^{-u_i}\right)^{-d_i} \quad (B7)$$

$$T \frac{d(\ln Q_V)}{dT} = \sum_{i=1}^n \frac{d_i u_i}{e^{u_i} - 1} \quad (B8)$$

$$T^2 \frac{d^2(\ln Q_V)}{dT^2} = \sum_{i=1}^n \frac{d_i u_i^2 e^{u_i}}{(e^{u_i} - 1)^2} - 2T \frac{d(\ln Q_V)}{dT} \quad (B9)$$

where

n number of unique frequencies

d_i degeneracy

$u_i = c_2 \nu_i / T$

For diatomic molecules ($n = 1$), ν_1 is calculated from the relation

$$\nu_1 = \omega_e - 2\omega_e x_e + 3.25 \omega_e y_e + 5\omega_e z_e \quad (B10)$$

Classical-rotator partition function for diatomic and linear polyatomic molecules:

$$Q_R = \frac{T}{c_2 B_0} \quad (B11)$$

$$T \frac{d(\ln Q_R)}{dT} = 1 \quad (\text{B12})$$

$$T^2 \frac{d^2(\ln Q_R)}{dT^2} = -1 \quad (\text{B13})$$

where

$$B_0 = B_e - \frac{\alpha_1}{2} + \frac{\alpha_2}{4} + \frac{\alpha_3}{8}$$

(Note that α_1 and α_2 are given as α_e and γ_e in ref. 16.)

Classical-rotator partition function for nonlinear polyatomic molecules:

$$Q_R = \left(\frac{T}{c_2}\right)^{3/2} \left(\frac{\pi}{A_0 B_0 C_0}\right)^{1/2} \frac{1}{\sigma} \quad (\text{B14})$$

$$T \frac{d(\ln Q_R)}{dT} = \frac{3}{2} \quad (\text{B15})$$

$$T^2 \frac{d^2(\ln Q_R)}{dT^2} = -\frac{3}{2} \quad (\text{B16})$$

where

σ symmetry number

$$A_0 = A_e - \frac{1}{2} \sum_{i=1}^n d_i \alpha_i^A$$

$$B_0 = B_e - \frac{1}{2} \sum_{i=1}^n d_i \alpha_i^B$$

$$C_0 = C_e - \frac{1}{2} \sum_{i=1}^n d_i \alpha_i^C$$

Anharmonic correction factor:

$$\ln Q_a = \sum_{i \leq j}^n \frac{d_i (d_j + \delta_{ij}) X_{ij}}{(e^{u_i} - 1)(e^{u_j} - 1)} \quad (\text{B17})$$

$$T \frac{d(\ln Q_a)}{dT} = \sum_{i < j}^n \frac{d_i(d_j + \delta_{ij})X_{ij}}{(e^{u_i} - 1)(e^{u_j} - 1)} \left(\frac{u_i e^{u_i}}{e^{u_i} - 1} + \frac{u_j e^{u_j}}{e^{u_j} - 1} - 1 \right) \quad (B18)$$

$$T^2 \frac{d^2(\ln Q_a)}{dT^2} = \sum_{i < j}^n \frac{d_i(d_j + \delta_{ij})X_{ij}}{(e^{u_i} - 1)(e^{u_j} - 1)} \left[\frac{2u_i^2 e^{2u_i}}{(e^{u_i} - 1)^2} + \frac{2u_i u_j e^{u_i} e^{u_j}}{(e^{u_i} - 1)(e^{u_j} - 1)} \right. \\ \left. + \frac{2u_j^2 e^{2u_j}}{(e^{u_j} - 1)^2} - \frac{u_i e^{u_i}(u_i + 4)}{e^{u_i} - 1} - \frac{u_j e^{u_j}(u_j + 4)}{e^{u_j} - 1} + 2 \right] \quad (B19)$$

where

$$\delta_{ij} = \begin{cases} 0 & \text{for } i \neq j \\ 1 & \text{for } i = j \end{cases}$$

For polyatomic molecules,

$$X_{ii} = \frac{-c_2}{T} \left(x_{ii} + \frac{g_{ii} + B_0}{3} \right)$$

which was derived in reference 14 ($g_{ii} + B_0 = 0$ for $d_i \neq 2$), and

$$X_{ij} = \frac{-c_2 X_{ij}}{T}$$

(Note that the g_{ii} appearing in the expression for X_{ii} is the one generally given by the spectroscopist in which the $-B_1^2$ term is included in the expression for $G_0(v_1, v_2, \dots)$. See footnote 5 of ref. 14 and p. 371 of ref. 12.)

For diatomic molecules ($i = j = 1$), X_{11} is analogous to $(c_2/T)\omega_e x_e$. When the higher-order anharmonic constants $\omega_e y_e$ and $\omega_e z_e$ are available, an adjusted value for the first-order anharmonicity in equations (B17) to (B19) can be obtained, by defining X_{11} to be

$$X_{11} = \frac{c_2}{T} (\omega_e x_e)^* = \frac{c_2}{T} (\omega_e x_e - 4.5 \omega_e y_e - 14.5 \omega_e z_e) \quad (B20)$$

Equation (B20) was derived to give an adjusted value $(\omega_{ex_e})^*$ so that for the vibrational levels $v = 1$ and 2 the same frequencies for $G_0(v)$ in equation (6) are obtained with ω_e and $(\omega_{ex_e})^*$ as with ω_e , ω_{ex_e} , ω_{ey_e} , and ω_{ez_e} .

Vibration-rotation interaction factor:

$$\ln Q_{RV} = \sum_{i=1}^n \frac{d_i r_i}{e^{u_i} - 1} \quad (B21)$$

$$T \frac{d(\ln Q_{RV})}{dT} = \sum_{i=1}^n \frac{d_i r_i u_i e^{u_i}}{(e^{u_i} - 1)^2} \quad (B22)$$

$$T^2 \frac{d^2(\ln Q_{RV})}{dT^2} = \sum_{i=1}^n \frac{d_i r_i u_i e^{u_i}}{(e^{u_i} - 1)^2} \left(\frac{2u_i e^{u_i}}{e^{u_i} - 1} - u_i - 2 \right) \quad (B23)$$

For diatomic molecules,

$$r_1 = b_1 + b_1^2$$

For linear polyatomic molecules,

$$r_i = b_i + b_i^2$$

For nonlinear molecules,

$$r_i = \frac{a_i + b_i + c_i}{2} + \frac{a_i^2 + b_i^2 + c_i^2}{4} + \frac{(a_i + b_i + c_i)^2}{8}$$

where

$$a_i = \alpha_i^A / A_0$$

$$b_i = \alpha_i^B / B_0$$

$$c_i = \alpha_i^C / C_0$$

For diatomic molecules, α_1^B is obtained from

$$\alpha_1^B = \alpha_1 - 2\alpha_2 - 3.25 \alpha_3 \quad (\text{B24})$$

Analogously with equation (B20) for anharmonicities, equation (B24) was derived to give an adjusted value for the first-order vibration-rotation interaction term α_1^B so that for the vibrational levels $v = 0$ and 1, the same B_v values are obtained from equation (6) with B_e and α_1^B as with B_e , α_1 , α_2 , and α_3 (B_v is the coefficient of $J(J+1)$ in eq. (6)).

Rotational-stretching correction factor:

$$\ln Q_\rho = \rho T \quad (\text{B25})$$

$$T \frac{d(\ln Q_\rho)}{dT} = \rho T \quad (\text{B26})$$

$$T^2 \frac{d^2(\ln Q_\rho)}{dT^2} = 0 \quad (\text{B27})$$

For diatomic and linear polyatomic molecules,

$$\rho = \frac{2D}{c_2 B_0^2}$$

where

$$D = \begin{cases} D_e + \frac{\beta_1}{2} + \frac{\beta_2}{4} + \frac{\beta_3}{8} & \text{for diatomic molecules} \\ D_{000} & \text{for linear polyatomic molecules} \end{cases}$$

For nonlinear molecules, ρ is taken directly from the literature.

Low-temperature rigid-rotator correction factor:

$$\ln Q_\theta = \frac{\theta_1}{T} + \frac{\theta_2}{T^2} + \frac{\theta_3}{T^3} \quad (\text{B28})$$

$$T \frac{d(\ln Q_\theta)}{dT} = -\frac{\theta_1}{T} - \frac{2\theta_2}{T^2} - \frac{3\theta_3}{T^3} \quad (\text{B29})$$

$$T^2 \frac{d^2(\ln Q_\theta)}{dT^2} = \frac{2\theta_1}{T} + \frac{6\theta_2}{T^2} + \frac{12\theta_3}{T^3} \quad (\text{B30})$$

For diatomic and linear polyatomic molecules,

$$\begin{aligned} \theta_1 &= \frac{c_2 B_0}{3} \\ \theta_2 &= \frac{(c_2 B_0)^2}{15} \\ \theta_3 &= \frac{4(c_2 B_0)^3}{315} \end{aligned}$$

For nonlinear molecules,

$$\begin{aligned} \theta_1 &= \frac{c_2}{12} \left[2(A_0 + B_0 + C_0) - \frac{A_0 B_0}{C_0} - \frac{A_0 B_0}{B_0} - \frac{B_0 C_0}{A_0} \right] \\ \theta_2 &= \frac{c_2^2}{480} \left[10(A_0^2 + B_0^2 + C_0^2) + 12(A_0 B_0 + B_0 C_0 + A_0 C_0) \right. \\ &\quad \left. - 12 \left(\frac{A_0^2 B_0 + A_0 B_0^2}{C_0} + \frac{B_0^2 C_0 + B_0 C_0^2}{A_0} + \frac{A_0^2 C_0 + A_0 C_0^2}{B_0} \right) \right. \\ &\quad \left. + 7 \left(\frac{A_0^2 B_0^2}{C_0^2} + \frac{A_0^2 C_0^2}{B_0^2} + \frac{B_0^2 C_0^2}{A_0^2} \right) \right] \end{aligned}$$

(The θ_3/T^3 term was ignored for nonlinear molecules.)

APPENDIX C

DISCUSSION OF PARTICULAR SUBSTANCES

Special treatments of data for particular substances are described herein. These details provide further explanation of the tables and of certain discussions in the text. The following three general areas are included:

- (1) Smoothing, interpolation, or extrapolation of thermodynamic functions for condensed substances and a few gases
- (2) Estimation techniques to obtain vibrational frequencies and structural parameters
- (3) Estimation techniques to obtain heats of formation or details involved in the indirect calculation of heats of formation, (including, when needed, heats of formation not given in table IV)

Al (Crystal, Liquid)

Heat-capacity data for the crystal were taken from a curve drawn to follow closely the data of reference 39 from 15° to 290° K and reference 40 from 340° to 932° K, the melting point. See page 8 for discussion of integration for enthalpy and entropy.

The heat of fusion, 2570 calories per mole, and the constant heat capacity of the liquid, 7 calories per mole per °K, were taken from reference 40.

AlCl₃ (Gas)

The frequency ν_3 was taken from reference 41. The remaining frequencies were obtained by using equations (II,210), (II,211), and (II,212) in reference 12 with some estimated force constant relations obtained from the boron trihalides. The constants k_8/l^2 , k_Δ/l^2 , and k_1 were calculated from ν_3 and from the assumptions that $k_8/l^2 = (1/25)k_1$ (ref. 41) and $k_\Delta/l^2 = (1/10)k_1$. Thus, $k_1 = 2.476 \times 10^5$ dynes per centimeter, $k_8/l^2 = 0.0990 \times 10^5$ dynes per centimeter, and $k_\Delta/l^2 = 0.2476 \times 10^5$ dynes per centimeter.

A plane symmetrical structure was assumed (ref. 41). The bond length $r = 2.14$ A was estimated from AlCl.

AlF₃ (Gas)

The frequencies were estimated by using equations (II,210), (II,211), and (II,212) in reference 12. The force constant k_1 was assumed to be in the same ratio to the AlF force constant as the force constant of AlCl₃ is to that of AlCl. The same relations between this stretching constant and the bending force constants assumed for the AlCl₃ molecule were assumed for AlF₃. Thus $k_1 = 5 \times 10^5$ dynes per centimeter, $k_8/l^2 = 0.2 \times 10^5$ dynes per centimeter, and $k_{\Delta}/l^2 = 0.5 \times 10^5$ dynes per centimeter.

A plane symmetrical structure was assumed. The bond length $r = 1.7$ A was estimated from AlF.

The heat of formation was calculated from the heat of sublimation.

AlF₃ (α , β)

Below 300° K, the heat capacity was taken from reference 42, and the enthalpy and entropy increments were obtained by the analytical method described on page 8. From 400° to the transition point, 727° K, C_p° , $H_T^{\circ} - H_O^{\circ}$, and S_T° were derived from the enthalpy equation for the alpha phase of reference 43. The heat-capacity data from these two references join smoothly.

For the beta phase (above 727° K), C_p° , $H_T^{\circ} - H_O^{\circ}$, and S_T° were also obtained from the appropriate enthalpy equation of reference 43.

Al₂O (Gas)

The Al-O bond length, 1.6 A, was estimated from the diatomic molecule, AlO. The AlOAl bond angle, 110°, was estimated by reference 44.

Al₂O₂ (Gas)

A planar ring structure was assumed (ref. 44). The Al-O bond length, 1.6 A, and the AlOAl bond angle, 110°, were considered to be the same as the estimates for Al₂O.

Al₂O₃ (Crystal, Liquid)

For the solid, C_p° , $H_T^{\circ} - H_O^{\circ}$, and S_T° at temperatures up to 1200° K were taken directly from reference 45. The C_p° data join smoothly to those calculated from the heat-capacity equation given in reference 46. Above 1200° K to the melting point, 2318° K, C_p° , $H_T^{\circ} - H_O^{\circ}$, and S_T° were calculated from the heat-capacity equation of reference 46 and the

associated enthalpy and entropy equations.

The heat of fusion, 26,000 calories per mole, was taken from reference 47.

For the liquid, a constant heat capacity, 35 calories per mole per °K, was estimated for temperatures up to 6000° K.

AlOCl (Gas)

The frequencies were estimated by using equations (II,198), (II,199), and (II,200) of reference 12. The stretching force constants k_1 and k_2 were assumed to be the same as the AlCl_3 and AlO constants, respectively. By comparison with other molecules, $k_8/l_1l_2 \approx 0.03(k_1k_2)^{1/2}$; thus, $k_1 = 2.5 \times 10^5$ dynes per centimeter, $k_2 = 5.5 \times 10^5$ dynes per centimeter, and $k_8/l_1l_2 = 0.11 \times 10^5$ dynes per centimeter.

The structure was assumed to be linear with $r(\text{Al-Cl}) = 2.14$ A from the AlCl_3 molecule and $r(\text{Al-O}) = 1.62$ A from AlO .

The heat of formation was calculated from estimated bond dissociation energies:

$$D_{298}^{\circ}(\text{Cl-AlO}) \approx \frac{1}{3} D_{298}^{\circ}(\text{AlCl}_3) = 102 \text{ kcal/mole}$$

$$D_{298}^{\circ}(\text{ClAl=O}) \approx D_{298}^{\circ}(\text{AlOF}) - \frac{1}{3} D_{298}^{\circ}(\text{AlF}_3) = 156 \text{ kcal/mole}$$

AlOF (Gas)

The frequencies were estimated by using equations (II,198), (II,199), and (II,200) in reference 12. The stretching force constants k_1 and k_2 were assumed to be the same as the AlF_3 and AlO constants, respectively. By comparison with other molecules, $k_8/l_1l_2 \approx 0.03(k_1k_2)^{1/2}$; thus, $k_1 = 5.0 \times 10^5$ dynes per centimeter, $k_2 = 5.5 \times 10^5$ dynes per centimeter, and $k_8/l_1l_2 = 0.16 \times 10^5$ dynes per centimeter.

The structure was assumed to be linear with $r(\text{Al-F}) = 1.7$ A from the AlF_3 molecule and $r(\text{Al-O}) = 1.62$ A from AlO .

B (Amorphous, Liquid)

At temperatures up to 300° K, C_p° , $H_f^{\circ} - H_0^{\circ}$, and S_f° were taken from reference 48 and in the range 300° to 1000° K, from reference 49. From 1100° to 2379° K, the calculated transition point, the heat capacities calculated in reference 49 from a Debye-Einstein equation were used.

The $H_T^{\circ} - H_O^{\circ}$ values were converted to $H_T^{\circ}(\text{amorphous}) - H_O^{\circ}(c)$ by use of the heats of formation of B(c) and B(amorphous) from reference 50. Enthalpy and entropy increments at temperatures above 1000° K were obtained by integration as described on page 8.

The free-energy data for the amorphous and the liquid phases imply a transition point at 2379° K and a heat of transition of 4918.5 calories per mole.

For the heat capacity of the liquid, the estimate of 7.5 calories per mole per $^{\circ}$ K taken from reference 51 was used from 2379° to 6000° K.

B (Crystal, Liquid)

At temperatures up to 300° K, C_p° , $H_T^{\circ} - H_O^{\circ}$, and S_T° were taken from reference 48, and in the range 300° to 1100° K, from reference 49. From 1400° to 2313° K, the melting point (ref. 50), heat capacities calculated in reference 49 from a Debye-Einstein equation were used. Heat-capacity data from 1100° to 1400° K were obtained from a curve joining the heat-capacity data selected for the other temperature ranges. Enthalpy and entropy increments above 1100° K were obtained by integration as described on page 8.

The heat of fusion, 5319.9 calories per mole, was calculated from the estimate of entropy of fusion, 2.3 calories per mole per $^{\circ}$ K, given in reference 51.

The estimate of 7.5 calories per mole per $^{\circ}$ K for the heat capacity of the liquid was taken from reference 51.

BCl_2 (Gas)

Frequencies were taken from corresponding BCl_3 frequencies. The bond angle was assumed to be 120° , since the bond angles of NO_2 and NO_3^- , SO_2 and SO_3 , and BCl_3 are all 120° . The B-Cl bond length, 1.73 A, was also assumed the same as that in BCl_3 .

The heat of formation was estimated from the average bond energy of BCl_3 , $D_0^{\circ}(B-Cl) = 105.4$ kilocalories per mole.

BF_2 (Gas)

Frequencies and structure were estimated from BF_3 in a manner analogous to that described for BCl_2 .

The bond angle and the bond length were thus estimated to be 120° and 1.295 A, respectively.

The heat of formation was estimated from the average bond energy of BF_3 , $D_0^\circ(\text{B-F}) = 152.8$ kilocalories per mole.

BFCl (Gas)

The frequencies were estimated to be the geometric mean of the corresponding BCl_2 and BF_2 frequencies. (This estimation method using CO_2 and CS_2 frequencies yields frequencies for COS in good agreement with spectroscopic measurements.)

The bond angle and the bond lengths were taken from BF_2 and BCl_2 .

The heat of formation was estimated from the average bond energies for BF_2 and BCl_2 .

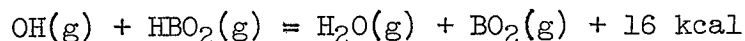
BN (Crystal)

At temperatures below 300°K , C_p° , $H_T^\circ - H_0^\circ$, and S_T° were taken from reference 52. From 350° to 1650°K , C_p° was taken from reference 53.

Since C_p° is constant between 1450° and 1650°K , this value was assumed to apply up to 6000°K . Above 300°K , enthalpy and entropy increments were obtained by integration as described on page 8.

BO_2 (Gas)

The heat of formation was calculated from the following room-temperature reaction reported by reference 54:



B_2O_3 (Gas)

Frequencies were taken from reference 55. Of two possible values given for ν_4 , the higher value was chosen arbitrarily.

Reference 55 suggests a C_{2v} (symmetry group) structure with an apex angle between 95° and 150° . An intermediate angle of 120° was used herein.

B_2O_3 (Glass, Liquid)

From 298.15° to 500°K , C_p° , $H_T^\circ - H_{298}^\circ$, and S_T° for the glass phase were obtained from equation (1) of reference 56. A constant value of C_p° of 30.45 calories per mole per $^\circ\text{K}$ for the liquid was assumed from

560° to 6000° K. This value is given by equation (2) of reference 56 for temperatures from 900° to 1800° K and is almost exactly that given by reference 57 for temperatures from 560° to 625° K.

Reference 57 shows that heat capacity has a rapid rise and a peak in the temperature range of about 500° to 560° K that is due to the change in the material from a glass to a liquid. Heat capacities in this range were so selected as to integrate numerically to an enthalpy value of 1564.7 calories per mole and at the same time to have a similar rapid increase and peak as the data of reference 57. The value of $H_{560}^{\circ} - H_{500}^{\circ} = 1564.7$ calories per mole was obtained from the difference of $H_{560}^{\circ} - H_{298}^{\circ}$ and $H_{500}^{\circ} - H_{298}^{\circ}$ given by equations (2) and (1), respectively, of reference 56.

The values of $(H_T^{\circ} - H_{298.15}^{\circ})(\text{glass})$ were converted to $H_T^{\circ}(\text{glass}) - H_0^{\circ}(\text{c})$ by adding the value of $H_{298.15}^{\circ}(\text{glass}) - H_0^{\circ}(\text{c}) = 6578.3$ calories per mole. This value was obtained from $(H_{298.15}^{\circ} - H_0^{\circ})(\text{c}) = 2218.3$ calories per mole (ref. 58) and $H_{298.15}^{\circ}(\text{glass}) - H_{298.15}^{\circ}(\text{c}) = 4360$ calories per mole (ref. 56).

The derived value for entropy at 298.15° K is 18.64 calories per mole per °K compared with the value of 18.9 given in reference 56.

B₂O₃ (Crystal, Liquid)

A heat-capacity curve drawn through the data of references 56 and 58 showed that the values from reference 58 in the range from 100° to 300° K joined smoothly with those from reference 56 in the range from 400° to 723.15° K. From 100° to 300° K, C_p° , $H_T^{\circ} - H_0^{\circ}$, and S_T° were taken from reference 58. From 300° to 400° K, the enthalpy and entropy increments were obtained by the analytical method described on page 8. From 400° to 723.15° K, C_p° and increments of enthalpy and entropy were derived from equation (1) of reference 56.

The implied heat of fusion and the entropy of fusion are 5626.7 calories per mole and 7.781 calories per mole per °K, respectively, compared with the values of 5270 calories per mole and 7.3 calories per mole per °K, respectively, given in reference 56.

BOCl (Gas)

The bending frequency was assumed to be the average of the bending frequencies of the isoelectronic molecules, COS and ClCN. The two stretching frequencies were obtained from estimated force constants by using equations (II,198) and (II,199) of reference 12. The force constant, $k_2(\text{B=O}) = 13.86 \times 10^5$ dynes per centimeter, is taken from B₂O₂ in reference 55. The force constant $k_1(\text{B-Cl})$ is expected to be slightly larger than the constant for BCl₃ (4.63×10^5 dynes/cm, ref. 12) and was taken to be 4.8×10^5 dynes per centimeter.

The structure was assumed to be linear with bond lengths, $r(\text{B-Cl}) = 1.73 \text{ \AA}$ from BCl_3 and $r(\text{B=O}) = 1.2 \text{ \AA}$ from HOBO.

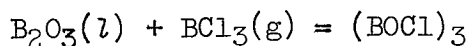
The heat of formation was estimated from average bond energies. From BCl_3 , $D_0^\circ(\text{B-Cl}) = 105.4$ kilocalories per mole; an average $D_0^\circ(\text{B=O}) = 204$ kilocalories per mole was calculated from HOBO by using H_3BO_3 data for the B-O bond and from BOF.

(BOCl)₃ (Gas)

Five frequencies were taken from the Raman spectrum measurements of reference 333. The remaining frequencies were taken either from similar molecules (refs. 333 and 334) or from molecules assumed to have similar frequencies.

The structure was assumed to be analogous to $(\text{HBO}_2)_3$ with $r(\text{B-O}) = 1.36 \text{ \AA}$ from $(\text{HBO}_2)_3$ and $r(\text{B-Cl}) = 1.73 \text{ \AA}$ from BCl_3 .

The equilibrium study of the reaction



yielded a heat of formation of -396.7 kilocalories per mole at 298.15° K (information received from J. A. Blauer of Rocket Power, Inc.).

BOF (Gas)

The frequencies were estimated in a manner similar to that for BOCl. The bending frequency was estimated to be the average of the HOBO estimate and an estimate for the isoelectronic molecule, FCN ($\nu_2 = 450 \text{ cm}^{-1}$). The force constant, $k_1(\text{B-F}) = 9 \times 10^5$ dynes per centimeter, is slightly larger than the constant for BF_3 (8.83×10^5 dynes/cm in ref. 12).

The structure is assumed to be linear with $r(\text{B-F}) = 1.295 \text{ \AA}$ from BF_3 and $r(\text{B=O}) = 1.2 \text{ \AA}$ from HOBO.

(BOF)₃ (Gas)

Five frequencies were taken from reference 334; four of these frequencies were obtained from infrared measurements. The remaining frequencies were taken either from similar molecules (ref. 333) or from molecules assumed to have similar frequencies.

The structure was assumed to be analogous to that of $(\text{HBO}_2)_3$ with $r(\text{B-O}) = 1.36 \text{ \AA}$ from $(\text{HBO}_2)_3$ and $r(\text{B-F}) = 1.30 \text{ \AA}$ from BF_3 .

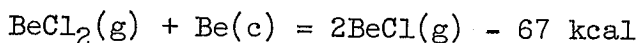
Be (Crystal, Liquid)

The heat-capacity data for the crystal were obtained from a smooth curve drawn to follow closely the data of reference 59 from 5° to 300° K, reference 60 from 400° to 900° K, and reference 61 from 900° to 1560° K, the melting point. A discussion of integration for enthalpy and entropy is on page 8.

The heat of fusion, 3520 calories per mole, was taken from reference 61. The constant heat-capacity value of 7.2 calories per mole per °K for the liquid was estimated from the enthalpy data of reference 61.

BeCl (Gas)

The heat of formation was obtained from the following reaction at a temperature of 1500° K:



This heat of reaction is reported by reference 303 as a preliminary value.

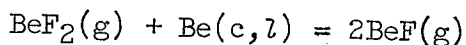
BeCl₂ (Gas)

The frequency ν_1 was estimated by using equation (II,195) of reference 12 and the force constant, $k_1(\text{Be-Cl}) = 2.9 \times 10^5$ dynes per centimeter, given in reference 62.

The heat of formation was calculated from the heat of sublimation, 34±1 kilocalories per mole, in the range of 496° to 578° K (ref. 63). The correction of the heat of sublimation to 298.15° K is 0.3 kilocalorie per mole, which is less than the uncertainty in the heat of sublimation and was therefore omitted. The heat of formation of the crystal given in reference 64 is $(\Delta H_{298.15}^{\circ})_f = -118.03$ kilocalorie per mole.

BeF (Gas)

A molecular flow effusion study was made of the reaction



that yielded thermodynamic second- and third-law heats of formation at 298.15° K of -48.3 and -50.9 kilocalories per mole (information received from R. E. Yates of Rocket Power, Inc.). These values were averaged to give -49.6 kilocalories per mole.

BeF₂ (Gas)

The frequency ν_1 was estimated by using equation (II,195) of reference 12 and the force constant, $k_1 = 5.0 \times 10^5$ dynes per centimeter, given in reference 62.

BeFCl (Gas)

The frequencies were estimated by using equations (II,198), (II,199), and (II,200) from reference 12 and the force constants for BeF₂ and BeCl₂ given in reference 62. The force constant, $k_8 = 1.13 \times 10^{11}$ dyne centimeter, was estimated to be the average of the values of k_8 for BeF₂ and BeCl₂.

The $r(\text{Be-Cl})$ and $r(\text{Be-F})$ bond distances were assumed to be the same as those given in reference 65 for BeCl₂ and BeF₂: $r(\text{Be-Cl}) = 1.75$ A and $r(\text{Be-F}) = 1.40$ A.

The heat of formation was estimated to be the average of the values for BeCl₂ and BeF₂.

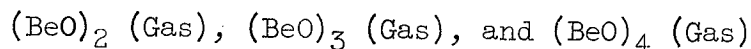
BeO (Crystal, Liquid)

A heat-capacity curve was faired through the three sets of data reported in the following three references: reference 66 (55.5° to 292.4° K), reference 67 (500° to 700° K), and reference 68 (1200° to the melting point, 2843° K, ref. 69). The heat-capacity data of reference 66 were taken directly, and enthalpy and entropy increments were obtained by the analytical integration technique described on page 8. The enthalpy data of reference 67 from 374° to 1175° K were fitted by the method of least squares to an equation of the form

$$H_T^{\circ} - H_0^{\circ} = \frac{a_1}{T} + a_2 + a_3 T + a_4 T^2$$

Enthalpy from this equation and the heat capacity and the entropy calculated from the corresponding equations were taken in the range of 500° to 700° K. The high-temperature heat capacity was calculated from the equation given in reference 68. The heat capacities at the intermediate temperatures were read from the curve, and enthalpy and entropy increments were obtained analytically.

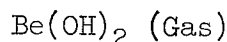
For the liquid, C_p° was estimated to be constant at 15 calories per mole per °K. The heat of fusion, 17,058 calories per mole, was calculated from an entropy of fusion, $\Delta S_{2843}^{\circ} = 6$ calories per mole per °K, as suggested in reference 70 for polyatomic molecules.



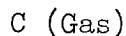
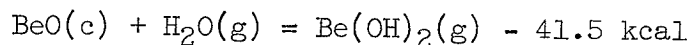
The frequencies for these polymers are the approximate estimates of references 4 (Dec. 31, 1960) and 5.

Also, the planar cyclic structures with $r(\text{Be-O}) = 1.63 \text{ \AA}$ assumed by these references were used herein.

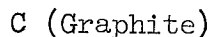
The heats of formation were calculated from the following heats of vaporization at 2150°K reported by reference 71: 172 ± 8 , 161 ± 6 , and 177 ± 8 kilocalories per mole for $(\text{BeO})_2$, $(\text{BeO})_3$, and $(\text{BeO})_4$, respectively.



The heat of formation was obtained from the following reaction at 1400°K reported in reference 72:



The heat of formation was calculated from the dissociation energy of CO given in reference 73, $D_0^\circ = 256.176$ kilocalories per mole.



Heat-capacity data were taken from a curve drawn to follow closely the data from the following references: from 13° to 300°K , reference 74; from 300° to 1100°K , reference 75; from 1100° to 2100°K , reference 76; and from 2100° to 3200°K , reference 77. From 3200° to 4000°K the curve was extrapolated to an estimated value of 6.5 calories per mole per $^\circ\text{K}$ at 4000°K .

Values of $H_T^\circ - H_0^\circ$ and S_T° at temperatures up to 300°K were taken from reference 74. Above 300°K , enthalpy and entropy increments were obtained by integration as described on page 8.

Reference 78 suggests a method of including the effects of the anisotropy of graphite in the Debye extrapolation of the heat capacity at constant volume. This suggestion was not followed because of uncertainties in converting to C_p° at the higher temperatures.

Although data for the liquid are not included in this report, reference 79 reports a heat of fusion of 10,000 calories per mole at 4000°K .

CCl₄ (Gas)

A regular tetrahedral model was assumed with the bond length, $r(\text{C-Cl}) = 1.760 \text{ \AA}$, from reference 80.

CF₂ (Gas)

The frequency ν_3 was estimated by using equations (II,189), (II,190), and (II,191) of reference 12. The latter two equations and the values of ν_1 and ν_2 (ref. 81) were used to solve for the force constant necessary in solving equation (II,189) for ν_3 . Choosing an angle of at least 130° was necessary in order to obtain real solutions to these equations. The assumed angle of 130° gives 1440 cm^{-1} for ν_3 . The same value of ν_3 may be estimated from a correlation of CF₂ frequencies with those of NO₂. The following equation was used to estimate the anharmonic constants:

$$\frac{x_{ij}(\text{CF}_2)}{x_{ij}(\text{NO}_2)} = \frac{\nu_i \nu_j(\text{CF}_2)}{\nu_i \nu_j(\text{NO}_2)}$$

This relation is usually used for estimating the anharmonicities of an isotopically substituted species (see eq. (II,307) of ref. 12). The spectroscopic constants of NO₂ were used in this case because of the similarity of the two molecules.

The C-F bond length, 1.30 \AA , was estimated from the structures of other molecules.

The heat of formation, -30 kilocalories per mole, is taken from reference 82. This value implies a C=C bond dissociation energy in C₂F₄ of 93 kilocalories per mole, which is lower than the C=C bond values of 142 kilocalories per mole in C₂H₄ and 149 kilocalories per mole in C₂Cl₄ (quoted in ref. 82). The suggested heat of formation of -46 kilocalories per mole in reference 4 implies the much lower C=C bond value in C₂F₄ of 60 kilocalories per mole.

CF₃ (Gas)

The frequencies ν_1 , ν_3 , and ν_4 were estimated by averaging corresponding frequencies in CF₂ and CF₄. The remaining frequency ν_2 was estimated to be an average of the BF₃ and COF₂ bending frequencies.

The molecule was assumed to be planar with a C-F bond length of 1.30 \AA , which was estimated from the structures of other molecules.

The statistical weight was assumed to be 2.

CF₄ (Gas)

Anharmonicities were calculated from the observed frequencies and band assignments given in reference 83. Since many more bands were observed than were necessary, the values obtained could vary, depending on the bands chosen to obtain the constants. In this case, the simpler combination bands were, in general, preferred; for example, $2\nu_4$ was chosen in preference to $3\nu_4$ to evaluate x_{44} .

CH (Gas)

Thermodynamic functions were taken directly from reference 21. Of the two sets of data given, the set including the $^4\Sigma^-$ state was used. It was necessary to subtract the entropy of nuclear spin, $R \ln 2 = 1.3775$ calories per mole per $^\circ\text{K}$, from the values of S_T° .

CH₂ (Gas)

Of the two most probable bending frequencies observed (1362 and 1114 cm^{-1} from ref. 84), the value of 1362 cm^{-1} was used because it was closer to the estimated value, 1480 cm^{-1} , of reference 84.

The bond dissociation energy, $D_0^\circ(\text{CH}_2\text{-H}) = 86.49$ kilocalories per mole, was taken from reference 85.

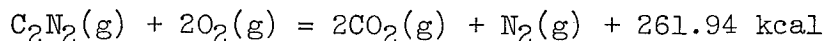
CH₃ (Gas)

The bending frequency ν_2 was taken from reference 86. The other frequencies were estimated from the frequencies of CH₂.

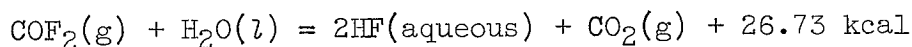
The heat of formation was calculated from the bond dissociation energy, $D_0^\circ(\text{CH}_3\text{-H}) = 101.9$ kilocalories per mole, reported in reference 85.

C₂N₂ (Gas)

The heat of formation was obtained from the following room-temperature reaction reported by reference 87:

COF₂ (Gas)

The heat of formation was inferred from the following room-temperature reaction (ref. 88):



where $(\Delta H_{298.15}^{\circ})_{\text{f, HF(aqueous)}} = -75.7$ kilocalories per mole and $(\Delta H_{298.15}^{\circ})_{\text{f, H}_2\text{O}(\text{l})} = -68.3174$ kilocalories per mole (ref. 50).

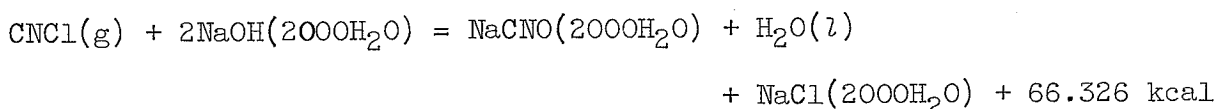
COFCl (Gas)

Interatomic distances and bond angles were estimated from the structures of COCl_2 and COF_2 . The structure was considered planar with the C=O, C-Cl, and C-F bonds and the angle ClCF equal to 1.17 Å, 1.746 Å, 1.32 Å, and 112° , respectively.

The heat of formation of COFCl was estimated to be the average of the values of COCl_2 and COF_2 .

ClCN (Gas)

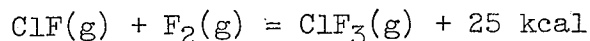
The heat of formation was obtained from the following room-temperature reaction (ref. 89):



where $(\Delta H_{298.15}^{\circ})_{\text{f, NaOH}(2000\text{H}_2\text{O})} = -112.162$ kilocalories per mole (ref. 50), $(\Delta H_{298.15}^{\circ})_{\text{f, NaCl}(2000\text{H}_2\text{O})} = -97.242$ kilocalories per mole (ref. 50), $(\Delta H_{298.15}^{\circ})_{\text{f, H}_2\text{O}(\text{l})} = -68.3174$ kilocalories per mole (ref. 50), and $(\Delta H_{298.15}^{\circ})_{\text{f, NaCNO}(2000\text{H}_2\text{O})} = -93.45$ kilocalories per mole (ref. 89).

ClF₃ (Gas)

The heat of formation was obtained from the following heat of reaction at 573° K reported by reference 90:

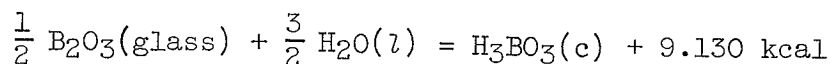


H₂ (Gas)

Thermodynamic functions at temperatures up to 5000° K were taken directly from reference 8. The data of reference 1 were used from 5000° to 6000° K and were adjusted to coincide with reference 8 at 5000° K.

H₃BO₃ (Gas)

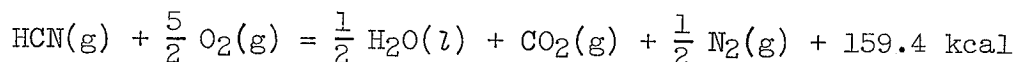
The heat of formation was obtained from the following room-temperature reaction (ref. 91):



where $(\Delta H_{298.15}^{\circ})_{\text{f}, \text{H}_2\text{O}(\text{l})} = -68.3174$ kilocalories per mole (ref. 50). The heat of sublimation $(\Delta H_{413}^{\circ})_{\text{s}, \text{H}_3\text{BO}_3}$ is 23.43 kilocalories per mole (ref. 92).

HCN (Gas)

The heat of formation was obtained from the heat of combustion at 298.15° K reported in reference 93:



where $(\Delta H_{298.15}^{\circ})_{\text{f}, \text{H}_2\text{O}(\text{l})} = -68.3174$ kilocalories per mole (ref. 50).

HCO (Gas)

The heat of formation was calculated from the dissociation energy $D_0^{\circ}(\text{HCO-H}) = 75.1$ kilocalories per mole (ref. 94).

HF (Gas)

Thermodynamic functions were calculated by using the method described in reference 13. (See section entitled "Closed form for rotation" in this report.) Vibrational energy was cut off after 20 levels.

The heat of formation given in reference 95, $(\Delta H_{298.15}^{\circ})_{\text{f}} = -64.4$ kilocalories per mole, and the heat of formation derived from the dissociation energy, $D_0^{\circ} = 135.15$ kilocalories per mole, given in reference 96 were averaged.

HS (Gas)

Thermodynamic functions for HS, OH, and SiH were taken from reference 9. In order to extrapolate the data from 5000° to 6000° K, a least-squares fit of the C_p° data between 3000° and 5000° K was made by using the equation

$$C_p^{\circ} = A + BT + \frac{C}{T^2}$$

This equation was integrated with respect to T and $\ln T$ in order to obtain enthalpy and entropy increments, respectively. Three-point Lagrangian interpolation was used to obtain data at temperatures not tabulated in reference 9.

Li (Crystal, Liquid)

Between 1.5° and 298.15° K, heat-capacity data were taken from a curve drawn to follow closely the data from reference 97 in the range from 1.5° to 20° K and from reference 98 in the range from 20° to 298.15° K. From 298.15° to 453.70° K, the melting point, an assumed linear equation for heat capacity was fitted to the enthalpy increment reported by reference 99 for this range.

The heat of fusion, 717.1 calories per mole, and the heat capacities from the melting point to 1200° K were taken from reference 99. The linear temperature dependence of heat capacities given in this reference for the range from 693° to 1173° K was assumed to apply up to 2500° K.

See page 8 for discussion of integration for enthalpy and entropy.

LiCl (Gas)

The rotational constant was calculated from the high estimate of the interatomic distance given by reference 100, $r = 2.022$ A. The high estimate for LiF in reference 100 compares well with the experimental value.

LiCl (Crystal, Liquid)

From 100° to 300° K, C_p° , $H_T^{\circ} - H_0^{\circ}$, and S_T° were taken from reference 101. From 400° to 883° K, C_p° , $H_T^{\circ} - H_0^{\circ}$, and S_T° were derived from equation (1) of reference 102. The heat-capacity data from these two references join smoothly.

For the liquid, a constant heat capacity of 15 calories per mole per $^{\circ}$ K, estimated from equation (2) of reference 102, was assumed up to 6000° K.

The heat of fusion, 4760 calories per mole, was taken from reference 103.

LiF (Crystal, Liquid)

Below 200° K, the heat-capacity data were taken from reference 104, and the enthalpy and entropy increments were obtained by the analytical method described on page 8. From 298.15° to the melting point of 1121.3° K, C_p^0 , $H_T^0 - H_0^0$, and S_T^0 were taken from reference 105. The heat-capacity data from these two references join smoothly.

The constant heat capacity, 15.51 calories per mole per °K, reported by reference 105 for the liquid from 1121.3° to 1200° K was assumed up to 6000° K. The heat of fusion, 6471.0 calories per mole, was taken from reference 105.

LiO (Gas)

Two possible ground-state assignments are suggested for LiO, the $^2\Pi$ state of OH and the $^2\Sigma$ state of Group III oxides. Since the halides and the hydrides of Groups I and III have the same ground-state configurations, a $^2\Sigma$ state was assumed for LiO and NaO. The interatomic distance, $r = 1.82$ A, was assumed to be the same as that for Li_2O . The values of ω_e and $\omega_e x_e$ were estimated from comparisons with other light-element diatomic molecules.

 Li_2O (Gas)

The frequencies were estimated according to equations (II,189), (II,190), and (II,191) of reference 12. The force constant k_1 was assumed to be the same as the LiO diatomic force constant, 3.14×10^5 dynes per centimeter, while the k_8/l^2 constant was estimated to be 0.65×10^5 dynes per centimeter by comparison with similar molecules (see table 40 of ref. 12).

The heat of formation was obtained from the heat of sublimation at 0° K, 106.1 ± 5 kilocalories per mole (ref. 106).

 Li_2O (Crystal, Liquid)

For the crystal, values of C_p^0 , $H_T^0 - H_0^0$, and S_T^0 were taken from reference 107 for temperatures from 100° to 300° K and from the equations in reference 108 for temperatures from 400° K to the melting point, 1700° K (ref. 109). The data from the two references join smoothly.

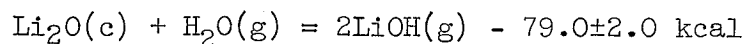
It was assumed that the entropy of fusion was equal to that of Na_2O , 8.4 calories per mole per °K (ref. 109), which gives an enthalpy of fusion of 14,280 calories per mole. The heat capacity for the liquid was estimated to be 21.5 calories per mole per °K.

LiOH (Gas)

The frequencies were estimated by taking an average of the two Li_2O stretching frequencies, an average of the two H_2O stretching frequencies, and an average of the bending frequencies of both the Li_2O and the H_2O molecules.

Bond lengths were assumed to be those of Li_2O and H_2O with an assumed bond angle of 105° .

The heat of formation was obtained from the following reaction reported by reference 110 at 1300°K :



LiOH (Crystal, Liquid)

Values of C_p° , $H_f^\circ - H_0^\circ$, and S_f° were taken from reference 111 for temperatures from 100° to 300°K and from the equations given in reference 108 for temperatures from 400° to 744.3°K , the melting point. The data from these two references join smoothly.

A heat of fusion of 5010 calories per mole was taken from reference 108.

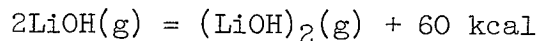
The constant value of heat capacity of the liquid, 20.74 calories per mole per $^\circ\text{K}$, given in reference 108 for temperatures to 900°K is assumed to apply to 6000°K .

 $(\text{LiOH})_2$ (Gas)

The frequencies and the structure were assigned according to the suggestions of reference 110. Six frequencies were taken from $(\text{LiF})_2$; the remaining O-H stretching and Li-OH bending frequencies are from the monomer, LiOH.

The trans configuration was assumed with the H atoms 60° above and below the plane.

The heat of formation was calculated from the heat of dimerization at 1300°K reported by reference 110:



Mg (Crystal, Liquid)

Heat-capacity data were taken from a curve drawn to follow closely

the data of reference 112 from 5° to 15° K, reference 113 from 15° to 298.15° K, reference 114 from 330° to 543° K, and reference 115 from 700° to 923° K, the melting point. The heat of fusion, 2140 calories per mole, was taken from reference 115. See page 8 for discussion of integration for enthalpy and entropy.

A constant heat capacity for the liquid of 8 calories per mole per °K was estimated for the range from 923° to 2500° K from the enthalpy data of reference 115 in the range 923° to 1100° K.

MgCl (Gas)

The interatomic distance, $r = 2.18$ A, was assumed to be the same as that in MgCl₂.

MgCl₂ (Gas)

The values of ν_2 and ν_3 were taken from reference 62; ν_1 was estimated by using equation (II,195) of reference 12 with the force constant, $k_1 = 1.9 \times 10^5$ dynes per centimeter, given in reference 62.

MgF₂ (Gas)

Frequencies were assumed to be in the same proportion to respective MgCl₂ frequencies as BeF₂ is to BeCl₂.

MgF₂ (Crystal, Liquid)

The heat-capacity data taken from reference 116 in the range from 54° to 246° K joined smoothly to the data calculated from the heat-capacity equation given in reference 40 for the range from 400° to the melting point, 1536° K. The heat capacities at 298.15° and 300° K were read from a plot of these data. From 0° to 300° K, enthalpy and entropy increments were obtained by the analytical method described on page 8. From 400° to 1536° K, C_p° and increments of enthalpy and entropy were derived from the equations of reference 40.

For the liquid, the enthalpy data of reference 117 in the range from 1539° to 1760° K were fitted by the method of least squares to the equation of a straight line. The resulting constant heat capacity, 22.664 calories per mole per °K, was assumed up to 6000° K.

From the crystal and the liquid enthalpy data, the implied heat of fusion is 13,884.0 calories per mole.

MgFCl (Gas)

The frequencies were estimated by taking an average of the two MgF_2 stretching frequencies, an average of the two MgCl_2 stretching frequencies, and an average of the bending frequencies of both the MgF_2 and the MgCl_2 molecules.

The bond lengths, $r(\text{Mg-F}) = 1.77 \text{ \AA}$ and $r(\text{Mg-Cl}) = 2.18 \text{ \AA}$, were taken from MgF_2 and MgCl_2 .

The heat of formation was estimated to be the average of the MgCl_2 and MgF_2 values.

MgO (Crystal)

A heat-capacity curve drawn through the data of reference 118 in the range from 20° to 300° K joined smoothly to the data calculated from the heat-capacity equation given in reference 40 in the range from 400° to 1500° K . Above 1500° K the heat-capacity curve was extrapolated to an estimated maximum value of 14.5 calories per mole per $^\circ \text{K}$ at 3000° K . From 0° to 300° K the enthalpy and entropy increments were obtained by the analytical method described on page 8. From 400° to 1500° K , C_p° and increments of enthalpy and entropy were derived from the equations of reference 40. From 1500° to 3000° K , values of C_p° were read from the curve and the enthalpy and entropy increments were obtained analytically.

MgOH (Gas)

One stretching frequency and the bending frequency were taken to be the same as the corresponding NaOH values. The remaining frequency was estimated to be $750 \pm 50 \text{ cm}^{-1}$ by examining the frequencies for NaO , NaF , NaOH , LiO , LiF , LiOH , BeO , BeF , BeF_2 , MgO , MgF , and MgF_2 .

Bond lengths were assumed to be those of MgO(c) (ref. 119) and $\text{H}_2\text{O(g)}$ with the bond angle taken to be 105° .

The heat of formation was obtained from the bond dissociation energy of MgOH reported by reference 120, $D_0^\circ(\text{Mg-OH}) = 56 \pm 5$ kilocalories per mole.

MgS (Gas)

The A state spectroscopic constants reported in reference 16 were assumed to be those for a $^1\Sigma$ ground state. The rotational constant was calculated from the estimated bond length, $r = 2.15 \text{ \AA}$, obtained from a correlation of force constants and internuclear distances in similar molecules.

NF (Gas)

The fundamental frequency was estimated to be the average of the stretching frequencies of NF_3 .

The interatomic distance, $r = 1.371 \text{ \AA}$, was assumed to be the same as the N-F bond length in NF_3 .

The dissociation energy was assumed to be one-third the heat of atomization of NF_3 .

 NF_2 (Gas)

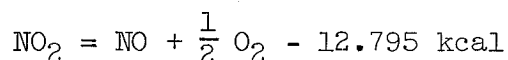
The heat of formation was obtained from the N_2F_4 dissociation energy, $D_{298.15}^{\circ}(\text{NF}_2-\text{NF}_2) = 20$ kilocalories per mole, which is an average value from references 121 and 122. The heat of formation of N_2F_4 was taken from reference 122, $(\Delta H_{298.15}^{\circ})_f = -2$ kilocalories per mole.

 N_2F_2 (Gas)

Rotational and vibrational data are for the chemically inactive trans isomer (ref. 123).

 NO_2 (Gas)

The heat of formation was calculated from the following reaction at 0°K reported by reference 124:

 N_2O_4 (Gas)

The heat of formation was calculated from the dissociation energy of N_2O_4 , $D_0^{\circ}(\text{NO}_2-\text{NO}_2) = 12.71$ kilocalories per mole. This value was obtained from a third-law treatment of the vapor-pressure data of reference 124 by using the free-energy data herein for NO_2 and N_2O_4 .

Na (Gas)

The heat of formation was computed from the equation

$$(\Delta H_{\text{O}}^{\circ})_{\text{f}} = -(\text{F}_{\text{T}}^{\circ} - \text{H}_{\text{O}}^{\circ})_{\text{Na(g)}} + \left(\text{F}_{\text{T}}^{\circ}_{\text{Na(l)}} - \text{H}_{\text{O}}^{\circ}_{\text{Na(c)}} \right) - RT \ln p_{\text{Na}}$$

Partial pressures of monatomic sodium were computed at the boiling points of 1154.61° and 896.6° K (ref. 125) corresponding to saturated pressures of 1.0 and 0.05 atmosphere, respectively. These values yielded an average heat of formation of 25.65 kilocalories per mole at 0° K.

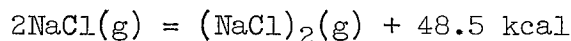
Na (Crystal, Liquid)

Heat-capacity data were taken from the following sources: from 1.5° to 20° K, reference 126; from 35° to 300° K, reference 127 (by using data from the highly pure cast sample); from 350° to 370.98° K (the melting point), reference 128. These data fit together smoothly.

The heat of fusion, 621.8 calories per mole, and heat capacities for the liquid between 370.98° and 1200° K were taken from reference 128. The C_p° curve was then graphically extrapolated. Enthalpy and entropy for the solid and the liquid were analytically integrated as described on page 8.

(NaCl)₂ (Gas)

The heat of formation was calculated from the heat of dimerization at 1000° K reported in reference 129:

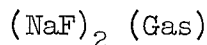


NaF (Gas)

The fundamental frequency ω_e was calculated from an estimated force constant by using equation (III,91) of reference 16. Force constants of the alkali halides were plotted against interatomic distance and against ionization potentials to obtain this estimate (see ref. 130).

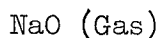
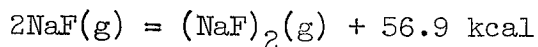
The rotation constant B_e was calculated from the interatomic distance, $r = 1.840$ A, given in reference 100. A plot of the values of α_e/B_e for the alkali halides obtained from reference 100 was used to obtain an estimate for α_e .

The heat of formation was calculated from an average heat of sublimation, 65.7 kilocalories per mole, at 298.15° K. This average is obtained from seven independent values, six of which are selected in reference 131 from a third-law treatment of the data, while the seventh is inferred from the dissociation energy measured in reference 132. The heat of formation of NaF(c), $(\Delta H_{298.15}^{\circ})_{\text{f}} = -136.3$ kilocalories per mole, was taken from reference 133.

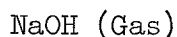


The bond length, $r(\text{Na-F}) = 2.02 \text{ \AA}$, was taken to be 10 percent higher than that of the monomer, since the LiF dimer distance is 10 percent greater than the monomer distance. The angles were considered equal to those of $(\text{LiF})_2$ since $(\text{LiCl})_2$ and $(\text{NaCl})_2$ have equal angles.

The heat of formation was calculated from the heat of dimerization at 1000° K reported in reference 129:



The ground state was assumed to be a ${}^2\Sigma$ state (see LiO (Gas)).

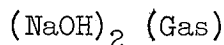


The frequency ν_1 was taken from reference 134, ν_3 was estimated to be the same as the corresponding LiOH frequency, and the bending frequency was estimated to be somewhat less than the LiOH frequency.

The structure is assumed to be analogous to LiOH . The Na-O bond length, 2.16 \AA , was estimated by using the following bond-length ratio:

$$\frac{r_{\text{NaOH}}(\text{Na-O})}{r_{\text{NaF}}(\text{Na-F})} = \frac{r_{\text{Li}_2\text{O}}(\text{Li-O})}{r_{\text{LiF}}(\text{Li-F})}$$

The heat of formation was calculated from the heat of sublimation reported by reference 135, $(\Delta H_{298.15}^\circ)_s = 46.4$ kilocalories per mole.

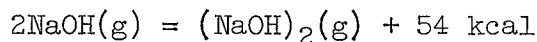


The frequencies and the structure were assigned by analogy to $(\text{LiOH})_2$. Six dimer frequencies are from $(\text{NaF})_2$; the remaining two, O-H stretching and Na-OH bending, are from the monomer.

The Na-O bond length ($r = 2.25 \text{ \AA}$) was estimated by using the following bond-length ratio:

$$\frac{r_{(\text{NaOH})_2}(\text{Na-O})}{r_{\text{NaOH}}(\text{Na-O})} = \frac{r_{(\text{LiOH})_2}(\text{Li-O})}{r_{\text{LiOH}}(\text{Li-O})}$$

The heat of formation was calculated from the heat of dimerization at 800° K reported in reference 136:



O_2 (Gas)

Thermodynamic functions were calculated by using the method described in reference 13 (see section entitled "Closed form for rotation" in this report). Vibrational energy was cut off at 41,260 cm^{-1} for all states except the $B^2\Sigma_u^-$ state, which was cut off at 57,127.5 cm^{-1} .

OH (Gas)

Thermodynamic functions were taken from reference 9. (See HS for interpolation and extrapolation techniques.)

P (Crystal, Liquid)

For the solid, heat capacities from 15° to 315° K were taken from reference 137. Values of $H_T^0 - H_0^0$ and S_T^0 up to 317.30° K, the melting point, were integrated from these data by the analytical method described on page 8.

The heat of fusion, 157.43 calories per mole, was taken from reference 137.

The heat capacity for the liquid at 320.15° K (ref. 137) was assumed to be constant from 317.30° to 2500° K.

PCl_3 (Gas)

The heat of formation of PCl_3 was obtained from the heat of formation of the liquid, $(\Delta H_{298.15}^0)_f = -79.4$ kilocalories per mole, reported in reference 138 and the heat of vaporization, $(\Delta H_{298.15}^0)_v = 7.78$ kilocalories per mole, reported in reference 50.

PF_3 (Gas)

The dissociation energy was calculated from an average bond energy given in reference 139, $D_0^0(\text{P-F}) = 117$ kilocalories per mole.

PH₃ (Gas)

The heat of formation was taken to be the average of two values, $(\Delta H_{298.15}^{\circ})_f = 1.3 \pm 0.4$ kilocalories per mole (ref. 140) and $(\Delta H_{298.15}^{\circ})_f = 2.21$ kilocalories per mole (ref. 50).

S (Gas)

The heat of formation was calculated from the dissociation energy of S₂, $D_0^{\circ} = 101$ kilocalories per mole (ref. 141).

S (Crystal, Liquid)

Heat capacities up to 300° K were taken from reference 142. Values of $H_T^{\circ} - H_0^{\circ}$ and S_T° up to 300° K were analytically integrated as described on page 8.

Values of C_p° , $H_T^{\circ} - H_{298.15}^{\circ}$, and $S_T^{\circ} - S_{298.15}^{\circ}$ from 400° to 700° K were interpolated from data given in reference 143. Reference 143 gives data at very close temperature intervals to show the effect of heat-capacity transitions occurring at 368.54°, 388.36° (the melting point), and 432.25° K.

The heat of fusion, 410.5 calories per mole, was taken from reference 143.

The heat capacity, 7.694 calories per mole per °K, given in reference 143 at the normal boiling point, 717.75° K, was assumed to be constant up to 2500° K.

SCl (Gas)

The vibrational frequency was estimated from SCl₂.

The interatomic distance, $r = 1.99$ A, was assumed to be the same as that in S₂Cl₂ and SCl₂.

The heat of formation was calculated from the heat of formation of S₂Cl₂ and from the bond energy, $D_{298.15}^{\circ}(S-S) = 69.1$ kilocalories per mole, assumed for S₂F₂.

SCl₂ (Gas)

A bond length of 1.99 A and a bond angle of 102° were selected from the data given in reference 119.

The heat of formation was calculated from the average free-energy change estimated from the following equilibrium-constant equation reported by reference 144 as a function of temperature:

$$\log_{10} \frac{p_{\text{SCl}_2}}{p_{\text{S}_2}^{1/2} p_{\text{Cl}_2}} = \frac{4478}{T} - 2.82 \quad (760^\circ \text{ K} < T < 1100^\circ \text{ K})$$

S₂Cl₂ (Gas)

A C₂ (symmetry group) configuration with the S-Cl bonds at right angles was assumed from reference 145. Average bond angles and lengths are from reference 119: r(S-Cl) = 1.99 Å, r(S-S) = 2.05 Å, and angle ClSS = 104°.

The heat of formation was calculated from the heat of formation of the liquid, (ΔH_{298.15}^o)_f = -14.4 kilocalories per mole (ref. 50), and the heat of vaporization, (ΔH_{411.2}^o)_v = 8.61 kilocalories per mole (ref. 50). The adjustment of the heat of vaporization at 411.2° K to 298.15° K was estimated to be 1.04 kilocalories per mole.

SF (Gas)

The vibrational frequency was estimated from SF₂.

The interatomic distance, r = 1.56 Å, was assumed to be the same as that in SF₆.

The dissociation energy, D_{298.15}^o(S-F) = 78 kilocalories per mole, was estimated to be one-sixth the total bond energies in SF₆.

SF₂ (Gas)

The frequencies were estimated from S-F group bending and stretching frequencies in SF₄, SF₆, and SO₂F₂.

A bond angle of 95° and a bond length of 1.56 Å are average values from SOF₂ and SO₂F₂.

The heat of formation was calculated from an average S-F bond energy, 78 kilocalories per mole at 298.15° K, estimated to be one-sixth the heat of atomization of SF₆.

SF₄ (Gas)

The heat of formation was calculated from an average S-F bond energy, 78 kilocalories per mole at 298.15° K, estimated to be one-sixth the heat of atomization of SF₆.

SF₆ (Gas)

The interatomic distance, $r(\text{S-F}) = 1.56 \text{ \AA}$, was assumed to be the same as the interatomic distance measured for S₂F₁₀ in an electron diffraction study reported in reference 146.

S₂F₂ (Gas)

The frequencies were estimated from corresponding frequencies of other molecules.

A C₂ (symmetry group) structure analogous to S₂Cl₂ was assumed with an S-F bond length of 1.56 Å.

The heat of formation was calculated from the S-S bond dissociation energy, $D_{298.15}^{\circ}(\text{FS-SF}) = 69.1$ kilocalories per mole, estimated from H₂S₂ as suggested by reference 6. Values of the heat of formation of liquid H₂S₂, $(\Delta H_{298.15}^{\circ})_f = -5.5$ kilocalories per mole, and heat of vaporization of liquid H₂S₂, $(\Delta H_{343.5}^{\circ})_v = 8.4$ kilocalories per mole, were taken from reference 50. In order to obtain the heat of formation of the gas at 298.15° K, heat capacities for the liquid and the gas, 29 and 18 calories per mole per °K, respectively, were estimated by the method described in reference 147. The S-F bond energy, 78 kilocalories per mole at 298.15° K, was estimated to be one-sixth the heat of atomization of SF₆.

SOCl (Gas)

The frequencies were estimated by taking the average stretching frequency of SO₂, the average stretching frequency of SCl₂, and the average bending frequency of both molecules.

The bond angle, 106°, and bond lengths, $r(\text{S-O}) = 1.45 \text{ \AA}$ and $r(\text{S-Cl}) = 2.07 \text{ \AA}$, were taken from the SOCl₂ structure given in reference 148.

The heat of formation was calculated from the S-Cl bond energy obtained by assuming both S-Cl bond energies in SOCl₂ to be equal (see

SOF (Gas)), that is, $D_{298.15}^{\circ}(\text{ClOS-Cl}) = 54.8$ kilocalories per mole.

SOCl₂ (Gas)

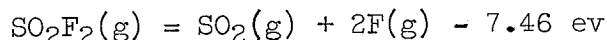
The heat of formation was obtained from the heat of formation of the liquid, $(\Delta H_{295.65}^{\circ})_f = 58.5$ kilocalories per mole (ref. 149), which was assumed to be the same at 298.15° K, the heat of vaporization, $(\Delta H_{348.9}^{\circ})_v = 7.41$ kilocalories per mole (ref. 50), and the heat capacity of the liquid, $C_p^{\circ} = 28.8$ calories per mole per °K (ref. 50).

SOF (Gas)

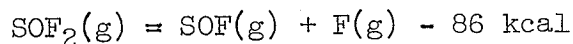
The frequencies were estimated from SO₂ and SF₂ according to the procedure described for SOCl.

The bond angle, 107°, and the bond length, $r(\text{S-O}) = 1.41$ Å, were taken to be the same as those reported for SOF₂ (ref. 150). The S-F bond length, 1.56 Å, was considered to be an average bond length from SOF₂ and SO₂F₂.

The heat of formation was calculated from an average S-F bond dissociation energy, $D_{298.15}^{\circ}(\text{FOS-F}) = 86$ kilocalories per mole, which was estimated from the following reaction obtained from ion appearance potential measurements of reference 151:



Both bond energies in SOF₂ were assumed to be equal, although it was suggested in reference 151 that the first bond may be 10 times stronger than the second. Based on the previous assumptions, the following heat of reaction was calculated at 298.15° K:



SOF₂ (Gas)

The heat of formation was calculated by assuming that the S=O bond energy was the same as that for SOCl₂, that is, $D_{298.15}^{\circ}(\text{F}_2\text{S=O}) = D_{298.15}^{\circ}(\text{Cl}_2\text{S=O}) = 104.8$ kilocalories per mole.

Si (Crystal, Liquid)

For the solid, heat capacities from 2.5° to 300° K were taken from reference 152 and from 400° to 1685° K (the melting point) they were computed from the following equation (ref. 153, eq. (4)):

$$C_p^{\circ} = 5.551 + 0.8785(10^{-3})T - \frac{0.90737(10^5)}{T^2}$$

The data from these two references join smoothly. Enthalpy and entropy were analytically integrated as described on page 8.

For the liquid, the enthalpy data of reference 154 in the range 1688° to 1825° K were fitted by the method of least squares to a linear equation:

$$H_T^{\circ}(l) - H_{298.15}^{\circ}(c) = 6.143 T + 10,334.8$$

This equation, which differs slightly from the equation in reference 154, was used to extrapolate the thermodynamic properties of liquid silicon up to 6000° K. The heat of fusion implied by the difference in enthalpy between solid and liquid at 1685° K is 12,031.6 calories per mole.

SiCl (Gas)

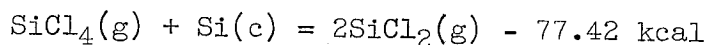
The interatomic distance, $r = 2.01$ A, for the ground state was assumed to be the same as the Si-Cl bond length in SiCl₄ (ref. 119).

SiCl₂ (Gas)

The frequencies were taken to be in the same proportion to the corresponding SiCl₄ frequencies as SiF₂ is to SiF₄.

An average bond length of 2.03 A and bond angle of 110° were taken from similar molecules (ref. 119).

The heat of formation was calculated from the heat of reaction obtained from a thermodynamic third-law treatment of the vapor-pressure data of reference 155:



A second-law treatment of the data supported this value of the heat of reaction. The corrected vapor-pressure data of reference 156 were also considered; however, while the third-law treatment of their data gave results in good agreement with those of reference 155, the second-law treatment gave values that differed significantly. The data of reference 155 were therefore preferred to those of reference 156.

SiF₂ (Gas)

The heat of formation was calculated from an estimated dissociation

energy of SiF_4 , $D_{298.15}^{\circ}(\text{SiF}_2-2\text{F}) = 298.2$ kilocalories per mole. This value was estimated by assuming the first three Si-F bond energies in SiF_4 to be equal and the last to be the SiF dissociation energy.

SiH (Gas)

Thermodynamic functions were taken from reference 9. See HS (Gas) for interpolation and extrapolation techniques.

SiO_2 (Gas)

The heat of formation was calculated from the heat of sublimation of α -quartz, $(\Delta H_{298.15}^{\circ})_s = 136 \pm 8$ kilocalories per mole (ref. 157), where the heat of formation of α -quartz was taken from reference 158, $(\Delta H_{298.15}^{\circ})_f = -217.74 \pm 0.33$ kilocalories per mole.

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TABLE I. - MOLECULAR CONSTANTS OF DIATOMIC GASES

[Numbers in braces were estimated by reference quoted; numbers in brackets were estimated for this report (see appendix C or indicated footnote).]

| Gas | Molecular weight | Symmetry number | Electronic state | Statistical weight | T_0 , cm ⁻¹ | ω_e , cm ⁻¹ | $\omega_e x_e$, cm ⁻¹ | $\omega_e y_e$, cm ⁻¹ | $\omega_e z_e$, cm ⁻¹ | E_e , cm ⁻¹ | α_1 , cm ⁻¹ | α_2 , cm ⁻¹ | α_3 , cm ⁻¹ | D_e , cm ⁻¹ | β_1 , cm ⁻¹ | β_2 , cm ⁻¹ | Reference | |
|-----------------|------------------|-----------------|----------------------------|--------------------|--------------------------|-------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|--------------------------|-------------------------------|-------------------------------|-------------------------------|---------------------------------------|------------------------------|------------------------------|---------------|-------|
| Al ₂ | 53.96 | 2 | X ¹ Σ | 1 | 0 | {278} | {1.76} | ----- | ----- | {0.194} | ^a [0.0016] | ----- | ----- | ^b [0.378]×10 ⁻⁶ | ----- | ----- | 159 | |
| AlCl | 62.437 | 1 | X ¹ Σ | 1 | 0 | 479.91 | 1.94 | ----- | ----- | .241 | .002 | ----- | ----- | ^b [.243] | ----- | ----- | 23 | |
| | | | a ³ Π | 2 | 24,542 | 522.83 | 2.162 | ----- | ----- | .249 | .002 | ----- | ----- | ^b [.226] | ----- | ----- | -- | |
| | | | a ³ Π | 2 | 24,615 | 522.83 | 2.162 | ----- | ----- | .249 | .002 | ----- | ----- | ^b [.226] | ----- | ----- | -- | |
| | | | a ³ Π | 2 | 24,680 | 522.83 | 2.162 | ----- | ----- | .249 | .002 | ----- | ----- | ^b [.226] | ----- | ----- | -- | |
| AlF | 45.98 | 1 | X ¹ Σ | 1 | 0 | 801.95 | 4.70 | ----- | ----- | .55228 | .00483 | ----- | ----- | .97 | ----- | ----- | 160, 161, 162 | |
| AlH | 27.988 | 1 | X ¹ Σ | 1 | 0 | 1682.498 | 29.088 | 0.2389 | ----- | 6.39023 | .18579 | 0.00161 | ----- | 357.02 | -5.73×10 ⁻⁶ | 0.282×10 ⁻⁶ | 163 | |
| AlO | 42.98 | 1 | X ² Σ | 2 | 0 | 979.15 | 6.97 | 0 | ----- | .64126 | .00580 | ----- | ----- | 1.08 | .02 | ----- | 164, 165 | |
| | | | A ² Σ | 2 | 20,635.18 | 869.98 | 3.52 | ----- | ----- | .60399 | .00447 | ----- | ----- | ----- | 1.16 | ----- | ----- | ----- |
| | | | B ² Π | 4 | 33,085 | 728.3 | 7.5 | ----- | ----- | .6026 | .0036 | ----- | ----- | ----- | ^b [1.65] | ----- | ----- | ----- |
| B ₂ | 21.64 | 2 | X ³ Σ | 3 | 0 | 1061.4 | 9.6 | ----- | ----- | 1.236 | .014 | ----- | ----- | ^b [6.70] | ----- | ----- | 16 | |
| | | | A ³ Σ | 3 | 30,518.1 | 946.4 | 2.7 | ----- | ----- | 1.183 | .011 | ----- | ----- | ----- | ^b [7.39] | ----- | ----- | -- |
| BCl | 46.277 | 1 | ¹ Σ | 1 | 0 | 843.90 | 5.17 | ----- | ----- | .6918 | .00658 | ----- | ----- | 1.76 | .07 | ----- | 166, 32 | |
| BF | 29.82 | 1 | X ¹ Σ | 1 | 0 | 1410.65 | 11.99 | .057 | ----- | 1.5293 | .0168 | -.00015 | ----- | 7 | ----- | ----- | 167 | |
| | | | A ¹ Π | 2 | 51,088.68 | 1272.64 | 12.68 | -.247 | ----- | 1.4381 | .0168 | -.00058 | ----- | 7 | ----- | ----- | ----- | ----- |
| BH | 11.828 | 1 | X ¹ Σ | 1 | 0 | 2368 | 49 | ----- | ----- | 12.037 | .413 | ----- | ----- | 1244 | -40 | ----- | 16 | |
| BN | 24.828 | 1 | X ³ Π | 6 | 0 | 1522.7 | 12.4 | ----- | ----- | 1.684 | .025 | ----- | ----- | ^b [8.24] | ----- | ----- | 168, 32 | |
| | | | A ³ Π | 6 | 27,775.8 | 1324.5 | 15.1 | ----- | ----- | 1.572 | .010 | ----- | ----- | ^b [8.86] | ----- | ----- | ----- | |
| BO | 26.82 | 1 | X ² Σ | 2 | 0 | 1896.32 | 11.945 | ----- | ----- | 1.8024 | .0169 | ----- | ----- | 6.47 | .02 | ----- | 169 | |
| | | | A ² Π | 4 | ^c 23,585.34 | 1267.81 | 11.285 | ----- | ----- | 1.4294 | .0199 | ----- | ----- | 7.26 | ----- | ----- | ----- | |
| | | | B ² Σ | 2 | 42,872.26 | 1288.91 | 10.78 | ----- | ----- | 1.5345 | .0214 | ----- | ----- | 8.7 | ----- | ----- | ----- | |
| BS | 42.866 | 1 | X ² Σ | 2 | 0 | 1188.16 | 6.40 | ----- | ----- | .80586 | .00618 | ----- | ----- | 1.44 | ----- | ----- | 170 | |
| | | | A ² $\Pi_{1/2}$ | 2 | 15,662.73 | 758.45 | 4.68 | ----- | ----- | .63151 | .00604 | ----- | ----- | ^b [1.75] | ----- | ----- | ----- | |
| | | | A ² $\Pi_{3/2}$ | 2 | 15,996.34 | 758.45 | 4.68 | ----- | ----- | .63151 | .00604 | ----- | ----- | ^b [1.75] | ----- | ----- | ----- | |
| | | | C ² $\Pi_{1/2}$ | 2 | 38,781.93 | 898.68 | 6.83 | ----- | ----- | .71223 | ^a [.00710] | ----- | ----- | ^b [1.79] | ----- | ----- | ----- | |
| | | | C ² $\Pi_{3/2}$ | 2 | 38,897.28 | 898.68 | 6.83 | ----- | ----- | .71223 | ^a [.00710] | ----- | ----- | ^b [1.79] | ----- | ----- | ----- | |
| BeCl | 44.470 | 1 | X ² Σ | 2 | 0 | 844.14 | 4.818 | ----- | ----- | {.8} | ^a [.007] | ----- | ----- | ^b [2.87] | ----- | ----- | 304, 16 | |
| | | | A ² Π | 4 | 27,959.5 | 821.66 | 5.482 | ----- | ----- | ^d [.8] | ^d [.007] | ----- | ----- | ^b [3.03] | ----- | ----- | ----- | |
| BeF | 28.013 | 1 | X ² Σ | 2 | 0 | 1265.61 | 9.234 | .02259 | ----- | 1.4877 | .01685 | ----- | ----- | 8.209 | ----- | ----- | 23, 171 | |
| | | | A ² Π | 4 | 33,187.21 | 1171.36 | 8.523 | -.00497 | ----- | 1.4187 | .0161 | ----- | ----- | 8.301 | ----- | ----- | ----- | |
| BeH | 10.021 | 1 | X ² Σ | 2 | 0 | 2058.5 | 35.5 | -.5 | ----- | 10.307 | .3 | ----- | ----- | 980 | ----- | ----- | 16 | |
| BeO | 25.013 | 1 | X ¹ Σ | 1 | 0 | 1487.256 | 11.8286 | .02235 | ----- | 1.6509 | .0190 | ----- | ----- | 8.197 | -.0096 | ----- | 16, 23 | |
| | | | A ¹ Π | 2 | 9,234.92 | 1144.186 | 8.4137 | .03389 | ----- | 1.3660 | .01628 | .000055 | ----- | 7.79 | -.044 | ----- | ----- | |
| | | | B ¹ Σ | 1 | 21,196.70 | 1370.755 | 7.7448 | -.00027 | ----- | 1.5757 | .0154 | ----- | ----- | 8.41 | -.07 | ----- | ----- | |
| | | | C ¹ Σ | 1 | 29,683.0 | 1081.5 | 9.1 | ----- | ----- | 1.308 | .010 | ----- | ----- | ^b [7.65] | ----- | ----- | ----- | |

^aApproximated by assuming relation in ref. 16,^bCalculated by assuming relation in ref. 16,^dConstants assumed to be same as for ground state.

$$p. 108: \alpha_e = \frac{6 \sqrt{\omega_e x_e B_e^3}}{\omega_e} - \frac{6 B_e^2}{\omega_e}$$

$$p. 107: D_e = 4 B_e^3 / \omega_e^2$$

^cCalculated from T_0 .

TABLE I. - Continued. MOLECULAR CONSTANTS OF DIATOMIC GASES

[Numbers in braces were estimated by reference quoted; numbers in brackets were estimated for this report (see appendix C or indicated footnote).]

| Gas | Molec-ular weight | Sym-metry num-ber | Elec-tronic state | Statis-tical weight | T_0 , cm ⁻¹ | ω_e , cm ⁻¹ | $\omega_e x_e$, cm ⁻¹ | $\omega_e y_e$, cm ⁻¹ | $\omega_e z_e$, cm ⁻¹ | B_e , cm ⁻¹ | α_1 , cm ⁻¹ | α_2 , cm ⁻¹ | α_3 , cm ⁻¹ | D_e , cm ⁻¹ | β_1 , cm ⁻¹ | β_2 , cm ⁻¹ | Reference | |
|-----------------------------|-------------------|-------------------|--------------------------------------|---------------------|--------------------------|-------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|--------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------------|------------------------------|------------------------------|--------------|-------|
| C ₂ | 24.022 | 2 | 1 Σ_g^- | 1 | 0 | 1854.83 | 14.07 | ----- | ----- | 1.8189 | 0.01830 | ----- | ----- | b[7.00]x10 ⁻⁶ | ----- | ----- | 16, 172, 173 | |
| | | | 3 Π_u | 6 | 610 | 1640.64 | 11.66 | ----- | ----- | 1.6312 | .01681 | ----- | ----- | 7.01 | -0.15x10 ⁻⁶ | ----- | ----- | |
| | | | 3 Σ_g^- | 3 | 6,243.5 | 1469.82 | 11.18 | .02 | ----- | ----- | 1.4972 | .01632 | ----- | ----- | b[6.21] | ----- | ----- | ----- |
| | | | 1 Π_u | 2 | 8,268.5 | 1607.64 | 12.13 | ----- | ----- | ----- | 1.6156 | .01718 | ----- | ----- | b[6.53] | ----- | ----- | ----- |
| CCl | 47.468 | 1 | X ² $\Pi_{1/2}$ | 2 | 0 | 874.1 | 4.6 | ----- | ----- | .6942 | .00669 | ----- | ----- | 1.87 | ----- | ----- | 174 | |
| | | | X ² $\Pi_{3/2}$ | 2 | 133.64 | 870.5 | 3.4 | ----- | ----- | ----- | .6942 | .00669 | ----- | ----- | 1.87 | ----- | ----- | --- |
| | | | B ² Δ | 4 | 36,003.92 | 863.6 | ----- | ----- | ----- | ----- | .70337 | ----- | ----- | ----- | 1.828 | ----- | ----- | --- |
| CF | 31.011 | 1 | X ² Π | 2 | 0 | 1308.1 | 10.85 | ----- | ----- | 1.4183 | .0190 | ----- | ----- | 6.7 | ----- | ----- | 175 | |
| | | | X ² Π | 2 | 77 | 1308.1 | 10.85 | ----- | ----- | ----- | 1.4183 | .0190 | ----- | ----- | 6.7 | ----- | ----- | --- |
| CH ^e | ----- | --- | --- | --- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | --- | |
| CN | 26.019 | 1 | X ² Σ | 2 | 0 | 2068.107 | 13.136 | ----- | ----- | 1.8985 | .01734 | ----- | ----- | 6.4 | .0095 | ----- | 16 | |
| | | | A ² Π | 4 | 9,114.59 | 1813.91 | 12.876 | ----- | ----- | ----- | 1.7155 | .01745 | ----- | ----- | b[6.14] | ----- | ----- | --- |
| | | | B ² Σ | 2 | 25,797.85 | 2163.50 | 20.24 | ----- | ----- | ----- | 1.9690 | .02213 | ----- | ----- | b[6.52] | ----- | ----- | --- |
| CO | 28.011 | 1 | X ¹ Σ | 1 | 0 | 2169.56 | 13.453 | .0308 | ----- | 1.93024 | .017470 | ----- | ----- | 6.42 | .04 | ----- | 16 | |
| CP | 42.986 | 1 | X ² Σ | 2 | 0 | 1239.28 | 6.86 | ----- | ----- | .79814 | .00596 | ----- | ----- | 1.324 | ----- | ----- | 23 | |
| | | | A ² Π | 2 | 6,806.30 | 1061.66 | 6.031 | ----- | ----- | ----- | .6976 | .0077 | ----- | ----- | b[1.20] | ----- | ----- | --- |
| | | | A ² Π | 2 | 6,964.57 | 1061.66 | 6.031 | ----- | ----- | ----- | .6976 | .0077 | ----- | ----- | b[1.20] | ----- | ----- | --- |
| | | | B ² Σ | 2 | 28,898.92 | 836.06 | 5.913 | ----- | ----- | ----- | .68247 | .00627 | ----- | ----- | 1.819 | ----- | ----- | --- |
| CS | 44.077 | 1 | X ¹ Σ | 1 | 0 | 1284.2 | 6.5 | ----- | ----- | .8189279 | .0059102 | ----- | ----- | b[1.33] | ----- | ----- | 16, 176 | |
| | | | A ¹ Π | 2 | 38,804.8 | 1071.6 | 10.3 | ----- | ----- | ----- | .7794 | .0085 | ----- | ----- | b[1.65] | ----- | ----- | --- |
| Cl ₂ | 70.914 | 2 | X ¹ Σ | 1 | 0 | 561.1 | 3.9 | ----- | ----- | .2406 | .0017 | ----- | ----- | b[1.177] | ----- | ----- | 16 | |
| ClF | 54.457 | 1 | X ¹ Σ | 1 | 0 | 784.5 | 6.20 | ----- | ----- | .514076 | .0043282 | ----- | ----- | b[.883] | ----- | ----- | 177, 178 | |
| ClO | 51.457 | 1 | X ² Π | 4 | 0 | 866 | 7.5 | ----- | ----- | .6431 | a[.0069] | ----- | ----- | 2.2 | ----- | ----- | 179, 180 | |
| F ₂ | 38.00 | 2 | X ¹ Σ | 1 | 0 | 923 | 15.6 | ----- | ----- | .8909 | a[.0162] | ----- | ----- | b[3.32] | ----- | ----- | 181, 182 | |
| H ₂ ^e | ----- | --- | --- | --- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | --- | |
| HCl | 36.465 | 1 | 1 Σ | 1 | 0 | 2989.07 | 52.03 | .056 | ----- | 10.5877 | .3036 | ----- | ----- | 530.1 | -5.7 | ----- | 16, 183 | |
| HF ^e | 20.008 | 1 | 1 Σ | 1 | 0 | 4138.57 | 90.04 | .932 | f-0.0142 | 20.9541 | .7957 | .01182 | g-0.000311 | h2153 | 62.3 | -2.06x10 ⁻⁶ | 184, 185 | |
| HS ^e | ----- | --- | --- | --- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | --- | |
| I ₂ | 13.880 | 2 | X ¹ Σ | 1 | 0 | 353.558 | 2.624 | -.0059 | ----- | .68103 | .00717 | -.00008 | ----- | 10.11 | .029 | ----- | 16 | |
| LiCl | 42.397 | 1 | X ¹ Σ | 1 | 0 | 641.1 | 4.2 | ----- | ----- | e[.7102] | [.0087] | ----- | ----- | b[3.49] | ----- | ----- | 186, 100 | |
| LiF | 25.940 | 1 | X ¹ Σ | 1 | 0 | 910.2 | 7.971 | ----- | ----- | 1.390 | .01998 | ----- | ----- | b[13.0] | ----- | ----- | 187 | |
| LiH | 7.948 | 1 | X ¹ Σ | 1 | 0 | 1406.685 | 23.235 | .1637 | ----- | 7.5243 | .2137 | .00075 | ----- | 864.3 | -16.0 | -.05 | 16, 188 | |
| LiO | 22.940 | 1 | X ² Σ ^e | 2 | 0 | [1050] | [11] | ----- | ----- | [1.05] | a[.014] | ----- | ----- | b[4.20] | ----- | ----- | ----- | |

^aApproximated by assuming relation in ref. 16,

$$p. 108: \alpha_e = \frac{6 \sqrt{\omega_e x_e B_e^3}}{\omega_e} - \frac{6 B_e^2}{\omega_e}$$

^bCalculated by assuming relation in ref. 16,

$$p. 107: D_e = 4 B_e^3 / \omega_e^2$$

^cSee appendix C.

$$f - 0.00059 \left(v + \frac{1}{2} \right)^5$$

$$g - 0.0000058 \left(v + \frac{1}{2} \right)^4$$

$$h \quad H_v = \left[1.68 - 0.065 \left(v + \frac{1}{2} \right) \right] \times 10^{-7}$$

$$F_e = -1.8 \times 10^{-11}$$

TABLE I. - Continued. MOLECULAR CONSTANTS OF DIATOMIC GASES

[Numbers in braces were estimated by reference quoted; numbers in brackets were estimated for this report (see appendix C or indicated footnote).]

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| Gas | Molec- ular weight | Sym- metry num- ber | Elec- tronic state | Statis- tical weight | T_0 , cm ⁻¹ | ω_e , cm ⁻¹ | $\omega_e x_e$, cm ⁻¹ | $\omega_e y_e$, cm ⁻¹ | $\omega_e z_e$, cm ⁻¹ | B_e , cm ⁻¹ | α_1 , cm ⁻¹ | α_2 , cm ⁻¹ | α_3 , cm ⁻¹ | D_e , cm ⁻¹ | β_1 , cm ⁻¹ | β_2 , cm ⁻¹ | Reference | |
|------------------|--------------------------|------------------------------|----------------------------|----------------------------|-----------------------------|----------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|-----------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------|---------------------------------|---------------------------------|--------------|-----------------|
| MgCl | 59.777 | 1 | X ² Σ | 2 | 0 | 462.4 | 2.02 | ----- | ----- | [0.243] | ^a [0.0014] | ----- | ----- | b[0.268]x10 ⁻⁶ | ----- | ----- | 16 | |
| | | | A ² Π | 2 | 26,533.3 | 489.3 | 2.50 | ----- | ----- | ----- | ¹ [.257] | ^a [.0017] | ----- | ----- | b[.285] | ----- | ----- | -- |
| MgF | 43.32 | 1 | A ² Π | 2 | 26,478.3 | 488.3 | 2.50 | ----- | ----- | ¹ [.257] | ^a [.0017] | ----- | ----- | b[.285] | ----- | ----- | -- | |
| | | | X ² Σ | 2 | 0 | 715.6 | 3.82 | ----- | ----- | ----- | .515 | ^a [.004] | ----- | ----- | b[1.07] | ----- | ----- | 16 |
| | | | A ² Π | 2 | 27,829.4 | 743.9 | 3.95 | ----- | ----- | ----- | .526 | ^a [.004] | ----- | ----- | b[1.05] | ----- | ----- | -- |
| | | | A ² Π | 2 | 27,863.7 | 743.9 | 3.95 | ----- | ----- | ----- | .526 | ^a [.004] | ----- | ----- | b[1.05] | ----- | ----- | -- |
| MgH | 25.328 | 1 | B ² Σ | 2 | 37,187.4 | 755.7 | 6.20 | ----- | ----- | .534 | ^a [.005] | ----- | ----- | b[1.07] | ----- | ----- | -- | |
| | | | C ² Σ | 2 | 42,579.9 | 819.6 | 4.79 | ----- | ----- | ----- | ¹ [.559] | ^a [.004] | ----- | ----- | b[1.04] | ----- | ----- | -- |
| | | | X ² Σ | 2 | 0 | 1495.3 | 31.5 | -0.15 | ----- | ----- | 5.8147 | .1667 | -0.0073 | ----- | 325 | 10x10 ⁻⁶ | ----- | 16, 23 |
| MgO | 40.32 | 1 | A ² Π | 4 | 19,278.3 | 1610.8 | 40.71 | 1.48 | ----- | 6.1743 | .1881 | ----- | ----- | b[363] | ----- | ----- | -- | |
| | | | X ¹ Σ | 1 | 0 | 782.99 | 5.15 | ----- | ----- | ----- | .5713 | .0050 | ----- | ----- | 1.21 | .02 | ----- | 23 |
| MgS | 56.386 | 1 | A ¹ Σ | 2 | 3,503.26 | 662.69 | 3.69 | ----- | ----- | .5029 | .0046 | ----- | ----- | 1.172 | -.05 | ----- | -- | |
| | | | B ¹ Σ | 1 | 20,003.57 | 821.91 | 4.74 | ----- | ----- | ----- | .5791 | .0045 | ----- | ----- | 1.13 | .025 | ----- | -- |
| | | | A ¹ Σ e | 1 | 0 | 523 | 2.91 | ----- | ----- | ----- | [.262] | ^a [.0018] | ----- | ----- | b[.263] | ----- | ----- | 16 |
| N ₂ | 28.016 | 2 | X ¹ Σ | 1 | 0 | 2357.78 | 14.185 | -0.124 | ----- | 1.9978 | .01708 | -0.000460 | ----- | b[5.74] | ----- | ----- | 23, 169 | |
| | | | A ³ Σ | 3 | 49,756.5 | 1460.19 | 13.888 | -0.025 | ----- | 1.440 | .013 | ----- | ----- | b[5.60] | ----- | ----- | -- | |
| NF | 33.008 | 1 | X ³ Σ | 3 | 0 | [990] | J[10.5] | ----- | ----- | [1.112] | ^a [.016] | ----- | ----- | b[5.61] | ----- | ----- | ----- | |
| NH | 15.016 | 1 | X ³ Σ | 3 | 0 | ^k [3298.4] | ^k [86.5] | ----- | ----- | 16.6670 | .646 | ----- | ----- | 1685 | ----- | ----- | 16, 190, 191 | |
| | | | a ¹ Δ | 2 | 14,922 | 3186 | ^a [29] | ----- | ----- | 16.537 | (.17) | ----- | ----- | b[1782] | ----- | ----- | 21 | |
| | | | b ¹ Σ | 1 | 23,571 | 3480 | ----- | ----- | ----- | 16.400 | ----- | ----- | ----- | b[1457] | ----- | ----- | -- | |
| | | | A ³ Π | 6 | 29,777.09 | ^k [3232.5] | ^k [99.2] | ----- | ----- | 16.6927 | .744 | ----- | ----- | 1758 | 40 | ----- | -- | |
| NO | 30.008 | 1 | ² $\Pi_{1/2}$ | 2 | 0 | 1903.79 | 13.97 | -0.012 | ----- | 1.7056 | .018 | ----- | ----- | b[5.48] | ----- | ----- | 16, 192 | |
| | | | ² $\Pi_{3/2}$ | 2 | 120.9 | 1903.44 | 13.97 | -0.012 | ----- | 1.7056 | .018 | ----- | ----- | b[5.48] | ----- | ----- | -- | |
| | | | X ² $\Pi_{1/2}$ | 2 | 0 | 1218.25 | 7.67 | ----- | ----- | ----- | .77287 | .00611 | ----- | ----- | 1.22 | ----- | ----- | 23 |
| NS | 46.074 | 1 | X ² $\Pi_{3/2}$ | 2 | 223 | 1218.25 | 7.67 | ----- | ----- | .77287 | .00611 | ----- | ----- | 1.22 | ----- | ----- | -- | |
| | | | A ² $\Pi_{1/2}$ | 2 | 39,882.4 | 961.6 | 8.64 | ----- | ----- | ----- | .6938 | .0054 | ----- | ----- | b[1.44] | ----- | ----- | -- |
| | | | A ² $\Pi_{3/2}$ | 2 | 39,920.6 | 939.9 | 4.80 | ----- | ----- | ----- | .6938 | .0054 | ----- | ----- | b[1.51] | ----- | ----- | -- |
| | | | B ² Σ | 2 | 43,383.9 | [1402.8] | [8.74] | ----- | ----- | ----- | .82917 | ^a [.0066] | ----- | ----- | b[1.16] | ----- | ----- | -- |
| Na ₂ | 45.982 | 2 | X ¹ Σ | 1 | 0 | 159.23 | .726 | -0.0027 | ----- | .15471 | .00079 | -0.00003 | ----- | .5837 | .0047 | ----- | 16, 25 | |
| NaCl | 58.448 | 1 | X ¹ Σ | 1 | 0 | 365 | ^a [2.04] | ----- | ----- | ^m .216903 | .001597 | .000005 | ----- | b[.306] | ----- | ----- | 100, 130 | |
| NaF | 41.991 | 1 | X ¹ Σ | 1 | 0 | [525] | ^a [3.0] | ----- | ----- | (.4787) | [.0039] | ----- | ----- | b[1.59] | ----- | ----- | 100, 130 | |
| NaH | 23.999 | 1 | X ¹ Σ | 1 | 0 | 1172.2 | 19.72 | .160 | -0.005 | 4.9009 | .1353 | ----- | ----- | 332 | -3 | ----- | 16 | |
| NaO | 38.991 | 1 | X ² Σ e | 2 | 0 | [665] | [4.8] | ----- | ----- | [.4898] | [.00495] | ----- | ----- | b[1.06] | ----- | ----- | 3 | |
| O ₂ e | 32.000 | 2 | X ³ Σ | 3 | ⁿ -.244 | 1580.1618 | 12.070 | .0546 | -0.00143 | 1.445306 | .015785 | ----- | ----- | ^o 4.955 | .086 | ----- | ----- | 23, 13, 32, 193 |
| | | | a ¹ Δ | 2 | ⁿ 7,918.13 | 1509.1 | 12.9 | ----- | ----- | ----- | 1.4260 | .0171 | ----- | ----- | b[5.094] | ----- | ----- | -- |
| | | | b ¹ Σ | 1 | ⁿ 13,195.22 | 1432.5066 | 13.94661 | -0.01075 | ----- | ----- | 1.400067 | .018163 | ----- | ----- | 5.35 | .007 | ----- | ----- |
| | | | A ³ Σ | 3 | ⁿ 36,095 | 818.9 | 22.49 | ----- | ----- | ----- | 1.06 | ^a [.0293] | ----- | ----- | b[6.9] | ----- | ----- | -- |
| | | | B ³ Σ | 3 | ⁿ 49,802.1 | 700.27 | 8.0003 | -0.37521 | ----- | ----- | .819 | .011 | ----- | ----- | 4.36 | ----- | ----- | -- |

^aApproximated by assuming relation in ref. 16,

$$p. 108: \alpha_e = \frac{6 \sqrt{\omega_e x_e B_e^2} - 6B_e^2}{\omega_e}$$

^bCalculated by assuming relation in ref. 16,
p. 107: $D_e = 4B_e^2/\omega_e^2$.

^cSee appendix C.

¹Approximated by assuming relation given in ref. 16,
eq. (VIII,1), p. 456: $\omega_e^2/B_e = \omega_e^2/B_e^2$.

²Approximated by assuming linear Birge-Sponer relation:
 $\omega_e x_e = \omega_e^2/4D_e^2$.

^k $\omega_e^2(1/2)$ given in ref. 190 and the relation in footnote a
were used to obtain ω_e and $\omega_e x_e$.

³ B_0 .

^m ν_{01} (ν_{01} is nearly equal to B_e ; see ref. 16).

ⁿValues are T_e .

^o $\omega_e = 1.387 \times 10^{-13}$,
 $F_e = -3.22 \times 10^{-17}$.

TABLE I. - Concluded. MOLECULAR CONSTANTS OF DIATOMIC GASES

[Numbers in braces were estimated by reference quoted; numbers in brackets were estimated for this report (see appendix C or indicated footnote).]

| Gas | Molec- ular weight | Sym- metry num- ber | Elec- tronic state | Statis- tical weight | T ₀ , cm ⁻¹ | ω _e , cm ⁻¹ | ω _e x _e , cm ⁻¹ | ω _e y _e , cm ⁻¹ | ω _e z _e , cm ⁻¹ | B _e , cm ⁻¹ | a ₁ , cm ⁻¹ | a ₂ , cm ⁻¹ | a ₃ , cm ⁻¹ | D _e , cm ⁻¹ | β ₁ , cm ⁻¹ | β ₂ , cm ⁻¹ | Reference |
|------------------|--------------------------|------------------------------|--------------------------|----------------------------|--------------------------------------|--------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|--------------------------------------|--------------------------------------|---------------|
| OH ^e | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| P ₂ | 61.950 | 2 | X ¹ Σ | 1 | 0 | 780.89 | 2.820 | -0.00511 | --- | 0.30359 | 0.001477 | -0.0000032 | --- | ^b [0.184]×10 ⁻⁶ | --- | --- | 194 |
| | | | A ¹ Π | 2 | 34,434.30 | 618.88 | {2.97} | --- | --- | .27520 | .00169 | --- | --- | ^b [.218] | --- | --- | --- |
| PH | 31.983 | 1 | X ³ Σ | 3 | 0 | 2415 | {35} | --- | --- | 8.505 | ^a [.186] | --- | --- | 450 | --- | --- | 16, 9 |
| | | | A ³ Π | 6 | 29,321.9 | 1938 | ^p [28] | --- | --- | 8.114 | ^p [.177] | --- | --- | ^b [569] | --- | --- | --- |
| PN | 44.983 | 1 | X ¹ Σ | 1 | 0 | 1337.13 | 6.982 | --- | --- | .78608 | .00557 | --- | --- | 1.09 | --- | --- | 23 |
| | | | A ¹ Π | 2 | 39,688.52 | 1103.00 | 7.221 | --- | --- | .75059 | .00663 | --- | --- | ^b [1.28] | --- | --- | --- |
| PO | 46.975 | 1 | X ² Π | 2 | 0 | 1233.32 | 6.57 | --- | --- | .7330 | .0055 | --- | --- | ^b [1.04] | --- | --- | 195, 196, 197 |
| | | | X ² Π | 2 | 222.6 | 1233.32 | 6.57 | --- | --- | .7330 | .0055 | --- | --- | ^b [1.04] | --- | --- | --- |
| | | | B ² Σ | 2 | 30,696.27 | 1166.1 | 14.10 | --- | --- | .7475 | .0088 | --- | --- | ^b [1.23] | --- | --- | --- |
| | | | A ² Σ | 2 | 40,485.54 | 1391.05 | 6.99 | --- | --- | .7800 | .0054 | --- | --- | ^b [.981] | --- | --- | --- |
| PS | 63.041 | 1 | X ² Π | 2 | 0 | 739.0 | 3.0 | --- | --- | .29 | ^a [.0015] | --- | --- | ^b [.179] | --- | --- | 195 |
| | | | X ² Π | 2 | 321.4 | 739.0 | 3.0 | --- | --- | .29 | ^a [.0015] | --- | --- | ^b [.179] | --- | --- | --- |
| S ₂ | 64.132 | 2 | X ³ Σ | 3 | 0 | 724.69 | 2.844 | --- | --- | .2948 | .00159 | --- | --- | .2 | --- | --- | 16 |
| SCl | 67.523 | 1 | X ² Π | 4 | 0 | {535} | ^j [5.85] | --- | --- | [.2528] | ^a [.00273] | --- | --- | ^b [.226] | --- | --- | --- |
| SF | 51.066 | 1 | X ² Π | 4 | 0 | {850} | ^j [6.30] | --- | --- | [.5807] | ^a [.00546] | --- | --- | ^b [1.08] | --- | --- | --- |
| SO | 48.066 | 1 | X ³ Σ | 3 | 0 | 1147.57 | 6.109 | --- | --- | .71941 | .00561 | --- | --- | 1.131 | -0.00051×10 ⁻⁶ | --- | 198 |
| Si ₂ | 56.18 | 2 | X ³ Σ | 3 | 0 | 505.78 | 1.96 | --- | --- | .2367 | .00134 | --- | --- | ^b [.207] | --- | --- | 199 |
| SiCl | 63.547 | 1 | X ² Π | 2 | 0 | 533.3 | 2.18 | --- | --- | [.266] | ^a [.0015] | --- | --- | ^b [.265] | --- | --- | 16, 119 |
| | | | X ² Π | 2 | 207.9 | 533.3 | 2.18 | --- | --- | [.266] | ^a [.0015] | --- | --- | ^b [.265] | --- | --- | --- |
| | | | B ² Σ | 2 | 34,186.0 | 698.7 | 1.39 | --- | --- | ⁱ [.348] | ^a [.0010] | --- | --- | ^b [.345] | --- | --- | --- |
| | | | C ² Δ | 4 | 41,241.3 | 871.5 | 2.18 | --- | --- | ⁱ [.334] | ^a [.0015] | --- | --- | ^b [.331] | --- | --- | --- |
| SiF | 47.09 | 1 | X ² Π | 2 | 0 | 857.0 | 4.66 | --- | --- | .5808 | .00565 | --- | --- | ^b [1.07] | --- | --- | 16, 200 |
| | | | X ² Π | 2 | 161.92 | 857.0 | 4.66 | --- | --- | .5808 | .00565 | --- | --- | ^b [1.07] | --- | --- | --- |
| | | | A ² Σ | 2 | 22,787.64 | 718.04 | 10.152 | .157 | --- | .57752 | .00939 | .00013 | --- | ^b [1.49] | --- | --- | --- |
| | | | B ² Σ | 2 | 34,638.48 | 1010.47 | 4.818 | --- | --- | .62613 | .00461 | --- | --- | ^b [.962] | --- | --- | --- |
| | | | C ² Σ | 2 | 39,455.1 | 890.8 | 5.8 | --- | --- | .6034 | .0067 | --- | --- | ^b [1.11] | --- | --- | --- |
| | | | D ² Σ | 2 | 47,491.2 | 1002.4 | 5.63 | --- | --- | .624 | .0055 | --- | --- | ^b [.967] | --- | --- | --- |
| SiH ^e | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SiN | 42.098 | 1 | X ² Σ | 2 | 0 | 1150.872 | 6.5508 | --- | --- | .7300 | .00566 | --- | --- | 1.179 | .001 | --- | 16 |
| | | | B ² Σ | 2 | 24,236.53 | 1030.284 | 16.7194 | .11698 | --- | .7225 | .01035 | --- | --- | ^b [1.42] | --- | --- | --- |
| SiO | 44.09 | 1 | X ¹ Σ | 1 | 0 | 1240.50 | 5.91 | --- | --- | .72620 | .00507 | --- | --- | 1.02 | --- | --- | 201 |
| | | | A ¹ Π | 2 | 42,640.4 | 852.06 | 6.43 | --- | --- | .63033 | .00693 | --- | --- | 1.43 | --- | --- | --- |
| SiS | 60.156 | 1 | X ¹ Σ | 1 | 0 | 748.3 | 2.55 | --- | --- | .30265 | .00148 | --- | --- | .200 | -.001 | --- | 16 |
| | | | D ¹ Π | 2 | 34,910.1 | 511.2 | 2.37 | -.045 | --- | .26550 | .00202 | --- | --- | ^b [.286] | --- | --- | --- |

^aApproximated by assuming relation in ref. 16,

$$p. 108: \alpha_e = \frac{6\sqrt{\omega_e x_e B_e^3} - 6B_e^2}{\omega_e}$$

^bCalculated by assuming relation in ref. 16,

$$p. 107: D_e = 4B_e^3/\omega_e^2$$

^cSee appendix C.

ⁱApproximated by assuming relation given in ref. 16, eq. (VIII,1), p. 456: $\omega_e/B_e^2 = \omega_b/B_b^2$.

^jApproximated by assuming linear Birge-Sponer relation: $\omega_e x_e = \omega_e^2/4D_0$.

^pApproximated by assuming relation

$$\frac{\omega_e x_e}{\omega_e} = \frac{\omega_e x_e'}{\omega_e'} \quad \text{and} \quad \frac{\alpha_e}{B_e} = \frac{\alpha_e'}{B_e'}$$

TABLE II. - MOLECULAR CONSTANTS OF POLYATOMIC GASES

[Numbers in braces were estimated by reference quoted; numbers in brackets were estimated for this report (see appendix C or indicated footnote).]

(a) Harmonic oscillators.

| Gas | Molecular weight | Symmetry number | Statistical weight | Frequencies, $\nu_1(\nu_1)$, cm^{-1} | Moments of inertia, ($\text{g}\cdot\text{cm}^2$) | | | References |
|----------------------------------|------------------|-----------------|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|----------------------------|----------------------------|----------------------------|
| | | | | | I_A | I_B | I_C | |
| AlCl ₃ | 135.351 | 6 | 1 | {345}, {240}, 610(2), {150}(2) | [40.438] $\times 10^{-39}$ | [40.438] $\times 10^{-39}$ | [80.876] $\times 10^{-39}$ | 41 |
| AlF ₃ | 83.98 | 6 | 1 | {670}, {370}, {975}(2), {280}(2) | [13.67] | [13.67] | [27.35] | -- |
| Al ₂ O | 69.96 | 2 | 1 | {1079}, {351}, {921} | [1.726] | [15.389] | [17.115] | 44 |
| Al ₂ O ₂ | 85.96 | 2 | 1 | {1000}(2), {930}(2), {600}, {200} | [4.474] | [15.389] | [19.864] | 44 |
| AlOCl | 78.437 | 1 | 1 | {1000}, {220}(2), {450} | ----- | [28.65] | ----- | -- |
| AlOF | 61.98 | 1 | 1 | {1090}, {270}(2), {710} | ----- | [15.98] | ----- | -- |
| BCl ₂ | 81.734 | 2 | 2 | {470}, {240}, {960} | [1.166] | [26.43] | [27.59] | -- |
| BCl ₃ | 117.191 | 6 | 1 | 471, 458.7, 961.9(2), 245.2(2) | 26.428 | 26.428 | 52.855 | 119, 202, 203 |
| BF ₂ | 48.82 | 2 | 2 | {890}, {480}, {1460} | [.586] | [7.935] | [8.521] | ----- |
| BF ₃ | 67.82 | 6 | 1 | 888, 696.69, 1463.9(2), 480.7(2) | 7.9352 | ^a 7.9352 | 15.870 | 12, 204, 205 |
| BFC1 | 65.277 | 1 | 2 | {650}, {340}, {1180} | [.77985] | [14.858] | [15.637] | ----- |
| BH ₃ | 13.844 | 6 | 1 | {2384}, {802}, {2976}(2), {1765}(2) | [.3378] | [.3378] | [.6756] | 206 |
| BO ₂ | 42.82 | 2 | 4 | 1070, 464(2), 1322 | ----- | ^a 8.502 | ----- | 207 |
| B ₂ O ₂ | 53.64 | 2 | 1 | {2066}, 1910, {570}, {565}(2), {287}(2) | ----- | 24.923 | ----- | 55 |
| B ₂ O ₃ | 69.64 | 2 | 1 | 2073(2), 1240, 730, 457, 259, 460, 522, 460 | 2.9336 | 30.545 | 33.479 | ^b 55, 208, 209 |
| BOCl | 62.277 | 1 | 1 | {680}, {450}(2), {2040} | ----- | [16.71] | ----- | -- |
| (BOCl) ₃ | 186.851 | 6 | 1 | 1037, 807, 333, {1200}(2), {720}, {450}, {740}(2), {1390}(2), {1450}(2), 390(2), 150(2), {330}(2), {160}(2) | [96.66] | [96.66] | [193.33] | ^b 333, 334 |
| BOF | 45.82 | 1 | 1 | {1020}, {530}(2), {2200} | ----- | [9.009] | ----- | -- |
| (BOF) ₃ | 137.46 | 6 | 1 | {1356}, {807}, {540}, {1200}(2), 718, {530}, ^a 968(2), 1391(2), 1455(2), {400}(2), {160}(4), {350}(2) | [45.833] | [45.833] | [91.667] | ^b 333, 334 |
| BeCl ₂ | 79.927 | 2 | 1 | {370}, 482(2), 1113 | ----- | 36.06 | ----- | 62, 65 |
| BeF ₂ | 47.013 | 2 | 1 | {670}, 825(2), 1520 | ----- | 12.37 | ----- | 62, 65 |
| BeFC1 | 63.47 | 1 | 1 | {1350}, {650}(2), {490} | ----- | [20.92] | ----- | 62, 65 |
| (BeO) ₂ | 50.026 | 4 | 1 | {1200}(3), {600}(2), {300} | [3.976] | [7.058] | [11.033] | 4(12/31/60), 5 |
| (BeO) ₃ | 75.039 | 6 | 1 | {1200}(6), {600}(6) | [16.55] | [16.55] | [33.10] | 5 |
| (BeO) ₄ | 100.052 | 8 | 1 | {1200}(8), {600}(8), {300}(2) | [37.671] | [37.671] | [75.341] | 4(12/31/60), 5 |
| Be(OH) ₂ | 43.029 | 2 | 1 | {610}, {620}(2), {1350}, {1595}(4), {3680}(2) | ----- | [16.361] | ----- | 5 |
| C ₃ | 36.033 | 2 | 1 | 1300, 550(2), 2200 | ----- | ^a 6.539 | ----- | 210 |
| CCl ₄ | 153.839 | 12 | 1 | 458, 218(2), 794(3), 310(3) | 48.626 | 48.626 | 48.626 | ^b 80, 211 |
| CF ₃ | 69.011 | 6 | 2 | {1030}, {660}, {1360}(2), {650}(2) | [7.997] | [7.997] | [15.99] | ----- |
| CH ₂ | 14.027 | 2 | 3 | {2918}, ^b 1362(2), {3173} | ----- | .3551 | ----- | 84, 212 |
| CH ₃ | 15.035 | 6 | 2 | {2920}, 580, {3170}(2), {1360}(2) | .2928 | .2928 | .5856 | 86 |
| C ₂ H ₄ | 28.054 | 4 | 1 | 3019.3, 1623.3, 1342.4, 2989.4, 1443.9, 3089, 1055, 3105.5, 995.0, 825, 943, 949.2 | .5759 | 2.809 | 3.384 | 213 |
| C ₂ N ₂ | 52.038 | 2 | 1 | 2328.5, 850.6, 2157.6, 507.2(2), 235(2) | ----- | ^{a, c} 17.768 | ----- | 214, 215 |
| COCl ₂ | 98.925 | 2 | 1 | 567, 1827, 285, 849, 440, 580 | ^d 10.6256 | ^d 24.4336 | ^d 35.1018 | 216, 217 |
| COF ₂ | 66.011 | 2 | 1 | 965, 1928, 626, 1249, 584, 774 | ^d 7.10284 | ^d 7.13977 | ^d 14.2677 | 119, 218, ^e 219 |
| COFC1 | 82.468 | 1 | 1 | 776, 1868, 501, 1095, 415, 667 | [7.0208] | [16.378] | [23.399] | 119, 217, 218 |
| ClF ₃ | 92.457 | 2 | 1 | 752, 528, 326, 703, 434, 364 | 6.1126 | 18.1791 | 24.3133 | 220, 221 |
| Cl ₂ O | 86.914 | 2 | 1 | 668, 320, 969 | 2.0221 | 23.081 | 25.103 | 222, 223 |
| HBO ₂ | 43.828 | 1 | 1 | 3680, 2030, 1420, {1250}, {600}, {700} | .11549 | 9.1052 | 9.2207 | 224 |
| H ₃ BO ₃ | 61.844 | 3 | 1 | 3250, 1060, 881, 652, 824, 3150(2), 1440(2), 544(2), 1185(2), 209(2) | 8.363 | 8.363 | 16.73 | 225, 226 |
| (HBO ₂) ₃ | 131.484 | 3 | 1 | {3500}(3), {1300}(2), {1150}, {1100}, {1000}(4), {950}, {900}(2), {750}(2), {600}(3), {550}, {500}(2), {450}(2), {350}(3), {250}, {200}(2) | 44.624 | 44.624 | 89.249 | 224 |
| HCO | 29.019 | 1 | 2 | {3000}, 1860, 1083 | ^d 1.2515 | ^d 1.6729 | ^d 1.9981 | 227, 228 |
| (LiCl) ₂ | 84.794 | 4 | 1 | {330}, {296}, {385}, {356}, 335, 460 | 3.9592 | 38.358 | 42.317 | 229, 230, 231 |
| (LiF) ₂ | 51.88 | 4 | 1 | {465}, {365}, {407}, {385}, 460, 640 | [2.943] | [9.858] | [12.80] | 229, 230, 232 |

^aCalculated from B_e or B_0 .

^c $D_0 = 4 \times 10^{-8} \text{ cm}^{-1}$.

^eRevised rotational constants were received directly from D. F. Smith.

^bSee appendix c.

^dCalculated from A_0 , B_0 , or C_0 .

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TABLE II. - Continued. MOLECULAR CONSTANTS OF POLYATOMIC GASES

[Numbers in braces were estimated by reference quoted; numbers in brackets were estimated for this report (see appendix C or indicated footnote).]

(a) Concluded. Harmonic oscillators.

| Gas | Molecular weight | Symmetry number | Statistical weight | Frequencies, $\nu_1(d_1)$, cm^{-1} | Moments of inertia, $(g)(\text{cm}^2)$ | | | References |
|--------------------------------|------------------|-----------------|--------------------|----------------------------------------------------------------------|----------------------------------------|---------------------------|---------------------------|-----------------------|
| | | | | | I_A | I_B | I_C | |
| (LiF) ₃ | 77.82 | 6 | 1 | {900}(6), {300}(6) | {18.67}×10 ⁻³⁹ | {18.67}×10 ⁻³⁹ | {37.34}×10 ⁻³⁹ | 4(12/31/60) |
| Li ₂ O | 29.88 | 2 | 1 | [1040], [650], [1100] | 1.344 | 5.121 | 6.465 | 253 |
| LiOH | 23.948 | 1 | 1 | [1070], [1120], [3710] | [.13248] | [2.7697] | [2.9022] | --- |
| (LiOH) ₂ | 47.896 | 2 | 1 | {465}, {365}, {407}, {385}, {460}, {640}, {3710}(2), {1120}(4) | {3.6450} | {12.740} | {15.969} | 110, 229 |
| MgCl ₂ | 95.234 | 2 | 1 | {300}, 295(2), 597 | ----- | 55.95 | ----- | 62, 65 |
| MgF ₂ | 62.32 | 2 | 1 | {540}, [500](2), [820] | ----- | 19.77 | ----- | 65 |
| MgPCl | 78.777 | 1 | 1 | [680], [400](2), [450] | ----- | [33.84] | ----- | --- |
| MgOH | 41.528 | 1 | 2 | [750], [950], [3710] | [.13319] | [7.4480] | [7.5812] | 119 |
| NF ₂ | 52.008 | 2 | 2 | 1069.6, 573.4, 930.7 | 1.203 | 7.373 | 6.576 | 234 |
| NF ₃ | 71.008 | 3 | 1 | 1031, 642, 907(2), 497(2) | 7.8545 | 7.8545 | 14.3544 | 235, 236 |
| N ₂ F ₂ | 66.016 | 2 | 1 | 1010, 1636, 592, 989, 421, 360 | .91905 | 21.244 | 22.163 | ^b 123 |
| NH ₃ | 17.032 | 3 | 1 | 3336.18, 949.87, 3443.381(2), 1626.1(2) | .28146 | ^a .28146 | ^f 8.45173 | 237, 238, 239 |
| N ₂ O ₄ | 92.016 | 4 | 1 | 1379.5, 808, 286, {50}, 1712, 482, 429, 672, 1748, 361, 1262, 750 | 12.51 | 22.61 | 35.12 | 240, 241, 242 |
| (NaCl) ₂ | 116.896 | 4 | 1 | 265, 159, 226, 155, 222, 260 | 16.48 | 48.16 | 64.65 | 229, 243 |
| (NaF) ₂ | 83.982 | 4 | 1 | 350, 209, 270, 201, 294, 313 | [11.54] | [16.20] | [27.75] | 229 |
| NaOH | 39.999 | 1 | 1 | 437, [950], [3710] | [.13325] | [7.6929] | [7.8261] | 134 |
| (NaOH) ₂ | 79.998 | 2 | 1 | {350}, {209}, {270}, {201}, {294}, {313}, {3710}(2), {950}(4) | [16.178] | [17.640] | [33.399] | 229, 110 |
| P ₄ | 123.900 | 12 | 1 | 606, 363(2), 464.5(3) | 25.117 | 25.117 | 25.117 | 244, 245 |
| PCl ₃ | 137.346 | 3 | 1 | 507.4, 260.1, 493.5(2), 189.0(2) | 32.48 | 32.48 | 57.76 | 246, 247 |
| PF ₃ | 87.975 | 3 | 1 | 892, 487, 860(2), 344(2) | 10.43 | 10.43 | 17.45 | 248, 249 |
| PH ₃ | 33.999 | 3 | 1 | 2322.9, 992.0, 2327.7(2), 1122.4(2) | .6263 | .6263 | .7200 | 250 |
| SCl ₂ | 102.980 | 2 | 1 | 208, 514, 535 | 5.75 | 28.16 | 33.91 | ^b 119, 251 |
| S ₂ Cl ₂ | 135.046 | 2 | 1 | 106, 206, 438, 448, 245, 537 | 14.853 | 59.852 | 65.844 | ^b 119, 145 |
| SF ₂ | 70.066 | 2 | 1 | [750], [540], [850] | [3.207] | [8.346] | [11.55] | ----- |
| SF ₄ | 108.066 | 2 | 1 | 889, 715, 557, 239, 401, 867, 532, 728, 463 | 17.454 | 19.549 | 25.719 | 252 |
| SF ₆ | 146.066 | 24 | 1 | 775, 644(2), 932(3), 613(3), 524(3), 344(3) | 30.707 | 30.707 | 30.707 | ^b 146, 253 |
| S ₂ F ₂ | 102.132 | 2 | 1 | [825], [580], [420], [725], [310], [230] | [7.4334] | [30.822] | [32.465] | ----- |
| SO ₃ | 80.066 | 6 | 1 | 1068, 495, 1391(2), 529(2) | 8.148 | 8.148 | 16.296 | 254, 255 |
| SOCl | 83.523 | 1 | 2 | [525], [360], [1260] | [2.7547] | [18.142] | [20.897] | ----- |
| SOCl ₂ | 118.98 | 1 | 1 | 1230, 490, 344, 194, 445, 284 | 13.499 | 36.866 | 47.600 | 148, 256, 257 |
| SOF | 67.066 | 1 | 2 | [800], [530], [1280] | [2.1169] | [8.3742] | [10.491] | ----- |
| SOF ₂ | 86.066 | 1 | 1 | 1333, 808, 530, 410, 748, 390 | ^d 9.7404 | ^d 10.042 | ^d 16.942 | 150, 258 |
| SO ₂ F ₂ | 102.066 | 2 | 1 | 1269, 848, 544, 588(2), 1502, 553, 885, 539 | ^d 16.343 | ^d 16.541 | ^d 16.593 | 259, 260, 261 |
| Si ₃ | 84.27 | 2 | 1 | {358}, {281}(2), {620} | ----- | {47.22} | ----- | 262 |
| SiCl ₂ | 99.004 | 2 | 1 | [410], [240], [560] | [4.53] | [32.55] | [37.08] | 119 |
| SiCl ₄ | 169.918 | 12 | 1 | 424, 150(2), 608(3), 221(3) | 63.42 | 63.42 | 63.42 | 12, 119 |
| SiF ₂ | 66.09 | 2 | 1 | 778, 427, 947 | 1.312 | 10.92 | 12.23 | 263 |
| SiF ₄ | 104.09 | 12 | 1 | 800, 268(2), 1031(3), 391(3) | 19.95 | 19.95 | 19.95 | 264 |
| SiH ₄ | 32.122 | 12 | 1 | 2187, 978(2), 2183(3), 910(3) | .97725 | .97725 | .97725 | 265 |
| SiO ₂ | 60.09 | 2 | 1 | {885}, {378}(2), {1295} | ----- | {12.27} | ----- | 266 |

^aCalculated from B_e or B_0 .

^dCalculated from A_0 , B_0 , or C_0 .

$\epsilon_p = 1.450 \times 10^{-5} \text{ } ^\circ\text{K}^{-1}$.

^bSee appendix c.

^fCalculated from C_e .

TABLE II. - Concluded. MOLECULAR CONSTANTS OF POLYATOMIC GASES

[Numbers in braces were estimated by reference quoted; numbers in brackets were estimated for this report (see appendix C or indicated footnote).]

(b) Anharmonic oscillators

| | CF ₂ | CF ₄ | CH ₄ | C ₂ H ₂ | CO ₂ | COS | CS ₂ | ClCN | ClO ₂ | HCN | H ₂ O | H ₂ S | NO ₂ | N ₂ O | SO ₂ |
|---------------------------------------------|-----------------|-----------------|---------------------|-------------------------------|-----------------------|-----------------------|----------------------|------------------------|--------------------|------------------------|-----------------------|----------------------|--------------------|------------------------|-----------------------|
| ν_1 , cm ⁻¹ | 1162 | 904 | 2916.5 | 3373.7 | ^a 1341.54 | 859 | ^a 667.22 | ^a 733.4 | 945.3 | 2096.291 | 3656.65 | 2614.56 | 1320.6 | ^a 1276.522 | 1151.74 |
| ν_2 (d ₂), cm ⁻¹ | 667 | 435(2) | 1534.0(2) | 1973.8 | 667.40(2) | 524(2) | 395.93(2) | 379.9(2) | 447.4 | 713.460(2) | 1594.78 | 1182.68 | 749.6 | 589.193(2) | 517.69 |
| ν_3 (d ₃), cm ⁻¹ | [1440] | 1283(3) | 3018.7(3) | 3281.93 | 2349.16 | 2064 | 1535.35 | 2219 | 1110.5 | 3311.473 | 3755.79 | 2627.48 | 1617.0 | 2225.745 | 1361.76 |
| ν_4 (d ₄), cm ⁻¹ | | 632(3) | 1306(5) | ^b 111.58(2) | | | | | | | | | | | |
| x_{11} , cm ⁻¹ | [-7.0] | 0 | -64.6 | ^c -24.08 | -3.75 | -4.0 | -.99 | [-5] | -4.4 | -7.0741 | -45.18 | -25.09 | -9.0 | -4.310 | -3.99 |
| x_{12} , cm ⁻¹ | [-7.5] | -4 | 0 | -16.94 | 3.62 | -6.8 | .68 | [-4] | -3.0 | -2.5265 | -15.14 | -19.69 | -9.7 | -.838 | -2.05 |
| x_{13} , cm ⁻¹ | [-22] | 0 | -65.0 | -99.01 | -19.37 | -4.5 | -7.28 | -2.0 | -14.4 | -10.4434 | -165.48 | -94.68 | -28.7 | -27.843 | -13.71 |
| x_{14} , cm ⁻¹ | | 2 | 0 | -16.46 | | | | | | | | | | | |
| x_{22} , cm ⁻¹ | [-.4] | -2 | 0 | -7.92 | -.63 | -.4 | -.15 | 2.1 | 0.0 | -2.6533 | -17.04 | -5.72 | -.5 | -.051 | -3.00 |
| x_{23} , cm ⁻¹ | [-2.1] | -1 | -15.0 | -1.58 | -12.53 | -11.5 | -6.45 | -11.0 | -13 | -19.0055 | -19.99 | -21.09 | -2.7 | -14.468 | -3.90 |
| x_{34} , cm ⁻¹ | | -6 | -11.2 | -6.15 | | | | | | | | | | | |
| x_{35} , cm ⁻¹ | [-13] | -5 | -17.5 | -25.69 | -12.63 | -7.0 | -6.54 | [-17] | -2.0 | -52.4901 | -44.62 | -24.00 | -16.4 | -15.020 | -5.17 |
| x_{34} , cm ⁻¹ | | 1 | -12.0 | -9.06 | | | | | | | | | | | |
| x_{44} , cm ⁻¹ | | -1.5 | -6.0 | 5.38 | | | | | | | | | | | |
| g_{22} , cm ⁻¹ | | | | (d) | .775 | 3.2 | -1.0 | -1 | | 5.160 | | | | ^e .308989 | |
| y_{111} , cm ⁻¹ | | | | | .13 | | | | | -.1889 | .47 | | | | .05 |
| y_{112} , cm ⁻¹ | | | | | -.08 | | | | | -.0012 | -.10 | | | | -.10 |
| y_{113} , cm ⁻¹ | | | | | 0 | | | | | -.7723 | .68 | | | | -.047 |
| y_{122} , cm ⁻¹ | | | | | -.07 | | | | | -.0747 | -.10 | | | | 0 |
| y_{123} , cm ⁻¹ | | | | | .02 | | | | | -.1240 | -1.72 | | | | .571 |
| y_{133} , cm ⁻¹ | | | | | .07 | | | | | -1.1010 | 1.17 | | | | .015 |
| y_{222} , cm ⁻¹ | | | | | .01 | | | | | -.0295 | -.60 | | | | -.016 |
| y_{223} , cm ⁻¹ | | | | | 0 | | | | | -.0375 | 1.55 | | | | -.006 |
| y_{233} , cm ⁻¹ | | | | | .01 | | | | | -.1230 | -.81 | | | | -.007 |
| y_{333} , cm ⁻¹ | | | | | .015 | | | | | -.3285 | -.45 | | | | -.009 |
| $ w_0 $, cm ⁻¹ | | | | | 51.31 | | 35.3 | 31.4 | | | | | | 30.245 | |
| A_e , cm ⁻¹ | | | ^g 5.2406 | | | | | | | ^h 1.7259 | 27.378 | ⁱ 10.351 | ^g 6.003 | | ^g 2.027359 |
| B_e , cm ⁻¹ | [6.119] | .189985 | ^g 5.2406 | | | | | | ^h 3.320 | ^k 1.484869 | 14.5844 | ⁱ 19.023 | ^j 4.434 | ^k 4.211101 | ^l 3.441741 |
| C_e , cm ⁻¹ | [.3037] | .189985 | ^g 5.2406 | 1.18171 | .391625 | .203724 | .109297 | J.199165 | ^h 2.276 | | 9.5256 | ⁱ 14.825 | ^l 4.412 | | ^l 2.935345 |
| α_A^1 , cm ⁻¹ | | | | | | | | | | | .750 | ¹ 1.125 | | | |
| α_A^2 , cm ⁻¹ | | | | | | | | | | | -2.941 | ¹ 1.346 | | | |
| α_A^3 , cm ⁻¹ | | | | | | | | | | | 1.253 | ¹ 1.173 | | | |
| α_B^1 , cm ⁻¹ | | | | .00685 | .00126 | -.0006044 | .000198 | | | ^m .010095 | .238 | ¹ 1.159 | | ^m .001863 | |
| α_B^2 , cm ⁻¹ | | | | .00622 | -.00076 | -.0003532 | -.000256 | | | ^m -.003607 | -.160 | ¹ 1.219 | | ^m -.0005534 | |
| α_B^3 , cm ⁻¹ | | | | ⁿ .00419 | .0030875 | .001858 | .000710 | | | ^m .010419 | .078 | ¹ 1.124 | | ^m .003442 | |
| α_C^1 , cm ⁻¹ | | | | | | | | | | | .2018 | ¹ 1.069 | | | |
| α_C^2 , cm ⁻¹ | | | | | | | | | | | .1392 | ¹ 1.062 | | | |
| α_C^3 , cm ⁻¹ | | | | | | | | | | | .1445 | ¹ 1.055 | | | |
| D_{000} , cm ⁻¹ | | | | 151×10 ⁻⁶ | 13.5×10 ⁻⁶ | 4.24×10 ⁻⁶ | 1.1×10 ⁻⁶ | 5.547×10 ⁻⁶ | | 293.6×10 ⁻⁶ | | | | 17.89×10 ⁻⁶ | |
| ρ , cm ⁻¹ | | | | | | | | | | | 2.15×10 ⁻⁵ | 1.7×10 ⁻⁵ | | | |
| Molecular weight | 50.011 | 88.011 | 16.043 | 26.038 | 44.011 | 60.077 | 76.143 | 61.476 | 67.457 | 27.027 | 18.016 | 34.082 | 46.008 | 44.016 | 64.066 |
| Statistical weight | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 |
| Symmetry number | 2 | 12 | 12 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 2 |
| References | 81 | 83, 119 | 267, 268 | 269, 270 | 271 | 272, 273, 274 | 275 | 276, 277 | 278, 279 | 280 | 281, 282, 283 | 284, 285 | 286 | 287 | 288, 289 |

^aUnperturbed vibrational frequency.^b $\nu_5 = 729.25(2)$.^c $x_{15} = -11.75$; $x_{25} = -0.85$; $x_{35} = -5.73$;
 $x_{45} = -12.65$; $x_{55} = -2.27$.^d $g_{44} = -1.10$ (incorrect sign reported by ref. 269); $g_{55} = 2.49$.^e $g_{22} = x_{11} - B_0 + \frac{1}{2} \nu_{111} + \nu_{211} + \frac{1}{2} \nu_{311}$.^f $\nu_{333} = \nu_{333}^0 + z_{3333}$.^g A_0 .^hAdjusted for the isotopic mixture.ⁱDerived from moments of inertia given in ref. 284.^j B_0 .^k $B_e = B_0 + \frac{1}{2} \alpha_1 + \alpha_2 + \frac{1}{2} \alpha_3$.^l C_0 .^m $\alpha_1^B = \alpha_1 + 2\nu_{11} + \nu_{12} + \frac{1}{2} \nu_{13}$ $\alpha_2^B = \alpha_2 + 3\nu_{22} + \frac{1}{2} \nu_{12} + \frac{1}{2} \nu_{23}$ $\alpha_3^B = \alpha_3 + 2\nu_{33} + \nu_{23} + \frac{1}{2} \nu_{13}$ ⁿ $\alpha_4^B = -1.31 \times 10^{-3}$ cm⁻¹; $\alpha_5^B = -2.15 \times 10^{-3}$ cm⁻¹.

TABLE III. - THERMODYNAMIC PROPERTIES

(1) Al (gas); molecular weight, 26.98

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_p° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 75760.4 | 76857.6 | ----- | 0 | ----- |
| 100 | 6.0209 | 588.2 | 33.3444 | 2746.3 | 76354.6 | 77331.1 | -162.0725 | 0 | 0 |
| 200 | 5.2899 | 1144.8 | 37.2314 | 6301.5 | 76911.2 | 77454.1 | -77.4971 | 0 | 0 |
| 298.15 | 5.1125 | 1653.6 | 39.3038 | 10064.8 | 77420.0 | 77420.0 | -49.6388 | 0 | 0 |
| 300 | 5.1107 | 1663.1 | 39.3354 | 10137.5 | 77429.5 | 77418.7 | -49.2889 | 0 | 0 |
| 400 | 5.0472 | 2170.5 | 40.7956 | 14147.7 | 77936.9 | 77328.6 | -35.1966 | 0 | 0 |
| 500 | 5.0181 | 2673.6 | 41.9184 | 18285.6 | 78440.0 | 77204.5 | -26.7528 | 0 | 0 |
| 600 | 5.0024 | 3174.6 | 42.8318 | 22524.5 | 78940.9 | 77048.6 | -21.1340 | 0 | 0 |
| 700 | 4.9931 | 3674.3 | 43.6021 | 26847.2 | 79440.7 | 76862.0 | -17.1293 | 0 | 0 |
| 800 | 4.9872 | 4173.3 | 44.2685 | 31241.5 | 79939.7 | 76645.0 | -14.1338 | 0 | 0 |
| 900 | 4.9831 | 4671.8 | 44.8556 | 35698.2 | 80438.2 | 76397.9 | -11.8109 | 0 | 0 |
| ^a 1000 | 4.9802 | 5170.0 | 45.3805 | 40210.5 | 80936.3 | 75605.1 | -9.9994 | 0 | 0 |
| 1100 | 4.9781 | 5667.9 | 45.8550 | 44772.7 | 81434.2 | 73403.0 | -8.5392 | 0 | 0 |
| 1200 | 4.9765 | 6165.6 | 46.2881 | 49380.1 | 81932.0 | 73200.8 | -7.3256 | 0 | 0 |
| 1300 | 4.9752 | 6663.2 | 46.6864 | 54029.1 | 82429.5 | 72998.3 | -6.3014 | 0 | 0 |
| 1400 | 4.9742 | 7160.6 | 47.0550 | 58716.4 | 82927.0 | 72795.8 | -5.4261 | 0 | 0 |
| 1500 | 4.9734 | 7658.0 | 47.3982 | 63439.3 | 83424.4 | 72593.2 | -4.6696 | 0 | 0 |
| 1600 | 4.9728 | 8155.3 | 47.7192 | 68195.3 | 83921.7 | 72390.5 | -4.0093 | 0 | 0 |
| 1700 | 4.9722 | 8652.6 | 48.0206 | 72982.5 | 84418.9 | 72187.7 | -3.4286 | 0 | 0 |
| 1800 | 4.9718 | 9149.8 | 48.3048 | 77798.9 | 84916.2 | 71984.9 | -2.9137 | 0 | 0 |
| 1900 | 4.9714 | 9646.9 | 48.5736 | 82642.9 | 85413.3 | 71782.1 | -2.4543 | 0 | 0 |
| 2000 | 4.9711 | 10144.1 | 48.8286 | 87513.1 | 85910.4 | 71579.2 | -2.0420 | 0 | 0 |
| 2100 | 4.9708 | 10641.2 | 49.0711 | 92408.2 | 86407.5 | 71376.3 | -1.6702 | 0 | 0 |
| 2200 | 4.9706 | 11138.2 | 49.3024 | 97327.0 | 86904.6 | 71173.4 | -1.3331 | 0 | 0 |
| 2300 | 4.9704 | 11635.3 | 49.5233 | 102268.3 | 87401.7 | 70970.5 | -1.0261 | 0 | 0 |
| 2400 | 4.9703 | 12132.3 | 49.7348 | 107231.3 | 87898.7 | 70767.5 | -0.7456 | 0 | 0 |
| 2500 | 4.9702 | 12629.3 | 49.9377 | 112215.0 | 88395.7 | 70564.5 | -0.4882 | 0 | 0 |
| 2600 | 4.9701 | 13126.3 | 50.1327 | 117218.6 | 88892.7 | 70361.5 | -0.2512 | 0 | 0 |
| 2700 | 4.9702 | 13623.4 | 50.3203 | 122241.3 | 89389.7 | 70158.5 | -0.0324 | 0 | 0 |
| 2800 | 4.9703 | 14120.4 | 50.5010 | 127282.4 | 89886.8 | 69955.6 | 0.1700 | 0 | 0 |
| 2900 | 4.9705 | 14617.4 | 50.6754 | 132341.3 | 90383.8 | 69752.6 | 0.3581 | 0 | 0 |
| 3000 | 4.9709 | 15114.5 | 50.8439 | 137417.3 | 90880.9 | 69549.7 | 0.5330 | 0 | 0 |
| 3100 | 4.9715 | 15611.6 | 51.0069 | 142509.9 | 91378.0 | 69346.8 | 0.6965 | 0 | 0 |
| 3200 | 4.9723 | 16108.8 | 51.1648 | 147618.5 | 91875.2 | 69144.0 | 0.8489 | 0 | 0 |
| 3300 | 4.9735 | 16606.1 | 51.3178 | 152742.7 | 92372.5 | 68941.3 | 0.9916 | 0 | 0 |
| 3400 | 4.9750 | 17103.5 | 51.4663 | 157882.0 | 92869.9 | 68738.7 | 1.1257 | 0 | 0 |
| 3500 | 4.9769 | 17601.1 | 51.6105 | 163035.8 | 93367.5 | 68536.3 | 1.2517 | 0 | 0 |
| 3600 | 4.9794 | 18098.9 | 51.7508 | 168203.9 | 93865.3 | 68334.1 | 1.3705 | 0 | 0 |
| 3700 | 4.9824 | 18597.0 | 51.8873 | 173385.9 | 94363.4 | 68132.2 | 1.4824 | 0 | 0 |
| 3800 | 4.9862 | 19095.4 | 52.0202 | 178581.3 | 94861.8 | 67930.6 | 1.5883 | 0 | 0 |
| 3900 | 4.9908 | 19594.3 | 52.1498 | 183789.8 | 95360.6 | 67729.4 | 1.6883 | 0 | 0 |
| 4000 | 4.9964 | 20093.6 | 52.2762 | 189011.1 | 95860.0 | 67528.8 | 1.7831 | 0 | 0 |
| 4100 | 5.0030 | 20593.6 | 52.3996 | 194244.9 | 96359.9 | 67328.7 | 1.8729 | 0 | 0 |
| 4200 | 5.0107 | 21094.2 | 52.5203 | 199490.9 | 96860.6 | 67129.4 | 1.9581 | 0 | 0 |
| 4300 | 5.0188 | 21595.5 | 52.6382 | 204748.9 | 97361.8 | 66930.6 | 2.0392 | 0 | 0 |
| 4400 | 5.0291 | 22097.8 | 52.7537 | 210018.5 | 97864.2 | 66733.0 | 2.1164 | 0 | 0 |
| 4500 | 5.0403 | 22601.2 | 52.8668 | 215299.5 | 98367.5 | 66536.3 | 2.1900 | 0 | 0 |
| 4600 | 5.0535 | 23105.8 | 52.9777 | 220591.8 | 98872.2 | 66341.0 | 2.2601 | 0 | 0 |
| 4700 | 5.0685 | 23611.9 | 53.0866 | 225895.0 | 99378.3 | 66147.1 | 2.3272 | 0 | 0 |
| 4800 | 5.0854 | 24119.6 | 53.1935 | 231209.0 | 99886.0 | 65954.8 | 2.3910 | 0 | 0 |
| 4900 | 5.1035 | 24628.8 | 53.2985 | 236533.6 | 100395.2 | 65764.0 | 2.4523 | 0 | 0 |
| 5000 | 5.1243 | 25140.2 | 53.4018 | 241868.6 | 100906.6 | 65575.4 | 2.5110 | 0 | 0 |
| 5100 | 5.1473 | 25653.8 | 53.5035 | 247213.9 | 101420.2 | 65389.0 | 2.5670 | 0 | 0 |
| 5200 | 5.1727 | 26169.8 | 53.6037 | 252569.3 | 101936.1 | 65204.9 | 2.6208 | 0 | 0 |
| 5300 | 5.2004 | 26688.4 | 53.7025 | 257934.6 | 102454.8 | 65023.6 | 2.6725 | 0 | 0 |
| 5400 | 5.2307 | 27209.9 | 53.7999 | 263309.7 | 102976.3 | 64845.1 | 2.7220 | 0 | 0 |
| 5500 | 5.2636 | 27734.6 | 53.8962 | 268694.6 | 103501.0 | 64669.8 | 2.7696 | 0 | 0 |
| 5600 | 5.2992 | 28262.7 | 53.9914 | 274088.9 | 104029.1 | 64497.9 | 2.8154 | 0 | 0 |
| 5700 | 5.3376 | 28794.5 | 54.0855 | 279492.8 | 104560.9 | 64329.7 | 2.8595 | 0 | 0 |
| 5800 | 5.3774 | 29329.6 | 54.1785 | 284905.9 | 105096.0 | 64164.8 | 2.9021 | 0 | 0 |
| 5900 | 5.4214 | 29869.5 | 54.2708 | 290328.4 | 105635.9 | 64004.7 | 2.9430 | 0 | 0 |
| 6000 | 5.4402 | 30398.0 | 54.3594 | 295758.6 | 106164.4 | 63833.2 | 2.9823 | 0 | 0 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Al, 932° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(2) Al (crystal, liquid); molecular weight, 26.98

| T, °K | C_p^o , cal/mole °K | $H_T^o - H_0^o$, ^a cal/mole | S_T^o , cal/mole °K | $-(F_T^o - H_0^o)$, ^a cal/mole | H_T^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|---------------------|--------------------------|--------------------------------------------|--------------------------|-----------------------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_T^o)_f$, cal/mole | $\log_{10} K_f$ | ΔH_T^o , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | 0 | 0 | -1091.2 | 0 | ----- | -76857.5 | ----- |
| 100 | 3.117 | 114.7 | 1.651 | 50.4 | -976.5 | 0 | 0 | -77331.1 | 162.0725 |
| 200 | 5.160 | 548.3 | 4.575 | 366.7 | -542.9 | 0 | 0 | -77454.1 | 77.4971 |
| 298.15 ^b | 5.813 | 1091.2 | 6.775 | 928.8 | 0 | 0 | 0 | -77420.0 | 49.6388 |
| 300 | 5.827 | 1102.0 | 6.811 | 941.3 | 10.8 | 0 | 0 | -77418.7 | 49.2889 |
| 400 | 6.124 | 1649.5 | 8.528 | 1711.7 | 608.3 | 0 | 0 | -77328.6 | 35.1966 |
| 500 | 6.420 | 2326.7 | 9.926 | 2636.3 | 1235.5 | 0 | 0 | -77204.5 | 26.7528 |
| 600 | 6.716 | 2983.5 | 11.123 | 3690.3 | 1892.3 | 0 | 0 | -77048.6 | 21.1340 |
| 700 | 7.012 | 3669.9 | 12.180 | 4856.1 | 2578.7 | 0 | 0 | -76862.0 | 17.1293 |
| 800 | 7.308 | 4305.9 | 13.136 | 6122.9 | 3294.7 | 0 | 0 | -76645.0 | 14.1338 |
| 900 | 7.604 | 5131.5 | 14.014 | 7481.1 | 4040.3 | 0 | 0 | -76397.9 | 11.8109 |
| 932 | 7.699 | 5376.4 | 14.281 | 7933.5 | 4285.2 | 0 | 0 | -76229.1 | 11.1623 |
| 932 | 7.0 | 7946.4 | 17.038 | 7933.5 | 6855.2 | 0 | 0 | -73692.8 | 11.1623 |
| 1000 | 7.0 | 8422.4 | 17.531 | 9108.6 | 7331.2 | 0 | 0 | -73605.1 | 9.9994 |
| 1100 | 7.0 | 9122.4 | 18.199 | 10896.5 | 8031.2 | 0 | 0 | -73403.0 | 8.5392 |
| 1200 | 7.0 | 9822.4 | 18.808 | 12747.2 | 8731.2 | 0 | 0 | -73200.3 | 7.3256 |
| 1300 | 7.0 | 10522.4 | 19.368 | 14656.0 | 9431.2 | 0 | 0 | -72998.3 | 6.3014 |
| 1400 | 7.0 | 11222.4 | 19.887 | 16619.4 | 10131.2 | 0 | 0 | -72795.8 | 5.4261 |
| 1500 | 7.0 | 11922.4 | 20.370 | 18632.6 | 10831.2 | 0 | 0 | -72593.2 | 4.6696 |
| 1600 | 7.0 | 12622.4 | 20.821 | 20691.2 | 11531.2 | 0 | 0 | -72390.5 | 4.0093 |
| 1700 | 7.0 | 13322.4 | 21.246 | 22795.8 | 12231.2 | 0 | 0 | -72187.7 | 3.4286 |
| 1800 | 7.0 | 14022.4 | 21.646 | 24940.4 | 12931.2 | 0 | 0 | -71985.0 | 2.9137 |
| 1900 | 7.0 | 14722.4 | 22.024 | 27123.2 | 13631.2 | 0 | 0 | -71782.1 | 2.4543 |
| 2000 | 7.0 | 15422.4 | 22.383 | 29343.6 | 14331.2 | 0 | 0 | -71579.2 | 2.0420 |
| 2100 | 7.0 | 16122.4 | 22.725 | 31600.1 | 15031.2 | 0 | 0 | -71376.3 | 1.6702 |
| 2200 | 7.0 | 16822.4 | 23.051 | 33889.8 | 15731.2 | 0 | 0 | -71173.4 | 1.3331 |
| 2300 | 7.0 | 17522.4 | 23.362 | 36210.2 | 16431.2 | 0 | 0 | -70970.5 | 1.0261 |
| 2400 | 7.0 | 18222.4 | 23.660 | 38561.6 | 17131.2 | 0 | 0 | -70767.5 | 0.7456 |
| 2500 | 7.0 | 18922.4 | 23.946 | 40942.6 | 17831.2 | 0 | 0 | -70564.5 | 0.4882 |
| 2600 | 7.0 | 19622.4 | 24.220 | 43349.6 | 18531.2 | 0 | 0 | -70361.5 | 0.2512 |
| 2700 | 7.0 | 20322.4 | 24.484 | 45784.4 | 19231.2 | 0 | 0 | -70158.5 | 0.0324 |
| 2800 | 7.0 | 21022.4 | 24.739 | 48246.8 | 19931.2 | 0 | 0 | -69955.6 | -0.1700 |
| 2900 | 7.0 | 21722.4 | 24.984 | 50731.2 | 20631.2 | 0 | 0 | -69752.6 | -0.3581 |
| 3000 | 7.0 | 22422.4 | 25.222 | 53243.6 | 21331.2 | 0 | 0 | -69549.7 | -0.5330 |
| 3100 | 7.0 | 23122.4 | 25.451 | 55775.7 | 22031.2 | 0 | 0 | -69346.8 | -0.6953 |
| 3200 | 7.0 | 23822.4 | 25.673 | 58331.2 | 22731.2 | 0 | 0 | -69144.0 | -0.8489 |
| 3300 | 7.0 | 24522.4 | 25.889 | 60911.3 | 23431.2 | 0 | 0 | -68941.3 | -0.9916 |
| 3400 | 7.0 | 25222.4 | 26.098 | 63510.8 | 24131.2 | 0 | 0 | -68738.7 | -1.1257 |
| 3500 | 7.0 | 25922.4 | 26.301 | 66131.1 | 24831.2 | 0 | 0 | -68536.3 | -1.2517 |
| 3600 | 7.0 | 26622.4 | 26.498 | 68770.4 | 25531.2 | 0 | 0 | -68334.1 | -1.3705 |
| 3700 | 7.0 | 27322.4 | 26.690 | 71430.6 | 26231.2 | 0 | 0 | -68132.2 | -1.4824 |
| 3800 | 7.0 | 28022.4 | 26.876 | 74106.4 | 26931.2 | 0 | 0 | -67930.6 | -1.5883 |
| 3900 | 7.0 | 28722.4 | 27.058 | 76803.9 | 27631.2 | 0 | 0 | -67729.4 | -1.6883 |
| 4000 | 7.0 | 29422.4 | 27.235 | 79517.6 | 28331.2 | 0 | 0 | -67528.8 | -1.7831 |
| 4100 | 7.0 | 30122.4 | 27.408 | 82250.4 | 29031.2 | 0 | 0 | -67328.7 | -1.8729 |
| 4200 | 7.0 | 30822.4 | 27.577 | 85001.0 | 29731.2 | 0 | 0 | -67129.4 | -1.9581 |
| 4300 | 7.0 | 31522.4 | 27.742 | 87768.2 | 30431.2 | 0 | 0 | -66930.5 | -2.0392 |
| 4400 | 7.0 | 32222.4 | 27.903 | 90550.8 | 31131.2 | 0 | 0 | -66733.0 | -2.1164 |
| 4500 | 7.0 | 32922.4 | 28.060 | 93347.6 | 31831.2 | 0 | 0 | -66536.3 | -2.1900 |
| 4600 | 7.0 | 33622.4 | 28.214 | 96162.0 | 32531.2 | 0 | 0 | -66341.0 | -2.2601 |
| 4700 | 7.0 | 34322.4 | 28.364 | 98988.4 | 33231.2 | 0 | 0 | -66147.1 | -2.3272 |
| 4800 | 7.0 | 35022.4 | 28.512 | 101835.2 | 33931.2 | 0 | 0 | -65954.8 | -2.3910 |
| 4900 | 7.0 | 35722.4 | 28.656 | 104692.0 | 34631.2 | 0 | 0 | -65764.0 | -2.4523 |
| 5000 | 7.0 | 36422.4 | 28.797 | 107562.6 | 35331.2 | 0 | 0 | -65575.4 | -2.5110 |
| 5100 | 7.0 | 37122.4 | 28.936 | 110451.2 | 36031.2 | 0 | 0 | -65389.0 | -2.5670 |
| 5200 | 7.0 | 37822.4 | 29.072 | 113352.0 | 36731.2 | 0 | 0 | -65204.9 | -2.6208 |
| 5300 | 7.0 | 38522.4 | 29.205 | 116264.1 | 37431.2 | 0 | 0 | -65023.5 | -2.6725 |
| 5400 | 7.0 | 39222.4 | 29.336 | 119192.0 | 38131.2 | 0 | 0 | -64845.1 | -2.7220 |
| 5500 | 7.0 | 39922.4 | 29.465 | 122135.1 | 38831.2 | 0 | 0 | -64669.8 | -2.7696 |
| 5600 | 7.0 | 40622.4 | 29.591 | 125087.2 | 39531.2 | 0 | 0 | -64497.9 | -2.8154 |
| 5700 | 7.0 | 41322.4 | 29.715 | 128053.1 | 40231.2 | 0 | 0 | -64329.7 | -2.8595 |
| 5800 | 7.0 | 42022.4 | 29.836 | 131026.4 | 40931.2 | 0 | 0 | -64164.8 | -2.9021 |
| 5900 | 7.0 | 42722.4 | 29.956 | 134018.0 | 41631.2 | 0 | 0 | -64004.7 | -2.9430 |
| 6000 | 7.0 | 43422.4 | 30.074 | 137021.6 | 42331.2 | 0 | 0 | -63843.2 | -2.9823 |

^a H_0^o refers to crystal state.^bMelting point.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(3) Al₂ (gas); molecular weight, 53.96

| T, °K | C _p ^o , cal/mole °K | H _f ^o -H ₀ ^o , cal/mole | S _F ^o , cal/mole °K | -(F _F ^o -H ₀ ^o), cal/mole | H _F ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _F ^o) _f , cal/mole | log ₁₀ K _f | ΔH _F ^o , cal/mole | log ₁₀ K |
| G | ----- | 0 | ----- | 0 | 114532.8 | 116715.2 | ----- | -37000.0 | ----- |
| 100 | 7.5893 | 711.2 | 44.9583 | 3784.6 | 115244.0 | 117197.0 | -247.0179 | -37465.1 | 77.1271 |
| 200 | 8.4503 | 1520.7 | 50.5345 | 8586.2 | 116053.4 | 117139.2 | -118.9535 | -37768.9 | 36.0406 |
| 298.15 | 8.7508 | 2367.0 | 53.9735 | 13725.2 | 116899.8 | 116899.8 | -76.8516 | -37940.2 | 22.4261 |
| 300 | 8.7543 | 2383.2 | 54.0277 | 13825.1 | 116916.0 | 116894.4 | -76.3232 | -37942.9 | 22.2546 |
| 400 | 8.8931 | 3266.3 | 56.5673 | 19360.6 | 117799.1 | 116582.5 | -55.0599 | -38074.7 | 15.3333 |
| 500 | 8.9748 | 4160.0 | 58.5611 | 25120.6 | 118692.8 | 116221.8 | -42.3386 | -38187.2 | 11.1671 |
| 600 | 9.0322 | 5060.5 | 60.2027 | 31061.2 | 119593.2 | 115808.6 | -33.8862 | -38288.6 | 8.3818 |
| 700 | 9.0779 | 5966.1 | 61.5986 | 37153.0 | 120498.8 | 115341.4 | -27.8714 | -38382.5 | 6.3871 |
| 800 | 9.1171 | 6875.8 | 62.8134 | 43374.9 | 121408.6 | 114819.2 | -23.3799 | -38470.7 | 4.8876 |
| 900 | 9.1525 | 7789.4 | 63.8893 | 49711.0 | 122322.1 | 114241.5 | -19.9032 | -38554.2 | 3.7187 |
| a1000 | 9.1855 | 8706.3 | 64.8553 | 56149.1 | 123239.0 | 108576.6 | -17.2173 | -38633.6 | 2.7816 |
| 1100 | 9.2169 | 9626.4 | 65.7323 | 62679.1 | 124159.2 | 108096.8 | -15.0651 | -38709.3 | 2.0133 |
| 1200 | 9.2472 | 10549.6 | 66.5356 | 69293.1 | 125082.4 | 107620.0 | -13.2793 | -38781.6 | 1.3718 |
| 1300 | 9.2768 | 11475.8 | 67.2769 | 75984.2 | 126008.6 | 107146.2 | -11.7747 | -38850.5 | 0.8281 |
| 1400 | 9.3059 | 12405.0 | 67.9655 | 82746.7 | 126937.7 | 106675.3 | -10.4910 | -38916.3 | 0.3612 |
| 1500 | 9.3345 | 13337.0 | 68.6085 | 89575.7 | 127869.7 | 106207.3 | -9.3833 | -38979.0 | -0.0441 |
| 1600 | 9.3628 | 14271.8 | 69.2118 | 96467.1 | 128804.6 | 105742.2 | -8.4179 | -39038.8 | -0.3993 |
| 1700 | 9.3909 | 15209.5 | 69.7803 | 103416.9 | 129742.3 | 105279.9 | -7.5704 | -39095.6 | -0.7132 |
| 1800 | 9.4188 | 16150.0 | 70.3178 | 110422.1 | 130682.8 | 104820.4 | -6.8201 | -39149.5 | -0.9926 |
| 1900 | 9.4465 | 17093.3 | 70.8278 | 117479.6 | 131626.0 | 104363.6 | -6.1515 | -39200.6 | -1.2429 |
| 2000 | 9.4741 | 18039.3 | 71.3131 | 124586.8 | 132572.1 | 103909.7 | -5.5526 | -39248.8 | -1.4685 |
| 2100 | 9.5016 | 18988.1 | 71.7760 | 131741.5 | 133520.9 | 103458.5 | -5.0133 | -39294.2 | -1.6729 |
| 2200 | 9.5291 | 19939.6 | 72.2186 | 138941.3 | 134472.4 | 103010.0 | -4.5251 | -39336.8 | -1.8588 |
| 2300 | 9.5565 | 20893.9 | 72.6428 | 146184.6 | 135426.7 | 102564.3 | -4.0811 | -39376.6 | -2.0288 |
| 2400 | 9.5838 | 21850.9 | 73.0501 | 153469.3 | 136383.7 | 102121.3 | -3.6759 | -39413.7 | -2.1848 |
| 2500 | 9.6110 | 22810.7 | 73.4419 | 160794.1 | 137343.4 | 101681.0 | -3.3049 | -39448.0 | -2.3284 |
| 2600 | 9.6382 | 23773.1 | 73.8194 | 168157.2 | 138305.9 | 101243.5 | -2.9635 | -39479.6 | -2.4611 |
| 2700 | 9.6654 | 24738.3 | 74.1836 | 175557.5 | 139271.1 | 100808.7 | -2.6489 | -39508.4 | -2.5840 |
| 2800 | 9.6926 | 25706.2 | 74.5356 | 182993.6 | 140239.0 | 100376.6 | -2.3583 | -39534.5 | -2.6983 |
| 2900 | 9.7197 | 26676.8 | 74.8762 | 190464.2 | 141209.6 | 99947.2 | -2.0884 | -39558.0 | -2.8047 |
| 3000 | 9.7468 | 27650.2 | 75.2062 | 197968.5 | 142182.9 | 99520.5 | -1.8382 | -39578.8 | -2.9041 |
| 3100 | 9.7739 | 28626.2 | 75.5262 | 205505.2 | 143159.0 | 99096.6 | -1.6046 | -39597.0 | -2.9971 |
| 3200 | 9.8010 | 29604.9 | 75.8370 | 213073.4 | 144137.7 | 98675.3 | -1.3866 | -39612.6 | -3.0844 |
| 3300 | 9.8281 | 30586.4 | 76.1390 | 220672.3 | 145119.2 | 98256.8 | -1.1831 | -39625.8 | -3.1664 |
| 3400 | 9.8551 | 31570.6 | 76.4328 | 228300.9 | 146103.3 | 97840.9 | -0.9922 | -39636.4 | -3.2436 |
| 3500 | 9.8821 | 32557.4 | 76.7189 | 235958.6 | 147090.2 | 97427.8 | -0.8129 | -39644.8 | -3.3164 |
| 3600 | 9.9092 | 33547.0 | 76.9976 | 243644.5 | 148079.7 | 97017.3 | -0.6442 | -39650.8 | -3.3851 |
| 3700 | 9.9362 | 34539.2 | 77.2695 | 251357.9 | 149072.0 | 96609.6 | -0.4854 | -39654.7 | -3.4502 |
| 3800 | 9.9632 | 35534.2 | 77.5348 | 259098.1 | 150067.0 | 96204.6 | -0.3353 | -39656.6 | -3.5118 |
| 3900 | 9.9902 | 36531.9 | 77.7940 | 266864.6 | 151064.6 | 95802.2 | -0.1938 | -39656.6 | -3.5703 |
| 4000 | 10.0172 | 37532.2 | 78.0472 | 274656.7 | 152065.0 | 95402.6 | -0.0597 | -39655.0 | -3.6259 |
| 4100 | 10.0441 | 38535.3 | 78.2949 | 282473.9 | 153068.1 | 95005.7 | 0.0671 | -39651.8 | -3.6787 |
| 4200 | 10.0711 | 39541.1 | 78.5373 | 290315.5 | 154073.8 | 94611.4 | 0.1872 | -39647.4 | -3.7290 |
| 4300 | 10.0981 | 40549.5 | 78.7746 | 298181.2 | 155082.3 | 94219.9 | 0.3014 | -39641.4 | -3.7770 |
| 4400 | 10.1251 | 41560.7 | 79.0070 | 306070.3 | 156093.5 | 93831.1 | 0.4099 | -39635.0 | -3.8228 |
| 4500 | 10.1520 | 42574.5 | 79.2349 | 313982.4 | 157107.3 | 93444.9 | 0.5134 | -39627.8 | -3.8665 |
| 4600 | 10.1790 | 43591.1 | 79.4583 | 321917.1 | 158123.9 | 93061.5 | 0.6118 | -39620.6 | -3.9084 |
| 4700 | 10.2059 | 44610.3 | 79.6775 | 329874.0 | 159143.1 | 92680.7 | 0.7059 | -39613.5 | -3.9484 |
| 4800 | 10.2329 | 45632.3 | 79.8927 | 337852.5 | 160165.0 | 92302.6 | 0.7953 | -39606.9 | -3.9868 |
| 4900 | 10.2598 | 46656.9 | 80.1039 | 345852.4 | 161189.7 | 91927.3 | 0.8810 | -39600.7 | -4.0236 |
| 5000 | 10.2868 | 47684.2 | 80.3115 | 353873.2 | 162217.0 | 91554.6 | 0.9630 | -39596.2 | -4.0589 |
| 5100 | 10.3137 | 48714.3 | 80.5155 | 361914.5 | 163247.0 | 91184.6 | 1.0411 | -39593.3 | -4.0928 |
| 5200 | 10.3407 | 49747.0 | 80.7160 | 369976.1 | 164279.8 | 90817.4 | 1.1161 | -39592.5 | -4.1255 |
| 5300 | 10.3676 | 50782.4 | 80.9132 | 378057.6 | 165315.2 | 90452.8 | 1.1881 | -39594.4 | -4.1568 |
| 5400 | 10.3945 | 51820.5 | 81.1073 | 386158.7 | 166353.3 | 90090.9 | 1.2570 | -39599.3 | -4.1871 |
| 5500 | 10.4215 | 52861.3 | 81.2982 | 394279.0 | 167394.1 | 89731.7 | 1.3229 | -39607.9 | -4.2162 |
| 5600 | 10.4484 | 53904.8 | 81.4863 | 402418.2 | 168437.6 | 89375.2 | 1.3865 | -39620.6 | -4.2443 |
| 5700 | 10.4754 | 54951.0 | 81.6714 | 410576.1 | 169483.8 | 89021.4 | 1.4475 | -39638.1 | -4.2715 |
| 5800 | 10.5023 | 55999.9 | 81.8538 | 418752.4 | 170532.6 | 88670.2 | 1.5066 | -39659.3 | -4.2977 |
| 5900 | 10.5292 | 57051.5 | 82.0336 | 426946.8 | 171584.2 | 88321.8 | 1.5630 | -39687.6 | -4.3230 |
| 6000 | 10.5561 | 58105.7 | 82.2108 | 435159.0 | 172638.5 | 87976.1 | 1.6172 | -39690.2 | -4.3474 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Al, 932° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(4) AlCl (gas); molecular weight, 62.437

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -13808.7 | -11620.8 | ----- | -117026.7 | ----- |
| 100 | 7.0577 | 696.9 | 46.1583 | 3918.9 | -13111.8 | -11386.6 | 29.6770 | -117414.8 | 251.9774 |
| 200 | 7.7805 | 1437.6 | 51.2629 | 8815.0 | -12371.1 | -11442.2 | 17.2253 | -117729.7 | 123.5333 |
| 298.15 | 8.2870 | 2228.7 | 54.4744 | 14012.8 | -11580.0 | -11580.0 | 13.0891 | -117950.6 | 81.1486 |
| 300 | 8.2938 | 2244.0 | 54.5256 | 14113.7 | -11564.7 | -11583.0 | 13.0368 | -117954.4 | 80.6155 |
| 400 | 8.5634 | 3088.3 | 56.9525 | 19692.7 | -10720.4 | -11750.9 | 10.9138 | -118147.9 | 59.1178 |
| 500 | 8.7150 | 3952.9 | 58.8812 | 25487.7 | -9855.8 | -11940.5 | 9.6204 | -118327.3 | 46.1987 |
| 600 | 8.8091 | 4829.4 | 60.4790 | 31458.0 | -8979.3 | -12155.1 | 8.7434 | -118496.2 | 37.5731 |
| 700 | 8.8729 | 5713.7 | 61.8420 | 37575.7 | -8095.0 | -12396.5 | 8.1052 | -118655.2 | 31.4034 |
| 800 | 8.9194 | 6603.4 | 63.0300 | 43820.6 | -7205.3 | -12665.5 | 7.6164 | -118805.2 | 26.7701 |
| 900 | 8.9555 | 7497.2 | 64.0827 | 50177.2 | -6311.5 | -12962.5 | 7.2277 | -118947.0 | 23.1620 |
| 1000 | 8.9850 | 8394.3 | 65.0279 | 56633.6 | -5414.4 | -15803.5 | 6.8688 | -119081.3 | 20.2721 |
| 1100 | 9.0101 | 9294.1 | 65.8854 | 63179.9 | -4514.6 | -16052.6 | 6.5522 | -119209.1 | 17.9050 |
| 1200 | 9.0320 | 10196.2 | 66.6704 | 69808.2 | -3612.5 | -16300.7 | 6.2845 | -119331.1 | 15.9304 |
| 1300 | 9.0518 | 11100.4 | 67.3941 | 76511.9 | -2708.3 | -16547.9 | 6.0545 | -119447.9 | 14.2579 |
| 1400 | 9.0700 | 12006.5 | 68.0656 | 83285.3 | -1802.2 | -16794.4 | 5.8543 | -119560.1 | 12.8230 |
| 1500 | 9.0870 | 12914.4 | 68.6920 | 90123.6 | -894.3 | -17040.0 | 5.6783 | -119668.2 | 11.5782 |
| 1600 | 9.1031 | 13823.9 | 69.2789 | 97022.4 | 15.2 | -17285.0 | 5.5222 | -119772.5 | 10.4880 |
| 1700 | 9.1185 | 14735.0 | 69.8313 | 103978.2 | 926.3 | -17529.2 | 5.3822 | -119873.5 | 9.5253 |
| 1800 | 9.1334 | 15647.6 | 70.3529 | 110987.6 | 1838.9 | -17772.8 | 5.2562 | -119971.3 | 8.6689 |
| 1900 | 9.1478 | 16561.6 | 70.8471 | 118047.9 | 2753.0 | -18015.6 | 5.1419 | -120066.3 | 7.9019 |
| 2000 | 9.1619 | 17477.1 | 71.3167 | 125156.2 | 3668.4 | -18257.9 | 5.0377 | -120158.6 | 7.2112 |
| 2100 | 9.1757 | 18394.0 | 71.7640 | 132310.5 | 4585.3 | -18499.5 | 4.9419 | -120248.3 | 6.5857 |
| 2200 | 9.1894 | 19312.3 | 72.1912 | 139508.4 | 5503.6 | -18740.4 | 4.8538 | -120335.7 | 6.0167 |
| 2300 | 9.2029 | 20231.9 | 72.6000 | 146748.1 | 6423.2 | -18980.7 | 4.7724 | -120420.9 | 5.4968 |
| 2400 | 9.2164 | 21152.9 | 72.9919 | 154027.8 | 7344.2 | -19220.4 | 4.6967 | -120503.9 | 5.0199 |
| 2500 | 9.2300 | 22075.2 | 73.3685 | 161346.0 | 8266.5 | -19459.4 | 4.6263 | -120584.9 | 4.5808 |
| 2600 | 9.2438 | 22998.9 | 73.7307 | 168701.0 | 9190.2 | -19697.7 | 4.5606 | -120663.8 | 4.1753 |
| 2700 | 9.2579 | 23923.9 | 74.0799 | 176091.7 | 10115.3 | -19935.3 | 4.4989 | -120740.8 | 3.7995 |
| 2800 | 9.2723 | 24850.5 | 74.4168 | 183516.6 | 11041.8 | -20172.1 | 4.4408 | -120815.9 | 3.4504 |
| 2900 | 9.2874 | 25778.4 | 74.7424 | 190974.6 | 11969.7 | -20408.1 | 4.3864 | -120889.0 | 3.1251 |
| 3000 | 9.3031 | 26707.9 | 75.0576 | 198464.7 | 12899.3 | -20643.3 | 4.3347 | -120960.2 | 2.8214 |
| 3100 | 9.3196 | 27639.1 | 75.3629 | 205985.8 | 13830.4 | -20877.5 | 4.2860 | -121029.4 | 2.5370 |
| 3200 | 9.3372 | 28571.9 | 75.6590 | 213537.0 | 14763.2 | -21110.6 | 4.2398 | -121096.6 | 2.2703 |
| 3300 | 9.3559 | 29506.6 | 75.9466 | 221117.4 | 15697.9 | -21342.6 | 4.1958 | -121161.8 | 2.0197 |
| 3400 | 9.3760 | 30443.1 | 76.2262 | 228726.1 | 16634.4 | -21573.3 | 4.1540 | -121224.9 | 1.7836 |
| 3500 | 9.3976 | 31381.8 | 76.4983 | 236362.4 | 17573.1 | -21802.5 | 4.1141 | -121285.8 | 1.5609 |
| 3600 | 9.4208 | 32322.7 | 76.7634 | 244025.5 | 18514.0 | -22030.1 | 4.0761 | -121344.4 | 1.3505 |
| 3700 | 9.4458 | 33266.0 | 77.0218 | 251714.8 | 19457.3 | -22256.0 | 4.0398 | -121400.6 | 1.1514 |
| 3800 | 9.4727 | 34211.9 | 77.2741 | 259429.7 | 20403.2 | -22479.9 | 4.0052 | -121454.4 | 0.9626 |
| 3900 | 9.5017 | 35160.6 | 77.5205 | 267169.4 | 21351.9 | -22701.7 | 3.9718 | -121505.5 | 0.7835 |
| 4000 | 9.5328 | 36112.3 | 77.7615 | 274933.6 | 22303.6 | -22921.1 | 3.9399 | -121554.0 | 0.6133 |
| 4100 | 9.5661 | 37067.3 | 77.9973 | 282721.6 | 23258.6 | -23137.9 | 3.9092 | -121599.7 | 0.4512 |
| 4200 | 9.6017 | 38025.6 | 78.2282 | 290532.9 | 24216.9 | -23351.8 | 3.8796 | -121642.4 | 0.2969 |
| 4300 | 9.6397 | 38987.7 | 78.4546 | 298367.1 | 25179.0 | -23562.8 | 3.8512 | -121681.9 | 0.1497 |
| 4400 | 9.6801 | 39953.7 | 78.6767 | 306223.6 | 26145.0 | -23770.4 | 3.8238 | -121718.5 | 0.0091 |
| 4500 | 9.7229 | 40923.8 | 78.8947 | 314102.2 | 27115.1 | -23974.5 | 3.7975 | -121751.7 | -0.1253 |
| 4600 | 9.7681 | 41898.3 | 79.1089 | 322002.5 | 28089.6 | -24174.9 | 3.7721 | -121781.8 | -0.2538 |
| 4700 | 9.8157 | 42877.5 | 79.3194 | 329923.9 | 29068.8 | -24371.2 | 3.7477 | -121808.5 | -0.3769 |
| 4800 | 9.8656 | 43861.5 | 79.5266 | 337866.2 | 30052.8 | -24563.3 | 3.7238 | -121831.8 | -0.4949 |
| 4900 | 9.9178 | 44850.7 | 79.7306 | 345829.1 | 31042.0 | -24750.8 | 3.7010 | -121851.4 | -0.6081 |
| 5000 | 9.9723 | 45845.2 | 79.9315 | 353812.2 | 32036.5 | -24933.7 | 3.6789 | -121867.7 | -0.7168 |
| 5100 | 10.0289 | 46845.2 | 80.1295 | 361815.3 | 33036.5 | -25111.7 | 3.6574 | -121880.6 | -0.8213 |
| 5200 | 10.0876 | 47851.0 | 80.3248 | 369838.1 | 34042.3 | -25284.5 | 3.6366 | -121890.0 | -0.9217 |
| 5300 | 10.1483 | 48862.8 | 80.5175 | 377880.2 | 35054.1 | -25451.9 | 3.6166 | -121896.0 | -1.0184 |
| 5400 | 10.2108 | 49880.7 | 80.7078 | 385941.5 | 36072.0 | -25613.8 | 3.5970 | -121898.7 | -1.1115 |
| 5500 | 10.2750 | 50905.0 | 80.8958 | 394021.7 | 37096.3 | -25770.0 | 3.5780 | -121898.1 | -1.2012 |
| 5600 | 10.3408 | 51935.8 | 81.0815 | 402120.6 | 38127.1 | -25920.4 | 3.5597 | -121894.4 | -1.2877 |
| 5700 | 10.4081 | 52973.2 | 81.2651 | 410237.9 | 39164.5 | -26064.7 | 3.5419 | -121887.6 | -1.3711 |
| 5800 | 10.4767 | 54017.5 | 81.4467 | 418373.5 | 40208.8 | -26202.8 | 3.5248 | -121877.3 | -1.4517 |
| 5900 | 10.5464 | 55068.6 | 81.6264 | 426527.2 | 41259.9 | -26334.6 | 3.5079 | -121864.8 | -1.5295 |
| 6000 | 10.6172 | 56126.8 | 81.8043 | 434698.7 | 42318.1 | -26460.0 | 3.4916 | -121833.7 | -1.6047 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Al, 932° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(5) AlCl_3 (gas); molecular weight, 133.351

| T, °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -144335.7 | -139954.3 | ----- | -302457.1 | ----- |
| 100 | 11.8770 | 936.9 | 58.9852 | 4961.7 | -143398.9 | -140176.1 | 304.0687 | -303598.9 | 646.8247 |
| 200 | 15.3117 | 2313.8 | 68.3925 | 11364.7 | -142021.9 | -140321.2 | 150.8330 | -304275.6 | 314.7629 |
| 298.15 | 17.1405 | 3915.8 | 74.8849 | 18411.2 | -140420.0 | -140420.0 | 100.3413 | -304691.9 | 205.2421 |
| 300 | 17.1651 | 3947.5 | 74.9910 | 18549.8 | -140388.3 | -140421.6 | 99.7066 | -304698.6 | 203.8649 |
| 400 | 18.1487 | 5718.2 | 80.0782 | 26313.1 | -138617.6 | -140492.4 | 74.1274 | -305026.3 | 148.3464 |
| 500 | 18.6982 | 7563.0 | 84.1926 | 34533.3 | -136772.7 | -140555.7 | 58.7727 | -305307.3 | 115.0018 |
| 600 | 19.0276 | 9450.6 | 87.6332 | 43129.3 | -134885.1 | -140628.1 | 48.5313 | -305553.9 | 92.7526 |
| 700 | 19.2381 | 11364.6 | 90.5832 | 52043.6 | -132971.1 | -140718.3 | 41.2119 | -305770.4 | 76.8482 |
| 800 | 19.3797 | 13295.9 | 93.1619 | 61233.6 | -131039.8 | -140831.0 | 35.7183 | -305960.3 | 64.9119 |
| 900 | 19.4792 | 15239.2 | 95.4506 | 70666.4 | -129096.6 | -140969.0 | 31.4417 | -306126.7 | 55.6227 |
| ^a 1000 | 19.5517 | 17190.9 | 97.5069 | 80316.0 | -127144.9 | -143649.8 | 27.9764 | -306272.9 | 48.1875 |
| 1100 | 19.6059 | 19148.9 | 99.3730 | 90161.4 | -125186.8 | -143738.4 | 25.1215 | -306401.8 | 42.1015 |
| 1200 | 19.6476 | 21111.7 | 101.0808 | 100185.3 | -123224.1 | -143826.3 | 22.7410 | -306515.9 | 37.0278 |
| 1300 | 19.6803 | 23078.1 | 102.6548 | 110373.1 | -121257.6 | -143914.2 | 20.7256 | -306617.3 | 32.7331 |
| 1400 | 19.7064 | 25047.5 | 104.1143 | 120712.5 | -119288.2 | -144002.4 | 18.9970 | -306708.0 | 29.0508 |
| 1500 | 19.7275 | 27019.2 | 105.4746 | 131192.7 | -117316.5 | -144091.2 | 17.4980 | -306789.3 | 25.8586 |
| 1600 | 19.7448 | 28992.9 | 106.7484 | 141804.5 | -115342.9 | -144181.0 | 16.1857 | -306862.7 | 23.0647 |
| 1700 | 19.7593 | 30968.1 | 107.9458 | 152539.8 | -113367.6 | -144271.7 | 15.0267 | -306929.1 | 20.5989 |
| 1800 | 19.7714 | 32944.7 | 109.0756 | 163391.4 | -111391.1 | -144363.6 | 13.9961 | -306989.4 | 18.4067 |
| 1900 | 19.7817 | 34922.3 | 110.1449 | 174352.9 | -109413.4 | -144456.8 | 13.0734 | -307044.5 | 16.4448 |
| 2000 | 19.7905 | 36900.9 | 111.1598 | 185418.6 | -107434.8 | -144551.4 | 12.2424 | -307094.9 | 14.6789 |
| 2100 | 19.7981 | 38880.4 | 112.1255 | 196583.2 | -105455.4 | -144647.4 | 11.4899 | -307141.3 | 13.0808 |
| 2200 | 19.8046 | 40860.5 | 113.0467 | 207842.2 | -103475.2 | -144744.8 | 10.8054 | -307184.0 | 11.6279 |
| 2300 | 19.8104 | 42841.3 | 113.9272 | 219191.2 | -101494.5 | -144843.8 | 10.1800 | -307223.5 | 10.3011 |
| 2400 | 19.8154 | 44822.6 | 114.7704 | 230626.4 | -99513.2 | -144944.4 | 9.6064 | -307260.1 | 9.0847 |
| 2500 | 19.8199 | 46804.3 | 115.5794 | 242144.1 | -97531.4 | -145046.6 | 9.0782 | -307294.1 | 7.9655 |
| 2600 | 19.8238 | 48786.5 | 116.3568 | 253741.2 | -95549.2 | -145150.4 | 8.5905 | -307325.8 | 6.9323 |
| 2700 | 19.8274 | 50769.1 | 117.1050 | 265414.5 | -93566.7 | -145255.8 | 8.1385 | -307355.4 | 5.9755 |
| 2800 | 19.8305 | 52752.0 | 117.8262 | 277161.3 | -91583.8 | -145362.9 | 7.7184 | -307383.1 | 5.0859 |
| 2900 | 19.8334 | 54735.2 | 118.5221 | 288978.9 | -89600.6 | -145471.7 | 7.3271 | -307409.1 | 4.2596 |
| 3000 | 19.8359 | 56718.7 | 119.1945 | 300864.9 | -87617.1 | -145582.3 | 6.9614 | -307433.6 | 3.4874 |
| 3100 | 19.8383 | 58702.4 | 119.8450 | 312817.1 | -85633.4 | -145694.5 | 6.6193 | -307456.8 | 2.7649 |
| 3200 | 19.8404 | 60686.3 | 120.4749 | 324833.3 | -83649.4 | -145808.5 | 6.2983 | -307478.7 | 2.0876 |
| 3300 | 19.8423 | 62670.4 | 121.0854 | 336911.4 | -81665.3 | -145924.2 | 5.9963 | -307499.4 | 1.4512 |
| 3400 | 19.8440 | 64654.8 | 121.6778 | 349049.7 | -79681.0 | -146041.7 | 5.7119 | -307519.3 | 0.8523 |
| 3500 | 19.8456 | 66639.2 | 122.2530 | 361246.4 | -77696.5 | -146160.9 | 5.4436 | -307538.2 | 0.2875 |
| 3600 | 19.8471 | 68623.9 | 122.8121 | 373499.8 | -75711.9 | -146281.9 | 5.1900 | -307556.5 | -0.2459 |
| 3700 | 19.8485 | 70608.7 | 123.3559 | 385808.3 | -73727.1 | -146404.7 | 4.9499 | -307574.2 | -0.7505 |
| 3800 | 19.8497 | 72593.6 | 123.8853 | 398170.5 | -71742.2 | -146529.3 | 4.7224 | -307591.4 | -1.2286 |
| 3900 | 19.8509 | 74578.6 | 124.4009 | 410584.9 | -69757.1 | -146655.6 | 4.5062 | -307608.2 | -1.6822 |
| 4000 | 19.8519 | 76563.7 | 124.9035 | 423050.3 | -67772.0 | -146783.7 | 4.3007 | -307624.9 | -2.1131 |
| 4100 | 19.8529 | 78549.0 | 125.3937 | 435565.2 | -65786.8 | -146913.6 | 4.1050 | -307641.6 | -2.5231 |
| 4200 | 19.8539 | 80534.3 | 125.8721 | 448128.6 | -63801.4 | -147045.4 | 3.9184 | -307658.3 | -2.9135 |
| 4300 | 19.8547 | 82519.8 | 126.3393 | 460739.3 | -61816.0 | -147178.9 | 3.7403 | -307675.1 | -3.2858 |
| 4400 | 19.8555 | 84505.3 | 126.7958 | 473396.1 | -59830.5 | -147314.2 | 3.5702 | -307692.5 | -3.6412 |
| 4500 | 19.8563 | 86490.9 | 127.2420 | 486098.1 | -57844.9 | -147451.3 | 3.4076 | -307710.3 | -3.9808 |
| 4600 | 19.8570 | 88476.5 | 127.6784 | 498844.2 | -55859.2 | -147590.2 | 3.2518 | -307729.0 | -4.3057 |
| 4700 | 19.8576 | 90462.3 | 128.1055 | 511633.5 | -53873.5 | -147731.0 | 3.1027 | -307748.6 | -4.6168 |
| 4800 | 19.8582 | 92448.1 | 128.5236 | 524465.0 | -51887.7 | -147873.6 | 2.9594 | -307769.5 | -4.9149 |
| 4900 | 19.8588 | 94433.9 | 128.9330 | 537337.9 | -49901.8 | -148017.9 | 2.8220 | -307791.5 | -5.2009 |
| 5000 | 19.8594 | 96419.8 | 129.3342 | 550251.3 | -47915.9 | -148164.1 | 2.6900 | -307815.3 | -5.4754 |
| 5100 | 19.8599 | 98405.8 | 129.7275 | 563204.4 | -45930.0 | -148312.1 | 2.5628 | -307841.0 | -5.7393 |
| 5200 | 19.8604 | 100391.8 | 130.1131 | 576196.6 | -43944.0 | -148461.9 | 2.4405 | -307868.7 | -5.9929 |
| 5300 | 19.8608 | 102377.9 | 130.4915 | 589226.8 | -41957.9 | -148613.6 | 2.3228 | -307898.8 | -6.2371 |
| 5400 | 19.8613 | 104364.0 | 130.8627 | 602294.6 | -39971.8 | -148767.1 | 2.2093 | -307931.5 | -6.4722 |
| 5500 | 19.8617 | 106350.1 | 131.2271 | 615399.2 | -37985.6 | -148922.4 | 2.0996 | -307967.0 | -6.6988 |
| 5600 | 19.8621 | 108336.3 | 131.5850 | 628539.8 | -35999.5 | -149079.5 | 1.9939 | -308005.8 | -6.9173 |
| 5700 | 19.8624 | 110322.5 | 131.9366 | 641715.9 | -34013.2 | -149238.4 | 1.8918 | -308047.9 | -7.1282 |
| 5800 | 19.8628 | 112308.8 | 132.2820 | 654926.9 | -32027.0 | -149399.2 | 1.7932 | -308093.2 | -7.3319 |
| 5900 | 19.8631 | 114295.1 | 132.6216 | 668172.1 | -30040.7 | -149561.8 | 1.6977 | -308143.0 | -7.5286 |
| 6000 | 19.8634 | 116281.4 | 132.9554 | 681451.0 | -28054.4 | -149726.3 | 1.6052 | -308181.1 | -7.7188 |

^a Change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Al, 932° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(6) AlF (gas); molecular weight, 45.98

| T, °K | C _p ^o , cal/mole °K | H _f ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _f ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -63525.1 | -61379.1 | ----- | -156591.7 | ----- |
| 100 | 6.9601 | 695.1 | 43.5818 | 3663.0 | -62830.0 | -61146.1 | 138.3449 | -156983.3 | 338.2889 |
| 200 | 7.1783 | 1398.6 | 48.4495 | 8291.3 | -62126.6 | -61226.3 | 71.5135 | -157362.3 | 166.5887 |
| 298.15 | 7.6320 | 2125.1 | 51.3996 | 13199.5 | -61400.0 | -61400.0 | 49.4637 | -157678.2 | 109.9326 |
| 300 | 7.6404 | 2139.3 | 51.4463 | 13294.6 | -61385.9 | -61403.6 | 49.1862 | -157683.6 | 109.2199 |
| 400 | 8.0309 | 2923.9 | 53.7008 | 18556.4 | -60601.2 | -61601.5 | 37.9874 | -157946.5 | 80.4807 |
| 500 | 8.3612 | 3741.4 | 55.5235 | 24020.6 | -59783.8 | -61814.0 | 31.2457 | -158164.2 | 63.2106 |
| 600 | 8.4845 | 4581.2 | 57.0546 | 29651.5 | -58943.9 | -62046.6 | 26.7349 | -158350.2 | 51.6824 |
| 700 | 8.6121 | 5436.4 | 58.3726 | 35424.4 | -58088.7 | -62303.0 | 23.5003 | -158514.0 | 43.4388 |
| 800 | 8.7042 | 6302.5 | 59.5290 | 41320.7 | -57222.6 | -62585.0 | 21.0637 | -158662.0 | 37.2500 |
| 900 | 8.7731 | 7176.5 | 60.5583 | 47326.0 | -56348.6 | -62893.9 | 19.1596 | -158798.2 | 32.4322 |
| 1000 | 8.8266 | 8056.6 | 61.4855 | 53428.9 | -55468.5 | -65746.3 | 17.5881 | -158925.6 | 28.5747 |
| 1100 | 8.8694 | 8941.5 | 62.3289 | 59620.3 | -54583.6 | -66006.4 | 16.2792 | -159046.1 | 25.4161 |
| 1200 | 8.9047 | 9830.2 | 63.1022 | 65892.4 | -53694.9 | -66265.4 | 15.1844 | -159160.9 | 22.7820 |
| 1300 | 8.9344 | 10722.2 | 63.8162 | 72238.8 | -52802.9 | -66523.6 | 14.2544 | -159271.1 | 20.5516 |
| 1400 | 8.9601 | 11617.0 | 64.4792 | 78653.9 | -51908.1 | -66781.2 | 13.4540 | -159377.5 | 18.6385 |
| 1500 | 8.9826 | 12514.1 | 65.0982 | 85133.1 | -51011.0 | -67038.3 | 12.7577 | -159480.5 | 16.9794 |
| 1600 | 9.0028 | 13413.4 | 65.6786 | 91672.3 | -50111.7 | -67295.0 | 12.1463 | -159580.7 | 15.5267 |
| 1700 | 9.0212 | 14314.6 | 66.2249 | 98267.7 | -49210.5 | -67551.5 | 11.6045 | -159678.3 | 14.2442 |
| 1800 | 9.0380 | 15217.6 | 66.7416 | 104916.3 | -48307.5 | -67807.6 | 11.1212 | -159773.6 | 13.1035 |
| 1900 | 9.0537 | 16122.2 | 67.2301 | 111615.0 | -47402.9 | -68063.6 | 10.6872 | -159866.8 | 12.0822 |
| 2000 | 9.0684 | 17028.3 | 67.6949 | 118361.5 | -46496.8 | -68319.4 | 10.2950 | -159958.2 | 11.1625 |
| 2100 | 9.0824 | 17935.9 | 68.1377 | 125153.3 | -45589.3 | -68575.0 | 9.9388 | -160047.7 | 10.3300 |
| 2200 | 9.0957 | 18844.8 | 68.5605 | 131988.3 | -44680.4 | -68830.6 | 9.6137 | -160135.6 | 9.5727 |
| 2300 | 9.1084 | 19755.0 | 68.9651 | 138864.8 | -43770.1 | -69086.0 | 9.3159 | -160221.9 | 8.8809 |
| 2400 | 9.1208 | 20666.5 | 69.3530 | 145780.8 | -42858.7 | -69341.4 | 9.0419 | -160306.7 | 8.2464 |
| 2500 | 9.1327 | 21579.1 | 69.7256 | 152734.9 | -41946.0 | -69596.7 | 8.7888 | -160390.2 | 7.6624 |
| 2600 | 9.1443 | 22493.0 | 70.0840 | 159725.5 | -41032.2 | -69852.0 | 8.5545 | -160472.3 | 7.1230 |
| 2700 | 9.1556 | 23408.0 | 70.4293 | 166751.2 | -40117.2 | -70107.2 | 8.3367 | -160553.1 | 6.6233 |
| 2800 | 9.1667 | 24324.1 | 70.7625 | 173810.9 | -39201.0 | -70362.5 | 8.1336 | -160632.6 | 6.1591 |
| 2900 | 9.1775 | 25241.3 | 71.0844 | 180903.4 | -38283.8 | -70617.7 | 7.9440 | -160710.9 | 5.7266 |
| 3000 | 9.1882 | 26159.6 | 71.3957 | 188027.4 | -37365.5 | -70872.8 | 7.7662 | -160788.1 | 5.3229 |
| 3100 | 9.1987 | 27078.9 | 71.6971 | 195182.2 | -36446.2 | -71128.0 | 7.5995 | -160864.2 | 4.9449 |
| 3200 | 9.2091 | 27999.3 | 71.9893 | 202366.6 | -35525.8 | -71383.2 | 7.4425 | -160939.2 | 4.5905 |
| 3300 | 9.2194 | 28920.8 | 72.2729 | 209579.7 | -34604.4 | -71638.4 | 7.2944 | -161013.2 | 4.2573 |
| 3400 | 9.2295 | 29843.2 | 72.5483 | 216820.9 | -33681.9 | -71893.6 | 7.1546 | -161086.3 | 3.9436 |
| 3500 | 9.2396 | 30766.7 | 72.8159 | 224089.1 | -32758.5 | -72148.8 | 7.0223 | -161158.4 | 3.6477 |
| 3600 | 9.2496 | 31691.1 | 73.0764 | 231383.8 | -31834.0 | -72404.0 | 6.8970 | -161229.7 | 3.3682 |
| 3700 | 9.2595 | 32616.6 | 73.3299 | 238704.2 | -30908.5 | -72659.2 | 6.7780 | -161300.2 | 3.1036 |
| 3800 | 9.2693 | 33543.0 | 73.5770 | 246049.6 | -29982.1 | -72914.5 | 6.6650 | -161370.0 | 2.8528 |
| 3900 | 9.2790 | 34470.4 | 73.8179 | 253419.4 | -29054.7 | -73169.7 | 6.5573 | -161439.2 | 2.6148 |
| 4000 | 9.2888 | 35398.8 | 74.0529 | 260813.0 | -28126.3 | -73425.0 | 6.4546 | -161507.8 | 2.3886 |
| 4100 | 9.2984 | 36328.2 | 74.2824 | 268229.8 | -27196.9 | -73680.4 | 6.3566 | -161576.1 | 2.1733 |
| 4200 | 9.3080 | 37258.5 | 74.5066 | 275669.3 | -26266.6 | -73935.7 | 6.2628 | -161644.1 | 1.9682 |
| 4300 | 9.3176 | 38189.8 | 74.7258 | 283130.9 | -25335.3 | -74191.1 | 6.1732 | -161711.7 | 1.7726 |
| 4400 | 9.3271 | 39122.0 | 74.9401 | 290614.3 | -24403.1 | -74446.5 | 6.0873 | -161779.4 | 1.5858 |
| 4500 | 9.3366 | 40055.2 | 75.1498 | 298118.8 | -23469.9 | -74702.0 | 6.0051 | -161847.0 | 1.4072 |
| 4600 | 9.3461 | 40989.3 | 75.3551 | 305644.1 | -22535.8 | -74957.4 | 5.9260 | -161915.1 | 1.2363 |
| 4700 | 9.3555 | 41924.4 | 75.5562 | 313189.7 | -21600.7 | -75212.9 | 5.8502 | -161983.6 | 1.0726 |
| 4800 | 9.3649 | 42860.4 | 75.7533 | 320755.2 | -20664.7 | -75468.5 | 5.7771 | -162052.7 | 0.9156 |
| 4900 | 9.3743 | 43797.4 | 75.9464 | 328340.2 | -19727.7 | -75724.1 | 5.7070 | -162122.4 | 0.7650 |
| 5000 | 9.3836 | 44735.3 | 76.1359 | 335944.3 | -18789.8 | -75979.7 | 5.6394 | -162193.3 | 0.6204 |
| 5100 | 9.3930 | 45674.1 | 76.3218 | 343567.3 | -17851.0 | -76235.4 | 5.5741 | -162265.4 | 0.4813 |
| 5200 | 9.4023 | 46613.9 | 76.5043 | 351208.6 | -16911.3 | -76491.1 | 5.5111 | -162338.9 | 0.3476 |
| 5300 | 9.4116 | 47554.6 | 76.6835 | 358868.0 | -15970.6 | -76746.8 | 5.4505 | -162414.2 | 0.2188 |
| 5400 | 9.4209 | 48496.2 | 76.8595 | 366545.2 | -15028.9 | -77002.6 | 5.3917 | -162491.4 | 0.0948 |
| 5500 | 9.4301 | 49438.7 | 77.0325 | 374239.8 | -14086.4 | -77258.4 | 5.3349 | -162570.9 | -0.0248 |
| 5600 | 9.4394 | 50382.2 | 77.2025 | 381951.6 | -13142.9 | -77514.2 | 5.2800 | -162652.8 | -0.1402 |
| 5700 | 9.4486 | 51326.6 | 77.3696 | 389680.2 | -12198.5 | -77770.1 | 5.2268 | -162737.5 | -0.2516 |
| 5800 | 9.4578 | 52271.9 | 77.5346 | 397425.4 | -11253.2 | -78026.1 | 5.1755 | -162824.5 | -0.3592 |
| 5900 | 9.4670 | 53218.2 | 77.6958 | 405186.9 | -10307.0 | -78282.0 | 5.1255 | -162915.4 | -0.4632 |
| 6000 | 9.4763 | 54165.3 | 77.8550 | 412964.5 | -9359.8 | -78538.1 | 5.0770 | -162993.9 | -0.5638 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Al, 932° K.

TABLE III - Continued. THERMODYNAMIC PROPERTIES

(7) AlF_3 (gas); molecular weight, 83.98

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -286872.2 | -282616.5 | ----- | -414539.1 | ----- |
| 100 | 9.4291 | 829.2 | 52.8128 | 4452.0 | -286042.9 | -282944.1 | 616.1846 | -415793.7 | 891.8715 |
| 200 | 12.5048 | 1936.3 | 60.3633 | 10136.3 | -284935.8 | -283320.9 | 306.8461 | -416820.6 | 437.0776 |
| 298.15 | 14.6027 | 3272.2 | 65.7697 | 16337.1 | -283600.0 | -283600.0 | 204.8860 | -417594.5 | 287.0151 |
| 300 | 14.6360 | 3299.2 | 65.8602 | 16458.8 | -283572.9 | -283604.5 | 203.6042 | -417607.1 | 285.1275 |
| 400 | 16.1313 | 4842.3 | 70.2891 | 23273.3 | -282029.8 | -2823814.1 | 151.9370 | -418191.8 | 209.0237 |
| 500 | 17.1394 | 6509.2 | 74.0045 | 30493.0 | -280362.9 | -283982.6 | 120.9161 | -418624.3 | 163.3050 |
| 600 | 17.8181 | 8259.3 | 77.1934 | 38056.7 | -278612.9 | -284136.5 | 100.2236 | -418949.8 | 132.7980 |
| 700 | 18.2849 | 10065.8 | 79.9772 | 45918.2 | -276806.3 | -284291.7 | 85.4354 | -419200.9 | 110.9923 |
| 800 | 18.6149 | 11911.7 | 82.4416 | 54041.6 | -274960.4 | -284458.1 | 74.3378 | -419399.0 | 94.6292 |
| 900 | 18.8548 | 13785.8 | 84.6487 | 62398.0 | -273086.3 | -284641.7 | 65.7010 | -419558.9 | 81.8969 |
| a1000 | 19.0337 | 15680.7 | 86.6449 | 70964.3 | -271191.5 | -2847362.4 | 58.7466 | -419690.2 | 71.7075 |
| 1100 | 19.1701 | 17591.1 | 88.4657 | 79721.1 | -269281.0 | -287486.7 | 53.0361 | -419799.8 | 63.3683 |
| 1200 | 19.2764 | 19513.7 | 90.1385 | 88652.5 | -267358.5 | -287607.5 | 48.2755 | -419892.6 | 56.4173 |
| 1300 | 19.3606 | 21445.7 | 91.6849 | 97744.6 | -265426.5 | -287726.2 | 44.2457 | -419972.1 | 50.5345 |
| 1400 | 19.4283 | 23385.2 | 93.1222 | 106985.8 | -263486.9 | -287843.7 | 40.7900 | -420040.9 | 45.4912 |
| 1500 | 19.4836 | 25330.9 | 94.4646 | 116365.9 | -261541.2 | -287960.8 | 37.7940 | -420101.1 | 41.1197 |
| 1600 | 19.5293 | 27281.7 | 95.7235 | 125876.0 | -259590.5 | -288078.1 | 35.1715 | -420154.1 | 37.2941 |
| 1700 | 19.5674 | 29236.5 | 96.9086 | 135508.2 | -257635.6 | -288196.1 | 32.8563 | -420201.2 | 33.9182 |
| 1800 | 19.5996 | 31194.9 | 98.0280 | 145255.5 | -255677.2 | -288315.1 | 30.7977 | -420243.2 | 30.9170 |
| 1900 | 19.6270 | 33156.3 | 99.0885 | 155111.8 | -253715.9 | -288435.4 | 28.9551 | -420281.0 | 28.2316 |
| 2000 | 19.6504 | 35120.2 | 100.0958 | 165071.4 | -251752.0 | -288557.3 | 27.2959 | -420315.1 | 25.8144 |
| 2100 | 19.6707 | 37086.3 | 101.0551 | 175129.4 | -249785.9 | -288680.8 | 25.7940 | -420346.1 | 23.6273 |
| 2200 | 19.6884 | 39054.3 | 101.9706 | 185281.0 | -247817.9 | -288806.2 | 24.4281 | -420374.4 | 21.6389 |
| 2300 | 19.7038 | 41023.9 | 102.8461 | 195522.1 | -245848.3 | -288933.5 | 23.1806 | -420400.3 | 19.8232 |
| 2400 | 19.7174 | 42995.0 | 103.6850 | 205849.0 | -243877.2 | -289063.0 | 22.0364 | -420424.0 | 18.1588 |
| 2500 | 19.7294 | 44967.3 | 104.4901 | 216258.0 | -241904.8 | -289194.6 | 20.9832 | -420446.0 | 16.6274 |
| 2600 | 19.7401 | 46940.8 | 105.2641 | 226746.0 | -239931.4 | -289328.5 | 20.0108 | -420466.3 | 15.2138 |
| 2700 | 19.7496 | 48915.3 | 106.0093 | 237309.9 | -237956.9 | -289464.7 | 19.1099 | -420485.1 | 13.9048 |
| 2800 | 19.7582 | 50890.7 | 106.7277 | 247946.9 | -235981.5 | -289603.3 | 18.2729 | -420502.6 | 12.6893 |
| 2900 | 19.7658 | 52866.9 | 107.4212 | 258654.6 | -234005.3 | -289744.3 | 17.4934 | -420519.0 | 11.5575 |
| 3000 | 19.7728 | 54843.8 | 108.0914 | 269430.4 | -232028.3 | -289887.8 | 16.7653 | -420534.4 | 10.5012 |
| 3100 | 19.7791 | 56821.4 | 108.7399 | 280272.1 | -230050.7 | -290033.8 | 16.0840 | -420548.8 | 9.5130 |
| 3200 | 19.7848 | 58799.6 | 109.3679 | 291177.7 | -228072.5 | -290182.3 | 15.4449 | -420562.5 | 8.5865 |
| 3300 | 19.7900 | 60778.4 | 109.9768 | 302145.1 | -226093.8 | -290333.4 | 14.8441 | -420575.4 | 7.7161 |
| 3400 | 19.7947 | 62757.6 | 110.5677 | 313172.5 | -224114.6 | -290487.1 | 14.2785 | -420587.8 | 6.8969 |
| 3500 | 19.7991 | 64737.3 | 111.1415 | 324258.1 | -222134.9 | -290643.4 | 13.7448 | -420599.7 | 6.1245 |
| 3600 | 19.8031 | 66717.4 | 111.6993 | 335400.2 | -220154.8 | -290802.3 | 13.2406 | -420611.2 | 5.3950 |
| 3700 | 19.8068 | 68697.9 | 112.2420 | 346597.4 | -218174.3 | -290963.8 | 12.7634 | -420622.4 | 4.7049 |
| 3800 | 19.8102 | 70678.8 | 112.7702 | 357848.1 | -216193.4 | -291128.1 | 12.3111 | -420633.4 | 4.0511 |
| 3900 | 19.8133 | 72659.9 | 113.2849 | 369151.0 | -214212.2 | -291295.0 | 11.8817 | -420644.4 | 3.4308 |
| 4000 | 19.8162 | 74641.4 | 113.7865 | 380504.7 | -212230.7 | -291464.6 | 11.4735 | -420655.4 | 2.8415 |
| 4100 | 19.8189 | 76623.2 | 114.2759 | 391907.9 | -210249.0 | -291636.8 | 11.0850 | -420666.6 | 2.2810 |
| 4200 | 19.8214 | 78605.2 | 114.7535 | 403359.5 | -208267.0 | -291811.9 | 10.7147 | -420678.2 | 1.7471 |
| 4300 | 19.8238 | 80587.5 | 115.2199 | 414858.2 | -206284.7 | -291989.6 | 10.3614 | -420690.0 | 1.2380 |
| 4400 | 19.8260 | 82569.9 | 115.6757 | 426403.1 | -204302.2 | -292170.0 | 10.0240 | -420702.6 | 0.7521 |
| 4500 | 19.8280 | 84552.6 | 116.1213 | 437993.0 | -202319.5 | -292353.2 | 9.7015 | -420715.8 | 0.2878 |
| 4600 | 19.8299 | 86535.5 | 116.5571 | 449627.0 | -200336.6 | -292539.1 | 9.3927 | -420730.1 | -0.1564 |
| 4700 | 19.8317 | 88518.6 | 116.9836 | 461304.1 | -198353.5 | -292727.8 | 9.0970 | -420745.5 | -0.5817 |
| 4800 | 19.8334 | 90501.9 | 117.4011 | 473023.4 | -196370.3 | -292919.3 | 8.8132 | -420762.3 | -0.9893 |
| 4900 | 19.8350 | 92485.3 | 117.8101 | 484784.1 | -194386.9 | -293113.5 | 8.5411 | -420780.3 | -1.3803 |
| 5000 | 19.8365 | 94468.9 | 118.2108 | 496585.2 | -192403.3 | -293310.4 | 8.2796 | -420800.3 | -1.7556 |
| 5100 | 19.8379 | 96452.6 | 118.6036 | 508426.0 | -190419.6 | -293510.2 | 8.0281 | -420822.3 | -2.1162 |
| 5200 | 19.8392 | 98436.5 | 118.9889 | 520305.7 | -188435.7 | -293712.7 | 7.7861 | -420846.5 | -2.4630 |
| 5300 | 19.8404 | 100420.4 | 119.3668 | 532223.5 | -186451.7 | -293918.0 | 7.5532 | -420873.2 | -2.7968 |
| 5400 | 19.8416 | 102404.5 | 119.7377 | 544178.8 | -184467.6 | -294126.1 | 7.3286 | -420902.6 | -3.1181 |
| 5500 | 19.8427 | 104388.7 | 120.1017 | 556170.8 | -182483.4 | -294337.0 | 7.1120 | -420934.9 | -3.4279 |
| 5600 | 19.8438 | 106373.1 | 120.4593 | 568198.9 | -180499.1 | -294550.6 | 6.9031 | -420970.6 | -3.7265 |
| 5700 | 19.8448 | 108357.5 | 120.8105 | 580262.5 | -178514.7 | -294767.1 | 6.7014 | -421009.7 | -4.0148 |
| 5800 | 19.8457 | 110342.0 | 121.1557 | 592360.8 | -176530.1 | -294986.3 | 6.5066 | -421052.0 | -4.2931 |
| 5900 | 19.8466 | 112326.6 | 121.4949 | 604493.4 | -174545.5 | -295208.4 | 6.3181 | -421099.0 | -4.5620 |
| 6000 | 19.8475 | 114311.4 | 121.8285 | 616659.6 | -172560.8 | -295433.2 | 6.1357 | -421134.5 | -4.8219 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Al, 932° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(8) AlF_3 (α , β); molecular weight, 83.98

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, ^a cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, ^a cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------------|------------------------------|----------------------------------------------------|------------------------------|-------------------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | 0 | 0 | -359082.0 | -354826.4 | ----- | -486749.0 | ----- |
| 100 | 5.9738 | 209.9 | 3.2725 | 117.4 | -358872.1 | -355773.3 | 764.5186 | -488622.9 | 1040.2055 |
| 200 | 13.5870 | 1214.5 | 9.9307 | 771.7 | -357867.5 | -356252.5 | 375.5167 | -489752.3 | 505.7483 |
| 298.15 | 17.9500 | 2782.0 | 15.6253 | 1876.7 | -356300.0 | -356300.0 | 247.2155 | -490294.5 | 329.3445 |
| 300 | 18.0112 | 2821.0 | 16.3834 | 2094.1 | -356261.0 | -356292.6 | 245.7422 | -490295.2 | 327.2656 |
| 400 | 20.2165 | 4733.8 | 21.2417 | 3762.9 | -354348.2 | -356132.5 | 180.7292 | -490510.1 | 237.8159 |
| 500 | 21.8300 | 6839.0 | 25.9326 | 6127.3 | -352243.0 | -355862.6 | 141.8277 | -490504.3 | 184.2166 |
| 600 | 23.2071 | 9092.1 | 30.0368 | 8929.9 | -349989.9 | -355513.4 | 115.9158 | -490326.8 | 148.4902 |
| 700 | 24.4726 | 11476.8 | 33.7102 | 12120.4 | -347605.2 | -355090.6 | 97.4275 | -489999.7 | 122.9844 |
| ^b 727 | 24.8027 | 12142.0 | 34.6426 | 13043.2 | -346940.0 | -353884.9 | 93.0935 | -488408.8 | 117.0643 |
| 727 | 23.111 | 12290.9 | 34.848 | 13043.2 | -346791.1 | -357625.9 | 93.0935 | -488942.6 | 117.0643 |
| 800 | 23.330 | 13986.0 | 37.070 | 15670.0 | -345096.0 | -354593.6 | 83.5815 | -489534.6 | 103.8729 |
| 900 | 23.630 | 16334.0 | 39.835 | 19517.5 | -342748.0 | -354303.4 | 72.8228 | -489220.5 | 89.0186 |
| ^c 1000 | 23.930 | 18712.0 | 42.340 | 23628.0 | -340370.0 | -356540.9 | 64.1824 | -488868.6 | 77.1433 |
| 1100 | 24.230 | 21120.0 | 44.635 | 27978.5 | -337962.0 | -356167.7 | 57.1024 | -488480.7 | 67.4346 |
| 1200 | 24.530 | 23558.0 | 46.756 | 32549.2 | -335524.0 | -355773.0 | 51.2088 | -488058.1 | 59.3506 |
| 1300 | 24.830 | 26026.0 | 48.732 | 37325.6 | -333056.0 | -355355.7 | 46.2278 | -487601.6 | 52.5167 |
| 1400 | 25.130 | 28524.0 | 50.583 | 42292.2 | -330558.0 | -354914.8 | 41.9633 | -487112.0 | 46.6645 |
| 1500 | 25.430 | 31052.0 | 52.327 | 47438.5 | -328030.0 | -354449.6 | 38.2722 | -486589.9 | 41.5979 |

^a H_0° refers to crystal α state.^bTransition point.^cA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Al, 932° K.

TABLE III - Continued. THERMODYNAMIC PROPERTIES

(9) AlH (gas); molecular weight, 27.988

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 59482.9 | 61586.0 | ----- | -66900.0 | ----- |
| 100 | 6.9607 | 689.7 | 37.2592 | 3036.2 | 60172.6 | 61781.6 | -129.9000 | -67295.2 | 143.1219 |
| 200 | 6.9677 | 1386.1 | 42.0856 | 7031.0 | 60869.0 | 61742.9 | -62.3852 | -67652.3 | 69.4315 |
| 298.15 | 7.0197 | 2071.8 | 44.8745 | 11307.5 | 61554.7 | 61554.7 | -40.2025 | -67963.1 | 45.0470 |
| 300 | 7.0216 | 2084.8 | 44.9180 | 11390.6 | 61567.7 | 61550.5 | -39.9243 | -67968.7 | 44.7398 |
| 400 | 7.1791 | 2794.0 | 46.9571 | 15988.8 | 62276.9 | 61314.9 | -28.7343 | -68263.8 | 32.3370 |
| 500 | 7.4070 | 3523.0 | 48.5828 | 20768.4 | 63005.9 | 61067.4 | -22.0468 | -68534.7 | 24.8639 |
| 600 | 7.6488 | 4275.8 | 49.9548 | 25697.0 | 63758.7 | 60813.4 | -17.6069 | -68779.6 | 19.8628 |
| 700 | 7.8721 | 5052.1 | 51.1509 | 30753.6 | 64535.0 | 60552.2 | -14.4490 | -68999.9 | 16.2785 |
| 800 | 8.0660 | 5849.2 | 52.2151 | 35922.8 | 65332.1 | 60280.6 | -12.0910 | -69198.6 | 13.5820 |
| 900 | 8.2301 | 6664.3 | 53.1749 | 41193.1 | 66147.2 | 59994.5 | -10.2654 | -69378.8 | 11.4789 |
| 1000 | 8.3680 | 7494.4 | 54.0494 | 46555.0 | 66977.3 | 57174.6 | -8.8524 | -69543.7 | 9.7923 |
| 1100 | 8.4842 | 8337.2 | 54.8525 | 52000.6 | 67820.0 | 56954.2 | -7.7189 | -69695.7 | 8.4092 |
| 1200 | 8.5828 | 9190.7 | 55.5951 | 57523.5 | 68673.5 | 56739.9 | -6.7777 | -69836.7 | 7.2542 |
| 1300 | 8.6672 | 10053.3 | 56.2855 | 63117.9 | 69536.1 | 56529.6 | -5.9841 | -69968.5 | 6.2749 |
| 1400 | 8.7402 | 10923.7 | 56.9306 | 68779.1 | 70406.6 | 56322.0 | -5.3068 | -70092.3 | 5.4340 |
| 1500 | 8.8041 | 11801.0 | 57.5358 | 74502.7 | 71283.9 | 56115.7 | -4.7217 | -70209.2 | 4.7040 |
| 1600 | 8.8606 | 12684.3 | 58.1058 | 80285.0 | 72167.2 | 55910.2 | -4.2114 | -70320.1 | 4.0642 |
| 1700 | 8.9111 | 13572.9 | 58.6445 | 86122.8 | 73055.8 | 55705.3 | -3.7631 | -70425.5 | 3.4988 |
| 1800 | 8.9566 | 14466.3 | 59.1552 | 92013.0 | 73949.2 | 55500.7 | -3.3659 | -70526.1 | 2.9955 |
| 1900 | 8.9981 | 15364.1 | 59.6406 | 97953.0 | 74847.0 | 55295.3 | -3.0118 | -70622.3 | 2.5445 |
| 2000 | 9.0362 | 16265.8 | 60.1031 | 103940.4 | 75748.7 | 55089.5 | -2.6944 | -70714.5 | 2.1381 |
| 2100 | 9.0715 | 17171.3 | 60.5449 | 109972.9 | 76654.1 | 54883.0 | -2.4084 | -70803.0 | 1.7699 |
| 2200 | 9.1044 | 18080.1 | 60.9676 | 116048.7 | 77563.0 | 54676.2 | -2.1494 | -70888.1 | 1.4348 |
| 2300 | 9.1354 | 18992.1 | 61.3730 | 122165.9 | 78475.0 | 54468.5 | -1.9135 | -70969.9 | 1.1284 |
| 2400 | 9.1645 | 19907.1 | 61.7625 | 128322.8 | 79390.0 | 54260.3 | -1.6985 | -71048.8 | 0.8473 |
| 2500 | 9.1923 | 20824.9 | 62.1371 | 134517.9 | 80307.8 | 54051.5 | -1.5012 | -71124.8 | 0.5884 |
| 2600 | 9.2187 | 21745.5 | 62.4982 | 140749.8 | 81228.4 | 53842.2 | -1.3198 | -71198.0 | 0.3491 |
| 2700 | 9.2441 | 22668.7 | 62.8466 | 147017.1 | 82151.5 | 53632.4 | -1.1523 | -71268.7 | 0.1274 |
| 2800 | 9.2685 | 23594.3 | 63.1832 | 153318.7 | 83077.2 | 53422.1 | -0.9978 | -71336.9 | -0.0787 |
| 2900 | 9.2921 | 24522.3 | 63.5089 | 159653.4 | 84005.2 | 53211.4 | -0.8542 | -71402.7 | -0.2708 |
| 3000 | 9.3150 | 25452.7 | 63.8243 | 166020.1 | 84935.6 | 53000.0 | -0.7208 | -71466.2 | -0.4502 |
| 3100 | 9.3372 | 26385.3 | 64.1301 | 172417.9 | 85868.2 | 52788.2 | -0.5964 | -71527.6 | -0.6183 |
| 3200 | 9.3589 | 27320.1 | 64.4269 | 178845.8 | 86803.0 | 52575.7 | -0.4803 | -71586.8 | -0.7759 |
| 3300 | 9.3801 | 28257.1 | 64.7152 | 185303.0 | 87740.0 | 52363.4 | -0.3718 | -71643.9 | -0.9241 |
| 3400 | 9.4008 | 29196.1 | 64.9955 | 191788.6 | 88679.0 | 52150.1 | -0.2701 | -71699.1 | -1.0637 |
| 3500 | 9.4211 | 30137.2 | 65.2683 | 198301.9 | 89620.1 | 51935.9 | -0.1746 | -71752.4 | -1.1954 |
| 3600 | 9.4411 | 31080.3 | 65.5340 | 204842.0 | 90563.2 | 51722.1 | -0.0845 | -71803.9 | -1.3199 |
| 3700 | 9.4608 | 32025.4 | 65.7929 | 211408.4 | 91508.3 | 51507.9 | 0.0001 | -71853.7 | -1.4378 |
| 3800 | 9.4801 | 32972.5 | 66.0455 | 218000.4 | 92455.4 | 51292.4 | 0.0801 | -71901.9 | -1.5495 |
| 3900 | 9.4992 | 33921.4 | 66.2920 | 224617.3 | 93404.3 | 51077.9 | 0.1554 | -71948.6 | -1.6556 |
| 4000 | 9.5181 | 34872.3 | 66.5327 | 231258.6 | 94355.2 | 50862.4 | 0.2270 | -71993.9 | -1.7564 |
| 4100 | 9.5368 | 35825.1 | 66.7680 | 237923.7 | 95307.9 | 50647.2 | 0.2945 | -72037.9 | -1.8523 |
| 4200 | 9.5552 | 36779.7 | 66.9980 | 244612.0 | 96262.5 | 50431.3 | 0.3588 | -72080.8 | -1.9438 |
| 4300 | 9.5735 | 37736.1 | 67.2231 | 251323.1 | 97219.0 | 50215.3 | 0.4196 | -72122.4 | -2.0310 |
| 4400 | 9.5917 | 38694.4 | 67.4434 | 258056.5 | 98177.2 | 49998.6 | 0.4774 | -72163.3 | -2.1144 |
| 4500 | 9.6097 | 39654.4 | 67.6591 | 264811.6 | 99137.3 | 49782.5 | 0.5325 | -72203.4 | -2.1940 |
| 4600 | 9.6275 | 40616.3 | 67.8705 | 271588.2 | 100099.2 | 49565.8 | 0.5849 | -72243.0 | -2.2703 |
| 4700 | 9.6452 | 41579.9 | 68.0778 | 278385.6 | 101062.8 | 49348.8 | 0.6350 | -72282.3 | -2.3433 |
| 4800 | 9.6629 | 42545.3 | 68.2810 | 285203.6 | 102028.2 | 49131.2 | 0.6826 | -72321.4 | -2.4134 |
| 4900 | 9.6804 | 43512.5 | 68.4804 | 292041.7 | 102995.4 | 48913.5 | 0.7282 | -72360.3 | -2.4806 |
| 5000 | 9.6978 | 44481.4 | 68.6762 | 298899.6 | 103964.3 | 48696.3 | 0.7718 | -72399.6 | -2.5452 |
| 5100 | 9.7151 | 45452.0 | 68.8684 | 305776.8 | 104934.9 | 48478.5 | 0.8134 | -72439.3 | -2.6072 |
| 5200 | 9.7324 | 46424.4 | 69.0572 | 312673.1 | 105907.3 | 48260.8 | 0.8532 | -72479.7 | -2.6669 |
| 5300 | 9.7495 | 47398.5 | 69.2428 | 319588.1 | 106881.4 | 48042.7 | 0.8913 | -72521.1 | -2.7244 |
| 5400 | 9.7666 | 48374.3 | 69.4252 | 326521.6 | 107857.2 | 47824.6 | 0.9281 | -72563.6 | -2.7798 |
| 5500 | 9.7837 | 49351.8 | 69.6045 | 333473.1 | 108834.7 | 47606.2 | 0.9630 | -72607.6 | -2.8332 |
| 5600 | 9.8006 | 50331.0 | 69.7810 | 340442.4 | 109813.9 | 47388.1 | 0.9968 | -72653.3 | -2.8848 |
| 5700 | 9.8175 | 51312.0 | 69.9546 | 347429.2 | 110794.8 | 47170.1 | 1.0291 | -72701.0 | -2.9345 |
| 5800 | 9.8344 | 52294.6 | 70.1255 | 354433.2 | 111777.4 | 46951.9 | 1.0603 | -72750.3 | -2.9826 |
| 5900 | 9.8512 | 53278.8 | 70.2937 | 361454.2 | 112761.7 | 46733.5 | 1.0902 | -72802.8 | -3.0291 |
| 6000 | 9.8680 | 54264.8 | 70.4594 | 368491.9 | 113747.7 | 46515.5 | 1.1188 | -72842.1 | -3.0740 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Al, 932° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(10) AlO (gas); molecular weight, 42.98

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 18715.5 | 20844.1 | ----- | -115000.0 | ----- |
| 100 | 6.9573 | 695.0 | 44.4610 | 3751.1 | 19410.5 | 21077.6 | -41.2307 | -115420.6 | 247.5738 |
| 200 | 7.0519 | 1393.5 | 49.2990 | 8466.3 | 20109.0 | 20994.6 | -18.2172 | -115836.2 | 121.2694 |
| 298.15 | 7.3815 | 2100.5 | 52.1709 | 13454.2 | 20816.0 | 20816.0 | -10.6920 | -116160.6 | 79.5490 |
| 300 | 7.3887 | 2114.2 | 52.2166 | 13550.8 | 20829.7 | 20812.4 | -10.5979 | -116166.1 | 79.0239 |
| 400 | 7.7654 | 2872.3 | 54.3950 | 18885.7 | 21587.8 | 20617.9 | -6.8237 | -116433.3 | 57.8454 |
| 500 | 8.0667 | 3664.6 | 56.1617 | 24416.2 | 22380.2 | 20417.5 | -4.5807 | -116654.6 | 45.1112 |
| 600 | 8.2879 | 4482.9 | 57.6531 | 30108.9 | 23198.5 | 20201.4 | -3.1007 | -116843.6 | 36.6067 |
| 700 | 8.4488 | 5320.2 | 58.9434 | 35940.2 | 24035.7 | 19963.3 | -2.0553 | -117009.9 | 30.5228 |
| 800 | 8.5677 | 6171.3 | 60.0798 | 41892.5 | 24886.8 | 19699.6 | -1.2811 | -117160.0 | 25.9536 |
| 900 | 8.6578 | 7032.8 | 61.0943 | 47952.1 | 25748.3 | 19408.4 | -0.6874 | -117298.0 | 22.3955 |
| 1000 | 8.7277 | 7902.2 | 62.0103 | 54108.1 | 26617.7 | 16573.1 | -0.2602 | -117427.0 | 19.5457 |
| 1100 | 8.7835 | 8777.9 | 62.8448 | 60351.4 | 27493.4 | 16329.3 | 0.0666 | -117548.9 | 17.2116 |
| 1200 | 8.8289 | 9658.6 | 63.6111 | 66674.8 | 28374.1 | 16085.8 | 0.3350 | -117665.1 | 15.2645 |
| 1300 | 8.8668 | 10543.4 | 64.3193 | 73071.7 | 29258.9 | 15842.2 | 0.5587 | -117776.6 | 13.6154 |
| 1400 | 8.8989 | 11431.7 | 64.9776 | 79537.0 | 30147.2 | 15598.6 | 0.7475 | -117884.3 | 12.2005 |
| 1500 | 8.9268 | 12323.0 | 65.5926 | 86065.8 | 31038.6 | 15354.5 | 0.9086 | -117988.7 | 10.9732 |
| 1600 | 8.9512 | 13217.0 | 66.1695 | 92654.2 | 31932.5 | 15110.0 | 1.0474 | -118090.2 | 9.8984 |
| 1700 | 8.9731 | 14113.2 | 66.7128 | 99298.6 | 32828.7 | 14864.8 | 1.1677 | -118189.3 | 8.9492 |
| 1800 | 8.9928 | 15011.5 | 67.2263 | 105995.8 | 33727.0 | 14618.7 | 1.2731 | -118286.1 | 8.1048 |
| 1900 | 9.0108 | 15911.7 | 67.7130 | 112743.0 | 34627.2 | 14371.7 | 1.3658 | -118380.8 | 7.3486 |
| 2000 | 9.0276 | 16813.6 | 68.1756 | 119537.6 | 35529.2 | 14123.7 | 1.4478 | -118473.8 | 6.6675 |
| 2100 | 9.0432 | 17717.2 | 68.6164 | 126377.4 | 36432.7 | 13874.4 | 1.5205 | -118565.2 | 6.0508 |
| 2200 | 9.0580 | 18622.2 | 69.0375 | 133260.2 | 37337.8 | 13623.9 | 1.5855 | -118655.0 | 5.4898 |
| 2300 | 9.0722 | 19528.8 | 69.4404 | 140184.2 | 38244.3 | 13372.2 | 1.6438 | -118743.4 | 4.9771 |
| 2400 | 9.0858 | 20436.7 | 69.8268 | 147147.7 | 39152.2 | 13119.0 | 1.6963 | -118830.6 | 4.5068 |
| 2500 | 9.0991 | 21345.9 | 70.1980 | 154149.1 | 40061.4 | 12864.6 | 1.7435 | -118916.6 | 4.0739 |
| 2600 | 9.1123 | 22256.5 | 70.5551 | 161186.9 | 40972.0 | 12608.8 | 1.7865 | -119001.6 | 3.6739 |
| 2700 | 9.1253 | 23168.4 | 70.8993 | 168259.7 | 41883.9 | 12351.8 | 1.8254 | -119085.5 | 3.3033 |
| 2800 | 9.1384 | 24081.5 | 71.2314 | 175366.3 | 42797.1 | 12093.5 | 1.8606 | -119168.5 | 2.9590 |
| 2900 | 9.1517 | 24996.0 | 71.5523 | 182505.6 | 43711.6 | 11834.1 | 1.8930 | -119250.7 | 2.6381 |
| 3000 | 9.1652 | 25911.9 | 71.8628 | 189676.4 | 44627.4 | 11573.5 | 1.9225 | -119332.1 | 2.3385 |
| 3100 | 9.1790 | 26829.1 | 72.1635 | 196877.8 | 45544.6 | 11312.1 | 1.9492 | -119412.7 | 2.0580 |
| 3200 | 9.1934 | 27747.7 | 72.4552 | 204108.8 | 46463.2 | 11049.7 | 1.9739 | -119492.7 | 1.7948 |
| 3300 | 9.2082 | 28667.8 | 72.7383 | 211368.6 | 47383.3 | 10786.6 | 1.9964 | -119572.0 | 1.5474 |
| 3400 | 9.2237 | 29589.4 | 73.0134 | 218656.2 | 48304.9 | 10522.9 | 2.0171 | -119650.7 | 1.3145 |
| 3500 | 9.2399 | 30512.5 | 73.2810 | 225971.0 | 49228.1 | 10258.8 | 2.0362 | -119728.8 | 1.0947 |
| 3600 | 9.2568 | 31437.4 | 73.5415 | 233312.2 | 50152.9 | 9994.4 | 2.0538 | -119806.3 | 0.8869 |
| 3700 | 9.2745 | 32363.9 | 73.7954 | 240679.1 | 51079.5 | 9729.8 | 2.0699 | -119883.4 | 0.6903 |
| 3800 | 9.2930 | 33292.3 | 74.0430 | 248071.1 | 52007.8 | 9465.2 | 2.0850 | -119960.0 | 0.5039 |
| 3900 | 9.3124 | 34222.6 | 74.2846 | 255487.5 | 52938.1 | 9200.7 | 2.0987 | -120036.1 | 0.3269 |
| 4000 | 9.3328 | 35154.8 | 74.5207 | 262927.8 | 53870.3 | 8936.6 | 2.1115 | -120111.8 | 0.1587 |
| 4100 | 9.3542 | 36089.2 | 74.7514 | 270391.5 | 54804.7 | 8673.0 | 2.1232 | -120187.1 | -0.0014 |
| 4200 | 9.3765 | 37025.7 | 74.9770 | 277877.9 | 55741.2 | 8410.1 | 2.1340 | -120262.1 | -0.1539 |
| 4300 | 9.3998 | 37964.5 | 75.1980 | 285386.7 | 56680.0 | 8147.9 | 2.1439 | -120336.5 | -0.2995 |
| 4400 | 9.4242 | 38905.7 | 75.4143 | 292917.4 | 57621.2 | 7886.8 | 2.1532 | -120410.9 | -0.4386 |
| 4500 | 9.4496 | 39849.4 | 75.6264 | 300469.4 | 58564.9 | 7626.7 | 2.1618 | -120484.8 | -0.5715 |
| 4600 | 9.4761 | 40795.6 | 75.8344 | 308042.5 | 59511.2 | 7368.0 | 2.1697 | -120558.8 | -0.6987 |
| 4700 | 9.5036 | 41744.6 | 76.0385 | 315636.2 | 60460.1 | 7110.7 | 2.1771 | -120632.7 | -0.8206 |
| 4800 | 9.5321 | 42696.4 | 76.2388 | 323250.1 | 61411.9 | 6855.1 | 2.1838 | -120706.6 | -0.9375 |
| 4900 | 9.5618 | 43651.1 | 76.4357 | 330883.8 | 62366.6 | 6601.1 | 2.1901 | -120780.3 | -1.0497 |
| 5000 | 9.5924 | 44608.8 | 76.6292 | 338537.1 | 63324.3 | 6349.1 | 2.1959 | -120854.4 | -1.1575 |
| 5100 | 9.6241 | 45569.6 | 76.8194 | 346209.6 | 64285.1 | 6099.1 | 2.2012 | -120928.8 | -1.2611 |
| 5200 | 9.6568 | 46533.6 | 77.0066 | 353900.9 | 65249.1 | 5851.3 | 2.2061 | -121003.6 | -1.3608 |
| 5300 | 9.6904 | 47501.0 | 77.1909 | 361610.8 | 66216.5 | 5605.8 | 2.2107 | -121078.9 | -1.4568 |
| 5400 | 9.7251 | 48471.7 | 77.3724 | 369339.0 | 67187.3 | 5362.7 | 2.2149 | -121154.8 | -1.5492 |
| 5500 | 9.7607 | 49446.0 | 77.5511 | 377085.2 | 68161.6 | 5122.2 | 2.2186 | -121231.6 | -1.6384 |
| 5600 | 9.7972 | 50423.9 | 77.7273 | 384849.1 | 69139.4 | 4884.3 | 2.2222 | -121309.3 | -1.7245 |
| 5700 | 9.8346 | 51405.5 | 77.9011 | 392630.6 | 70121.0 | 4649.3 | 2.2254 | -121388.1 | -1.8075 |
| 5800 | 9.8729 | 52390.9 | 78.0724 | 400429.2 | 71106.4 | 4417.1 | 2.2286 | -121467.5 | -1.8878 |
| 5900 | 9.9121 | 53380.1 | 78.2415 | 408245.0 | 72095.6 | 4188.0 | 2.2313 | -121548.9 | -1.9654 |
| 6000 | 9.9520 | 54373.3 | 78.4085 | 416077.5 | 73088.8 | 3962.0 | 2.2337 | -121616.0 | -2.0404 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Al, 932° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(11) Al_2O (gas); molecular weight, 69.96

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -35318.1 | -32098.3 | ----- | -244800.0 | ----- |
| 100 | 8.2787 | 801.4 | 51.7003 | 4368.6 | -34516.7 | -31873.1 | 75.7088 | -245702.4 | 526.5858 |
| 200 | 9.3145 | 1681.9 | 57.7626 | 9870.6 | -33636.1 | -32207.6 | 40.7655 | -246492.5 | 257.7501 |
| 298.15 | 10.2927 | 2644.3 | 61.6645 | 15741.0 | -32673.8 | -32673.8 | 29.1093 | -247070.4 | 168.9892 |
| 300 | 10.3106 | 2663.4 | 61.7282 | 15855.1 | -32654.7 | -32682.8 | 28.9616 | -247080.0 | 167.8724 |
| 400 | 11.1912 | 3740.1 | 64.8197 | 22187.8 | -31578.0 | -33156.2 | 22.9702 | -247536.0 | 122.8359 |
| 500 | 11.8584 | 4894.3 | 67.3926 | 28801.9 | -30423.7 | -33621.9 | 19.3239 | -247898.5 | 95.7687 |
| 600 | 12.3370 | 6105.5 | 69.5994 | 35654.2 | -29212.6 | -34102.0 | 16.8582 | -248195.6 | 77.6997 |
| 700 | 12.6787 | 7357.2 | 71.5283 | 42712.6 | -27960.9 | -34612.0 | 15.0716 | -248447.2 | 64.7789 |
| 800 | 12.9262 | 8638.1 | 73.2383 | 49952.5 | -26680.0 | -35162.0 | 13.7106 | -248666.5 | 55.0191 |
| 900 | 13.1090 | 9940.3 | 74.7718 | 57354.4 | -25377.8 | -35758.0 | 12.6347 | -248862.3 | 47.5285 |
| 1000 | 13.2469 | 11258.4 | 76.1605 | 64902.1 | -24059.7 | -41435.5 | 11.6782 | -249040.7 | 41.4835 |
| 1100 | 13.3530 | 12588.6 | 77.4282 | 72582.4 | -22729.5 | -41924.8 | 10.8499 | -249206.0 | 36.5341 |
| 1200 | 13.4361 | 13928.2 | 78.5938 | 80384.3 | -21389.8 | -42409.4 | 10.1519 | -249361.0 | 32.4070 |
| 1300 | 13.5023 | 15275.3 | 79.6720 | 88298.3 | -20042.8 | -42890.7 | 9.5546 | -249507.9 | 28.9127 |
| 1400 | 13.5558 | 16628.3 | 80.6746 | 96316.2 | -18689.8 | -43369.7 | 9.0367 | -249648.4 | 25.9159 |
| 1500 | 13.5995 | 17986.1 | 81.6114 | 104431.0 | -17332.0 | -43847.2 | 8.5829 | -249783.6 | 23.3172 |
| 1600 | 13.6358 | 19347.9 | 82.4903 | 112636.5 | -15970.2 | -44323.8 | 8.1819 | -249914.6 | 21.0421 |
| 1700 | 13.6661 | 20713.1 | 83.3179 | 120927.4 | -14605.0 | -44800.2 | 7.8236 | -250042.0 | 19.0337 |
| 1800 | 13.6917 | 22081.0 | 84.0998 | 129298.6 | -13237.1 | -45276.6 | 7.5020 | -250166.3 | 17.2475 |
| 1900 | 13.7136 | 23451.3 | 84.8406 | 137745.9 | -11866.8 | -45753.5 | 7.2114 | -250288.2 | 15.6485 |
| 2000 | 13.7323 | 24823.6 | 85.5446 | 146265.5 | -10494.5 | -46231.2 | 6.9470 | -250407.9 | 14.2088 |
| 2100 | 13.7485 | 26197.7 | 86.2150 | 154853.7 | -9120.4 | -46709.9 | 6.7050 | -250525.8 | 12.9055 |
| 2200 | 13.7627 | 27573.2 | 86.8549 | 163507.5 | -7744.8 | -47189.9 | 6.4828 | -250642.2 | 11.7202 |
| 2300 | 13.7750 | 28950.1 | 87.4669 | 172223.8 | -6367.9 | -47671.3 | 6.2780 | -250757.3 | 10.6374 |
| 2400 | 13.7859 | 30328.2 | 88.0534 | 181000.0 | -4989.9 | -48154.2 | 6.0883 | -250871.4 | 9.6444 |
| 2500 | 13.7955 | 31707.3 | 88.6164 | 189833.7 | -3610.8 | -48638.8 | 5.9119 | -250984.6 | 8.7305 |
| 2600 | 13.8041 | 33087.3 | 89.1576 | 198722.6 | -2230.8 | -49125.2 | 5.7478 | -251097.1 | 7.8864 |
| 2700 | 13.8118 | 34468.1 | 89.6787 | 207664.5 | -850.0 | -49613.3 | 5.5942 | -251209.2 | 7.1046 |
| 2800 | 13.8186 | 35849.8 | 90.1812 | 216657.7 | 531.5 | -50103.3 | 5.4499 | -251320.9 | 6.3782 |
| 2900 | 13.8248 | 37231.6 | 90.6662 | 225700.2 | 1913.7 | -50595.0 | 5.3147 | -251432.4 | 5.7017 |
| 3000 | 13.8304 | 38614.5 | 91.1350 | 234790.4 | 3296.4 | -51088.6 | 5.1867 | -251543.9 | 5.0700 |
| 3100 | 13.8354 | 39997.8 | 91.5886 | 243926.7 | 4679.7 | -51584.0 | 5.0663 | -251655.6 | 4.4787 |
| 3200 | 13.8400 | 41381.6 | 92.0279 | 253107.6 | 6063.5 | -52081.2 | 4.9522 | -251767.6 | 3.9242 |
| 3300 | 13.8442 | 42765.8 | 92.4538 | 262331.8 | 7447.7 | -52580.2 | 4.8436 | -251880.0 | 3.4031 |
| 3400 | 13.8480 | 44150.4 | 92.8672 | 271598.0 | 8832.3 | -53080.8 | 4.7407 | -251993.1 | 2.9124 |
| 3500 | 13.8515 | 45535.4 | 93.2686 | 280904.9 | 10217.3 | -53583.2 | 4.6428 | -252107.0 | 2.4495 |
| 3600 | 13.8548 | 46920.7 | 93.6589 | 290251.3 | 11602.6 | -54087.1 | 4.5495 | -252221.9 | 2.0121 |
| 3700 | 13.8577 | 48306.4 | 94.0386 | 299636.3 | 12988.3 | -54592.6 | 4.4602 | -252337.9 | 1.5982 |
| 3800 | 13.8605 | 49692.3 | 94.4081 | 309058.7 | 14374.2 | -55099.7 | 4.3753 | -252455.4 | 1.2059 |
| 3900 | 13.8630 | 51078.4 | 94.7682 | 318517.6 | 15760.4 | -55608.2 | 4.2936 | -252574.4 | 0.8335 |
| 4000 | 13.8653 | 52464.9 | 95.1192 | 328012.0 | 17146.8 | -56118.1 | 4.2154 | -252695.3 | 0.4796 |
| 4100 | 13.8675 | 53851.5 | 95.4616 | 337541.1 | 18533.4 | -56629.4 | 4.1402 | -252818.3 | 0.1428 |
| 4200 | 13.8696 | 55238.4 | 95.7958 | 347104.1 | 19920.3 | -57142.1 | 4.0679 | -252943.6 | -0.1781 |
| 4300 | 13.8714 | 56625.4 | 96.1222 | 356700.1 | 21307.3 | -57656.0 | 3.9983 | -253071.0 | -0.4843 |
| 4400 | 13.8732 | 58012.6 | 96.4411 | 366328.3 | 22694.6 | -58171.1 | 3.9314 | -253201.7 | -0.7767 |
| 4500 | 13.8748 | 59400.1 | 96.7529 | 375988.0 | 24082.0 | -58687.4 | 3.8671 | -253335.3 | -1.0562 |
| 4600 | 13.8764 | 60787.6 | 97.0579 | 385678.6 | 25469.5 | -59204.8 | 3.8048 | -253472.7 | -1.3237 |
| 4700 | 13.8778 | 62175.3 | 97.3563 | 395399.4 | 26857.2 | -59723.4 | 3.7449 | -253613.9 | -1.5800 |
| 4800 | 13.8792 | 63563.2 | 97.6485 | 405149.7 | 28245.1 | -60243.0 | 3.6865 | -253759.4 | -1.8258 |
| 4900 | 13.8805 | 64951.2 | 97.9347 | 414928.9 | 29633.1 | -60763.6 | 3.6305 | -253909.1 | -2.0616 |
| 5000 | 13.8817 | 66339.3 | 98.2151 | 424736.4 | 31021.2 | -61285.2 | 3.5762 | -254064.1 | -2.2892 |
| 5100 | 13.8828 | 67727.5 | 98.4900 | 434571.7 | 32409.4 | -61807.8 | 3.5233 | -254224.7 | -2.5060 |
| 5200 | 13.8838 | 69115.8 | 98.7596 | 444434.3 | 33797.7 | -62331.3 | 3.4721 | -254391.1 | -2.7155 |
| 5300 | 13.8848 | 70504.3 | 99.0241 | 454323.5 | 35186.2 | -62855.8 | 3.4226 | -254564.0 | -2.9173 |
| 5400 | 13.8858 | 71892.8 | 99.2837 | 464238.9 | 36574.7 | -63381.1 | 3.3744 | -254743.7 | -3.1118 |
| 5500 | 13.8867 | 73281.4 | 99.5385 | 474180.1 | 37963.3 | -63907.3 | 3.3273 | -254930.8 | -3.2993 |
| 5600 | 13.8875 | 74670.1 | 99.7887 | 484146.5 | 39352.0 | -64434.3 | 3.2818 | -255125.8 | -3.4803 |
| 5700 | 13.8884 | 76058.9 | 100.0345 | 494137.7 | 40740.8 | -64962.1 | 3.2375 | -255329.2 | -3.6550 |
| 5800 | 13.8891 | 77447.8 | 100.2760 | 504153.2 | 42129.7 | -65490.8 | 3.1947 | -255540.2 | -3.8238 |
| 5900 | 13.8898 | 78836.7 | 100.5135 | 514192.7 | 43518.7 | -66020.2 | 3.1525 | -255761.8 | -3.9871 |
| 6000 | 13.8905 | 80225.8 | 100.7469 | 524255.8 | 44907.7 | -66550.3 | 3.1115 | -255961.5 | -4.1450 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Al, 932° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(12) Al_2O_3 (gas); molecular weight, 85.96

| T, °K | C_p^0 , cal/mole °K | $H_T^0 - H_0^0$, cal/mole | S_T^0 , cal/mole °K | $-(F_T^0 - H_0^0)$, cal/mole | H_T^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -97568.9 | -93311.8 | ----- | -365000.0 | ----- |
| 100 | 9.0167 | 829.3 | 52.4132 | 4412.0 | -96739.6 | -93405.4 | 205.8135 | -366402.0 | 783.4224 |
| 200 | 10.5103 | 1801.8 | 59.0960 | 10017.4 | -95767.2 | -93996.0 | 103.5235 | -367657.5 | 382.4965 |
| 298.15 | 12.4959 | 2929.0 | 63.6550 | 16049.8 | -94640.0 | -94640.0 | 69.6096 | -368593.3 | 250.0916 |
| 300 | 12.5339 | 2952.1 | 63.7324 | 16167.6 | -94616.8 | -94651.4 | 69.1818 | -368608.4 | 248.4255 |
| 400 | 14.3943 | 4302.1 | 67.6033 | 22739.2 | -93266.8 | -95206.5 | 51.8968 | -369309.2 | 181.2350 |
| 500 | 15.7804 | 5814.8 | 70.9729 | 29671.7 | -91754.1 | -95679.5 | 41.4694 | -369823.7 | 140.8533 |
| 600 | 16.7577 | 7444.6 | 73.9417 | 36920.4 | -90124.4 | -96118.5 | 34.4842 | -370208.5 | 113.8991 |
| 700 | 17.4467 | 9156.8 | 76.5797 | 44449.0 | -88412.2 | -96557.1 | 29.4723 | -370503.5 | 94.6284 |
| 800 | 17.9411 | 10927.5 | 78.9434 | 52227.2 | -86641.5 | -97016.0 | 25.6956 | -370735.1 | 80.1651 |
| 900 | 18.3040 | 12740.6 | 81.0785 | 60230.1 | -84828.3 | -97508.1 | 22.7437 | -370921.0 | 68.9094 |
| 1000 | 18.5764 | 14585.3 | 83.0218 | 68436.6 | -82983.7 | -103073.0 | 20.2891 | -371073.1 | 59.9008 |
| 1100 | 18.7852 | 16453.8 | 84.8026 | 76829.0 | -81115.1 | -103443.4 | 18.2374 | -371199.7 | 52.5274 |
| 1200 | 18.9484 | 18340.8 | 86.4444 | 85392.4 | -79228.1 | -103804.8 | 16.5219 | -371306.5 | 46.3809 |
| 1300 | 19.0780 | 20242.3 | 87.9663 | 94113.9 | -77326.6 | -104160.0 | 15.0654 | -371397.7 | 41.1787 |
| 1400 | 19.1825 | 22155.5 | 89.3841 | 102982.2 | -75413.4 | -104510.8 | 13.8125 | -371476.5 | 36.7186 |
| 1500 | 19.2679 | 24078.2 | 90.7106 | 111987.7 | -73490.7 | -104858.8 | 12.7231 | -371545.3 | 32.8524 |
| 1600 | 19.3386 | 26008.6 | 91.9565 | 121121.7 | -71560.3 | -105205.3 | 11.7671 | -371605.8 | 29.4689 |
| 1700 | 19.3977 | 27945.5 | 93.1307 | 130376.6 | -69623.4 | -105551.3 | 10.9202 | -371659.4 | 26.4830 |
| 1800 | 19.4476 | 29887.9 | 94.2409 | 139745.7 | -67681.0 | -105897.6 | 10.1652 | -371707.2 | 23.8285 |
| 1900 | 19.4901 | 31834.8 | 95.2935 | 149222.9 | -65734.1 | -106245.1 | 9.4876 | -371750.2 | 21.4532 |
| 2000 | 19.5265 | 33785.7 | 96.2942 | 158802.7 | -63783.2 | -106594.2 | 8.8756 | -371789.2 | 19.3151 |
| 2100 | 19.5581 | 35740.0 | 97.2477 | 168480.1 | -61829.0 | -106945.5 | 8.3199 | -371824.7 | 17.3805 |
| 2200 | 19.5855 | 37697.2 | 98.1582 | 178250.8 | -59871.8 | -107299.4 | 7.8130 | -371857.4 | 15.6216 |
| 2300 | 19.6095 | 39657.0 | 99.0293 | 188110.4 | -57912.0 | -107656.2 | 7.3489 | -371887.4 | 14.0155 |
| 2400 | 19.6306 | 41619.0 | 99.8643 | 198055.4 | -55950.0 | -108016.2 | 6.9219 | -371915.6 | 12.5431 |
| 2500 | 19.6493 | 43583.0 | 100.6661 | 208082.2 | -53985.9 | -108379.6 | 6.5277 | -371942.1 | 11.1884 |
| 2600 | 19.6659 | 45548.8 | 101.4371 | 218187.6 | -52020.2 | -108746.5 | 6.1630 | -371967.3 | 9.9378 |
| 2700 | 19.6808 | 47516.1 | 102.1796 | 228368.7 | -50052.8 | -109117.0 | 5.8240 | -371991.6 | 8.7798 |
| 2800 | 19.6941 | 49484.9 | 102.8955 | 238622.6 | -48084.1 | -109491.2 | 5.5078 | -372015.3 | 7.7045 |
| 2900 | 19.7061 | 51454.9 | 103.5868 | 248946.9 | -46114.0 | -109869.1 | 5.2129 | -372038.6 | 6.7032 |
| 3000 | 19.7169 | 53426.1 | 104.2551 | 259339.2 | -44142.9 | -110250.6 | 4.9361 | -372061.9 | 5.7686 |
| 3100 | 19.7267 | 55398.2 | 104.9018 | 269797.2 | -42170.7 | -110635.8 | 4.6769 | -372085.4 | 4.8943 |
| 3200 | 19.7356 | 57371.4 | 105.5282 | 280318.9 | -40197.6 | -111024.7 | 4.4328 | -372109.4 | 4.0746 |
| 3300 | 19.7437 | 59345.3 | 106.1356 | 290902.2 | -38223.6 | -111417.0 | 4.2024 | -372134.2 | 3.3045 |
| 3400 | 19.7511 | 61320.1 | 106.7251 | 301545.4 | -36248.9 | -111812.8 | 3.9850 | -372160.0 | 2.5796 |
| 3500 | 19.7579 | 63295.5 | 107.2978 | 312246.7 | -34273.4 | -112212.0 | 3.7792 | -372187.1 | 1.8961 |
| 3600 | 19.7641 | 65271.6 | 107.8545 | 323004.5 | -32297.3 | -112614.4 | 3.5843 | -372215.8 | 1.2506 |
| 3700 | 19.7699 | 67248.3 | 108.3961 | 333817.1 | -30320.6 | -113020.0 | 3.3992 | -372246.3 | 0.6399 |
| 3800 | 19.7752 | 69225.6 | 108.9234 | 344683.2 | -28343.4 | -113428.7 | 3.2235 | -372278.9 | 0.0612 |
| 3900 | 19.7801 | 71203.3 | 109.4371 | 355601.3 | -26365.6 | -113840.3 | 3.0558 | -372313.9 | -0.4878 |
| 4000 | 19.7846 | 73181.6 | 109.9379 | 366570.2 | -24387.4 | -114254.8 | 2.8962 | -372351.6 | -1.0094 |
| 4100 | 19.7888 | 75160.3 | 110.4265 | 377588.5 | -22408.7 | -114672.0 | 2.7436 | -372392.2 | -1.5056 |
| 4200 | 19.7928 | 77139.3 | 110.9034 | 388655.1 | -20429.6 | -115091.9 | 2.5976 | -372436.2 | -1.9782 |
| 4300 | 19.7964 | 79118.8 | 111.3692 | 399768.8 | -18450.1 | -115514.3 | 2.4580 | -372483.1 | -2.4289 |
| 4400 | 19.7998 | 81098.6 | 111.8244 | 410928.6 | -16470.3 | -115939.2 | 2.3243 | -372534.4 | -2.8592 |
| 4500 | 19.8030 | 83078.8 | 112.2694 | 422133.4 | -14490.2 | -116366.5 | 2.1962 | -372589.7 | -3.2704 |
| 4600 | 19.8060 | 85059.2 | 112.7046 | 433382.1 | -12509.7 | -116796.0 | 2.0731 | -372649.7 | -3.6638 |
| 4700 | 19.8088 | 87039.9 | 113.1306 | 444674.0 | -10529.0 | -117227.8 | 1.9550 | -372714.7 | -4.0405 |
| 4800 | 19.8114 | 89021.0 | 113.5477 | 456008.0 | -8548.0 | -117661.7 | 1.8410 | -372785.0 | -4.4016 |
| 4900 | 19.8139 | 91002.2 | 113.9562 | 467383.2 | -6566.7 | -118097.7 | 1.7316 | -372860.6 | -4.7480 |
| 5000 | 19.8162 | 92983.7 | 114.3565 | 478798.9 | -4585.2 | -118535.6 | 1.6263 | -372942.7 | -5.0806 |
| 5100 | 19.8184 | 94965.4 | 114.7490 | 490254.3 | -2603.5 | -118975.5 | 1.5243 | -373031.3 | -5.4003 |
| 5200 | 19.8204 | 96947.4 | 115.1338 | 501748.5 | -621.5 | -119417.3 | 1.4261 | -373127.0 | -5.7077 |
| 5300 | 19.8224 | 98929.5 | 115.5114 | 513280.8 | 1360.6 | -119860.9 | 1.3313 | -373230.2 | -6.0036 |
| 5400 | 19.8242 | 100911.9 | 115.8819 | 524850.5 | 3342.9 | -120306.3 | 1.2396 | -373341.3 | -6.2886 |
| 5500 | 19.8259 | 102894.4 | 116.2457 | 536456.9 | 5325.4 | -120753.4 | 1.1507 | -373460.8 | -6.5634 |
| 5600 | 19.8276 | 104877.0 | 116.6029 | 548099.4 | 7308.1 | -121202.2 | 1.0649 | -373589.3 | -6.8284 |
| 5700 | 19.8291 | 106859.9 | 116.9539 | 559777.3 | 9290.9 | -121652.6 | 0.9817 | -373727.3 | -7.0843 |
| 5800 | 19.8306 | 108842.9 | 117.2988 | 571490.0 | 11273.9 | -122104.6 | 0.9015 | -373873.9 | -7.3314 |
| 5900 | 19.8320 | 110826.0 | 117.6378 | 583236.9 | 13257.1 | -122558.2 | 0.8232 | -374032.1 | -7.5702 |
| 6000 | 19.8334 | 112809.3 | 117.9711 | 595017.4 | 15240.3 | -123013.3 | 0.7472 | -374169.4 | -7.8010 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Al, 932° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (13) Al_2O_3 (crystal, liquid); molecular weight, 101.96

| T , °K | C_p^o , cal/mole °K | $H_f^o - H_o^o$, ^a cal/mole | S_f^o , cal/mole °K | $-(F_f^o - H_o^o)$, ^a cal/mole | H_f^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|--------------------------|--------------------------------------------|--------------------------|-----------------------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^o)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^o , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | 0 | 0 | -402794.4 | -397499.9 | ----- | -728174.6 | ----- |
| 100 | 3.0688 | 78.0 | 1.0241 | 24.5 | -402716.4 | -398691.6 | 857.2300 | -730855.4 | 1561.5708 |
| 200 | 12.2228 | 841.5 | 5.9465 | 347.8 | -401952.9 | -399839.0 | 421.0514 | -732877.2 | 762.0139 |
| 298.15 | 18.8840 | 2394.4 | 12.1750 | 1235.6 | -400400.0 | -400400.0 | 277.1216 | -733909.9 | 498.2058 |
| 300 | 18.9794 | 2429.3 | 12.2897 | 1257.6 | -400365.1 | -400406.2 | 275.3114 | -733923.1 | 494.8880 |
| 400 | 22.9876 | 4545.2 | 18.3509 | 2795.2 | -398249.2 | -400550.6 | 202.3746 | -734375.8 | 361.1852 |
| 500 | 25.3442 | 6970.8 | 23.7524 | 4905.4 | -395823.6 | -400476.0 | 158.6089 | -734487.9 | 280.9319 |
| 600 | 26.8881 | 9587.5 | 28.5206 | 7524.9 | -393206.9 | -400305.8 | 129.4413 | -734392.2 | 227.4297 |
| 700 | 27.9685 | 12333.2 | 32.7510 | 10592.5 | -390461.2 | -400099.9 | 108.6174 | -734157.5 | 189.2223 |
| 800 | 28.7572 | 15171.4 | 36.5392 | 14060.0 | -387623.0 | -399890.2 | 93.0072 | -733823.8 | 160.5777 |
| 900 | 29.3523 | 18078.4 | 39.9618 | 17887.2 | -384716.0 | -399695.4 | 80.8722 | -733416.9 | 138.3098 |
| b1000 | 29.8136 | 21037.5 | 43.0784 | 22040.9 | -381756.9 | -404559.6 | 71.0878 | -732954.7 | 120.5060 |
| 1100 | 30.1745 | 24036.8 | 45.9393 | 26496.4 | -378757.6 | -404218.7 | 63.0538 | -732450.1 | 105.9496 |
| 1200 | 30.4637 | 27069.8 | 48.5779 | 31223.7 | -375724.6 | -403858.4 | 56.3644 | -731910.1 | 93.8274 |
| 1300 | 30.9068 | 30141.0 | 51.0360 | 36205.8 | -372653.4 | -403472.2 | 50.7095 | -731330.5 | 83.5780 |
| 1400 | 31.2819 | 33250.6 | 53.3402 | 41425.8 | -369543.8 | -403058.7 | 45.8670 | -730711.6 | 74.8000 |
| 1500 | 31.6436 | 36396.9 | 55.5109 | 46869.4 | -366397.5 | -402618.4 | 41.6747 | -730054.9 | 67.1991 |
| 1600 | 31.9951 | 39578.9 | 57.5644 | 52524.1 | -363215.5 | -402151.7 | 38.0109 | -729362.0 | 60.5544 |
| 1700 | 32.3389 | 42795.7 | 59.5144 | 58378.8 | -359998.7 | -401659.3 | 34.7815 | -728633.7 | 54.6972 |
| 1800 | 32.6766 | 46046.5 | 61.3724 | 64423.9 | -356747.9 | -401141.5 | 31.9148 | -727871.0 | 49.4961 |
| 1900 | 33.0094 | 49330.8 | 63.1481 | 70650.5 | -353463.5 | -400598.8 | 29.3533 | -727074.4 | 44.8474 |
| 2000 | 33.3382 | 52648.3 | 64.8496 | 77051.0 | -350146.1 | -400031.4 | 27.0511 | -726244.6 | 40.6683 |
| 2100 | 33.6639 | 55998.4 | 66.4841 | 83618.2 | -346796.0 | -399439.6 | 24.9709 | -725382.1 | 36.8916 |
| 2200 | 33.9870 | 59381.0 | 68.0576 | 90345.8 | -343431.3 | -398823.7 | 23.0827 | -724487.1 | 33.4624 |
| 2300 | 34.3079 | 62795.7 | 69.5755 | 97227.9 | -339998.7 | -398183.9 | 21.3616 | -723560.2 | 30.3354 |
| c2318 | 34.365 | 63413.8 | 69.843 | 98482.3 | -339380.6 | -398063.3 | 21.0672 | -723384.9 | 29.7990 |
| 2318 | 35.0 | 89413.8 | 81.060 | 98482.3 | -313380.6 | -372051.2 | 21.0672 | -697362.4 | 29.7990 |
| 2400 | 35.0 | 92283.8 | 82.2765 | 105179.8 | -310510.6 | -371478.8 | 19.8703 | -696560.4 | 27.5565 |
| 2500 | 35.0 | 95783.8 | 83.7053 | 113479.4 | -307010.6 | -370769.9 | 18.5184 | -695549.1 | 25.0212 |
| 2600 | 35.0 | 99283.8 | 85.0780 | 121919.0 | -303510.6 | -370068.9 | 17.2732 | -694538.6 | 22.6843 |
| 2700 | 35.0 | 102783.8 | 86.3989 | 130493.3 | -300010.6 | -369375.7 | 16.1223 | -693529.1 | 20.5237 |
| 2800 | 35.0 | 106283.8 | 87.6718 | 139197.2 | -296510.6 | -368690.1 | 15.0553 | -692520.7 | 18.5203 |
| 2900 | 35.0 | 109783.8 | 88.9000 | 148026.2 | -293010.6 | -368012.0 | 14.0642 | -691513.7 | 16.6578 |
| 3000 | 35.0 | 113283.8 | 90.0865 | 156975.8 | -289510.6 | -367341.0 | 13.1404 | -690508.3 | 14.9220 |
| 3100 | 35.0 | 116783.8 | 91.2342 | 166042.2 | -286010.6 | -366677.1 | 12.2781 | -689504.7 | 13.3006 |
| 3200 | 35.0 | 120283.8 | 92.3454 | 175221.4 | -282510.6 | -366020.0 | 11.4712 | -688503.2 | 11.7827 |
| 3300 | 35.0 | 123783.8 | 93.4274 | 184510.1 | -279010.6 | -365369.5 | 10.7141 | -687504.0 | 10.3589 |
| 3400 | 35.0 | 127283.8 | 94.4672 | 193904.8 | -275510.6 | -364725.3 | 10.0031 | -686507.5 | 9.0207 |
| 3500 | 35.0 | 130783.8 | 95.4818 | 203402.5 | -272010.6 | -364087.3 | 9.3338 | -685513.7 | 7.7509 |
| 3600 | 35.0 | 134283.8 | 96.4678 | 213000.2 | -268510.6 | -363455.1 | 8.7029 | -684523.1 | 6.5728 |
| 3700 | 35.0 | 137783.8 | 97.4267 | 222695.2 | -265010.6 | -362828.5 | 8.1070 | -683535.8 | 5.4505 |
| 3800 | 35.0 | 141283.8 | 98.3601 | 232484.7 | -261510.6 | -362207.4 | 7.5439 | -682552.2 | 4.3888 |
| 3900 | 35.0 | 144783.8 | 99.2693 | 242366.4 | -258010.6 | -361591.5 | 7.0101 | -681572.5 | 3.3830 |
| 4000 | 35.0 | 148283.8 | 100.1554 | 252337.8 | -254510.6 | -360980.6 | 6.5041 | -680597.0 | 2.4289 |
| 4100 | 35.0 | 151783.8 | 101.0196 | 262396.7 | -251010.6 | -360374.4 | 6.0234 | -679626.0 | 1.5226 |
| 4200 | 35.0 | 155283.8 | 101.8631 | 272541.1 | -247510.6 | -359772.9 | 5.5663 | -678659.9 | 0.6607 |
| 4300 | 35.0 | 158783.8 | 102.6866 | 282768.7 | -244010.6 | -359175.7 | 5.1312 | -677698.3 | -0.1600 |
| 4400 | 35.0 | 162283.8 | 103.4912 | 293077.7 | -240510.6 | -358582.8 | 4.7166 | -676742.6 | -0.9422 |
| 4500 | 35.0 | 165783.8 | 104.2778 | 303466.3 | -237010.6 | -357993.9 | 4.3213 | -675792.3 | -1.5887 |
| 4600 | 35.0 | 169283.8 | 105.0471 | 313932.7 | -233510.6 | -357408.9 | 3.9436 | -674848.3 | -2.4016 |
| 4700 | 35.0 | 172783.8 | 105.7998 | 324475.2 | -230010.6 | -356827.7 | 3.5828 | -673910.9 | -3.0833 |
| 4800 | 35.0 | 176283.8 | 106.5367 | 335092.2 | -226510.6 | -356250.0 | 3.2372 | -672980.2 | -3.7357 |
| 4900 | 35.0 | 179783.8 | 107.2583 | 345782.0 | -223010.6 | -355675.8 | 2.9066 | -672056.2 | -4.3605 |
| 5000 | 35.0 | 183283.8 | 107.9654 | 356543.3 | -219510.6 | -355105.0 | 2.5897 | -671140.2 | -4.9596 |
| 5100 | 35.0 | 186783.8 | 108.6585 | 367374.6 | -216010.6 | -354537.5 | 2.2855 | -670232.2 | -5.5344 |
| 5200 | 35.0 | 190283.8 | 109.3381 | 378274.6 | -212510.6 | -353973.0 | 1.9935 | -669332.7 | -6.0803 |
| 5300 | 35.0 | 193783.8 | 110.0048 | 389241.8 | -209010.6 | -353411.7 | 1.7132 | -668442.0 | -6.6167 |
| 5400 | 35.0 | 197283.8 | 110.6591 | 400275.1 | -205510.6 | -352853.2 | 1.4435 | -667560.6 | -7.1268 |
| 5500 | 35.0 | 200783.8 | 111.3013 | 411373.3 | -202010.6 | -352297.6 | 1.1838 | -666689.0 | -7.6177 |
| 5600 | 35.0 | 204283.8 | 111.9319 | 422535.0 | -198510.6 | -351744.8 | 0.9341 | -665827.7 | -8.0905 |
| 5700 | 35.0 | 207783.8 | 112.5514 | 433759.3 | -195010.6 | -351194.7 | 0.6934 | -664977.1 | -8.5450 |
| 5800 | 35.0 | 211283.8 | 113.1601 | 445045.0 | -191510.6 | -350647.2 | 0.4618 | -664136.3 | -8.9853 |
| 5900 | 35.0 | 214783.8 | 113.7584 | 456391.0 | -188010.6 | -350102.3 | 0.2379 | -663308.5 | -9.4092 |
| 6000 | 35.0 | 218283.8 | 114.3467 | 467796.3 | -184510.6 | -349559.9 | 0.0217 | -662460.9 | -9.8183 |

^a H_o^o refers to crystal state.

^bA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Al, 932° K.

^cMelting point.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(14) AlOCl (gas); molecular weight, 78.457

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -95000.4 | -91775.1 | ----- | -256167.6 | ----- |
| 100 | 8.9163 | 753.0 | 49.3541 | 4182.5 | -94247.4 | -91831.5 | 201.6560 | -257027.1 | 550.6882 |
| 200 | 11.1582 | 1771.1 | 56.3216 | 9493.2 | -93229.3 | -91957.7 | 101.2595 | -257622.0 | 269.5669 |
| 298.15 | 12.3149 | 2927.7 | 61.0113 | 15262.9 | -92072.7 | -92072.7 | 68.1626 | -258000.0 | 176.8243 |
| 300 | 12.3319 | 2950.5 | 61.0876 | 15375.8 | -92049.9 | -92074.7 | 67.7465 | -258006.0 | 175.6581 |
| 400 | 13.0786 | 4223.6 | 64.7450 | 21674.4 | -90776.8 | -92168.8 | 50.9701 | -258288.5 | 128.6467 |
| 500 | 13.5709 | 5557.7 | 67.7200 | 28302.3 | -89442.6 | -92254.4 | 40.8946 | -258508.9 | 100.4119 |
| 600 | 13.9010 | 6932.4 | 70.2254 | 35202.9 | -88068.0 | -92348.6 | 34.1710 | -258686.0 | 81.5742 |
| 700 | 14.1282 | 8334.5 | 72.3864 | 42335.9 | -86665.8 | -92461.1 | 29.3632 | -258831.0 | 68.1103 |
| 800 | 14.2890 | 9755.8 | 74.2840 | 49671.4 | -85244.5 | -92597.3 | 25.7524 | -258951.6 | 58.0011 |
| 900 | 14.4060 | 11190.9 | 75.9741 | 57185.8 | -83809.5 | -92760.1 | 22.9395 | -259053.1 | 50.1547 |
| 1000 | 14.4934 | 12636.1 | 77.4967 | 64860.6 | -82364.3 | -95466.9 | 20.6445 | -259139.6 | 43.3543 |
| 1100 | 14.5601 | 14088.9 | 78.8813 | 72680.6 | -80911.5 | -95582.4 | 18.7465 | -259214.0 | 38.7052 |
| 1200 | 14.6121 | 15547.6 | 80.1505 | 80633.1 | -79452.8 | -95698.1 | 17.1632 | -259278.5 | 34.4131 |
| 1300 | 14.6533 | 17010.9 | 81.3218 | 88707.4 | -77989.4 | -95814.5 | 15.8218 | -259335.0 | 30.7805 |
| 1400 | 14.6865 | 18478.0 | 82.4090 | 96894.6 | -76522.4 | -95932.0 | 14.6706 | -259384.9 | 27.6662 |
| 1500 | 14.7136 | 19948.0 | 83.4232 | 105186.8 | -75052.3 | -96050.9 | 13.6716 | -259429.1 | 24.9666 |
| 1600 | 14.7359 | 21420.5 | 84.3736 | 113577.1 | -73579.8 | -96171.3 | 12.7966 | -259468.6 | 22.6041 |
| 1700 | 14.7546 | 22895.1 | 85.2675 | 122059.6 | -72105.3 | -96293.5 | 12.0233 | -259504.1 | 20.5193 |
| 1800 | 14.7704 | 24371.4 | 86.1113 | 130629.0 | -70629.0 | -96417.7 | 11.3352 | -259536.1 | 18.6658 |
| 1900 | 14.7838 | 25849.1 | 86.9103 | 139280.4 | -69151.3 | -96544.1 | 10.7188 | -259565.3 | 17.0073 |
| 2000 | 14.7954 | 27328.1 | 87.6689 | 148009.7 | -67672.3 | -96672.9 | 10.1632 | -259591.8 | 15.5145 |
| 2100 | 14.8053 | 28808.1 | 88.3910 | 156813.0 | -66192.2 | -96804.1 | 9.6598 | -259616.2 | 14.1637 |
| 2200 | 14.8140 | 30289.1 | 89.0799 | 165686.8 | -64711.3 | -96937.9 | 9.2015 | -259638.7 | 12.9355 |
| 2300 | 14.8216 | 31770.9 | 89.7386 | 174627.9 | -63229.5 | -97074.3 | 8.7825 | -259659.1 | 11.8141 |
| 2400 | 14.8282 | 33253.4 | 90.3696 | 183633.6 | -61747.0 | -97213.5 | 8.3979 | -259679.2 | 10.7861 |
| 2500 | 14.8341 | 34736.5 | 90.9750 | 192701.0 | -60263.9 | -97355.4 | 8.0435 | -259697.6 | 9.8402 |
| 2600 | 14.8394 | 36220.2 | 91.5569 | 201827.8 | -58780.2 | -97500.0 | 7.7161 | -259715.0 | 8.9670 |
| 2700 | 14.8440 | 37704.4 | 92.1170 | 211011.7 | -57296.0 | -97647.4 | 7.4124 | -259731.7 | 8.1585 |
| 2800 | 14.8482 | 39189.0 | 92.6570 | 220250.5 | -55811.4 | -97797.6 | 7.1298 | -259747.9 | 7.4077 |
| 2900 | 14.8520 | 40674.0 | 93.1781 | 229542.4 | -54326.4 | -97950.6 | 6.8665 | -259763.6 | 6.7086 |
| 3000 | 14.8554 | 42159.4 | 93.6816 | 238885.6 | -52841.0 | -98106.2 | 6.6201 | -259779.1 | 6.0560 |
| 3100 | 14.8585 | 43645.1 | 94.1688 | 248278.2 | -51355.3 | -98264.5 | 6.3895 | -259794.5 | 5.4456 |
| 3200 | 14.8613 | 45131.1 | 94.6406 | 257718.8 | -49869.3 | -98425.5 | 6.1729 | -259809.9 | 4.8732 |
| 3300 | 14.8639 | 46617.3 | 95.0979 | 267205.8 | -48383.1 | -98589.0 | 5.9689 | -259825.6 | 4.3355 |
| 3400 | 14.8662 | 48103.8 | 95.5417 | 276737.9 | -46896.5 | -98755.0 | 5.7768 | -259841.6 | 3.8294 |
| 3500 | 14.8683 | 49590.5 | 95.9727 | 286313.8 | -45409.8 | -98923.5 | 5.5952 | -259858.1 | 3.3522 |
| 3600 | 14.8703 | 51077.5 | 96.3915 | 295932.1 | -43922.9 | -99094.4 | 5.4235 | -259875.2 | 2.9015 |
| 3700 | 14.8721 | 52564.6 | 96.7990 | 305591.7 | -42435.8 | -99267.6 | 5.2608 | -259893.2 | 2.4751 |
| 3800 | 14.8738 | 54051.9 | 97.1956 | 315291.5 | -40948.5 | -99443.1 | 5.1065 | -259912.0 | 2.0711 |
| 3900 | 14.8753 | 55539.4 | 97.5820 | 325030.5 | -39461.0 | -99620.8 | 4.9597 | -259932.0 | 1.6879 |
| 4000 | 14.8768 | 57027.0 | 97.9586 | 334807.6 | -37973.4 | -99800.6 | 4.8200 | -259953.2 | 1.3237 |
| 4100 | 14.8781 | 58514.7 | 98.3260 | 344621.9 | -36485.7 | -99982.6 | 4.6869 | -259975.7 | 0.9773 |
| 4200 | 14.8793 | 60002.6 | 98.6845 | 354472.5 | -34997.8 | -100166.5 | 4.5598 | -259999.8 | 0.6473 |
| 4300 | 14.8805 | 61490.6 | 99.0347 | 364358.5 | -33509.8 | -100352.5 | 4.4384 | -260025.4 | 0.3327 |
| 4400 | 14.8815 | 62978.7 | 99.3768 | 374279.1 | -32021.7 | -100540.3 | 4.3224 | -260053.0 | 0.0323 |
| 4500 | 14.8825 | 64466.9 | 99.7112 | 384233.6 | -30533.5 | -100730.1 | 4.2114 | -260082.5 | -0.2547 |
| 4600 | 14.8835 | 65955.2 | 100.0383 | 394221.1 | -29045.2 | -100921.6 | 4.1049 | -260114.4 | -0.5293 |
| 4700 | 14.8844 | 67443.6 | 100.3584 | 404241.0 | -27556.8 | -101115.0 | 4.0029 | -260148.6 | -0.7923 |
| 4800 | 14.8852 | 68932.0 | 100.6718 | 414292.6 | -26068.3 | -101310.1 | 3.9048 | -260185.4 | -1.0443 |
| 4900 | 14.8860 | 70420.6 | 100.9787 | 424375.2 | -24579.8 | -101506.9 | 3.8106 | -260224.9 | -1.2861 |
| 5000 | 14.8867 | 71909.2 | 101.2795 | 434488.1 | -23091.1 | -101705.3 | 3.7201 | -260267.5 | -1.5182 |
| 5100 | 14.8874 | 73397.9 | 101.5743 | 444630.9 | -21602.4 | -101905.4 | 3.6327 | -260313.3 | -1.7413 |
| 5200 | 14.8880 | 74886.7 | 101.8634 | 454802.8 | -20113.7 | -102107.1 | 3.5487 | -260362.5 | -1.9558 |
| 5300 | 14.8886 | 76375.5 | 102.1470 | 465003.4 | -18624.8 | -102310.4 | 3.4677 | -260415.5 | -2.1623 |
| 5400 | 14.8892 | 77864.4 | 102.4253 | 475232.0 | -17135.9 | -102515.2 | 3.3894 | -260472.5 | -2.3611 |
| 5500 | 14.8898 | 79353.4 | 102.6985 | 485488.3 | -15647.0 | -102721.6 | 3.3138 | -260533.6 | -2.5528 |
| 5600 | 14.8903 | 80842.4 | 102.9668 | 495771.6 | -14158.0 | -102929.4 | 3.2409 | -260599.1 | -2.7377 |
| 5700 | 14.8908 | 82331.4 | 103.2303 | 506081.5 | -12668.9 | -103138.7 | 3.1703 | -260669.3 | -2.9162 |
| 5800 | 14.8912 | 83820.5 | 103.4893 | 516417.5 | -11179.8 | -103349.4 | 3.1022 | -260743.8 | -3.0885 |
| 5900 | 14.8917 | 85309.7 | 103.7439 | 526779.2 | -9690.7 | -103561.6 | 3.0361 | -260824.1 | -3.2550 |
| 6000 | 14.8921 | 86798.9 | 103.9942 | 537166.1 | -8201.5 | -103775.2 | 2.9720 | -260893.8 | -3.4160 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Al, 932° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(15) AlOF (gas); molecular weight, 61.98

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -141934.3 | -138750.9 | ----- | -292950.0 | ----- |
| 100 | 8.2481 | 728.0 | 47.1507 | 3987.1 | -141206.3 | -138831.8 | 304.3753 | -293836.2 | 631.3512 |
| 200 | 10.2505 | 1663.1 | 53.5522 | 9047.4 | -140271.3 | -139028.3 | 152.5923 | -294541.0 | 309.6569 |
| 298.15 | 11.5112 | 2734.3 | 57.8935 | 14526.6 | -139200.0 | -139200.0 | 102.5542 | -295034.8 | 203.5253 |
| 300 | 11.5313 | 2755.6 | 57.9647 | 14633.8 | -139178.7 | -139202.9 | 101.9250 | -295042.7 | 202.2917 |
| 400 | 12.4475 | 3957.3 | 61.4153 | 20608.8 | -137977.1 | -139338.9 | 76.5622 | -295406.6 | 148.5279 |
| 500 | 13.0833 | 5235.8 | 64.2656 | 26897.0 | -136698.5 | -139455.9 | 61.3307 | -295673.7 | 116.2349 |
| 600 | 13.5215 | 6567.4 | 66.6921 | 33447.9 | -135367.0 | -139574.5 | 51.1678 | -295874.4 | 94.6887 |
| 700 | 13.8280 | 7935.7 | 68.8008 | 40224.9 | -133998.6 | -139706.6 | 43.9022 | -296028.9 | 79.2895 |
| 800 | 14.0473 | 9330.1 | 70.6624 | 47199.8 | -132604.2 | -139859.2 | 38.4473 | -296150.7 | 67.7346 |
| 900 | 14.2082 | 10743.3 | 72.3267 | 54350.8 | -131191.1 | -140036.0 | 34.1997 | -296248.9 | 58.7442 |
| 1000 | 14.3290 | 12170.4 | 73.8302 | 61659.8 | -129763.9 | -142755.1 | 30.7566 | -296329.4 | 51.5496 |
| 1100 | 14.4215 | 13608.1 | 75.2004 | 69112.4 | -128326.2 | -142881.8 | 27.9191 | -296396.7 | 45.5617 |
| 1200 | 14.4939 | 15054.0 | 76.4585 | 76696.2 | -126880.3 | -143007.9 | 25.5525 | -296453.5 | 40.7541 |
| 1300 | 14.5514 | 16506.4 | 77.6210 | 84400.9 | -125427.9 | -143134.1 | 23.5483 | -296502.2 | 36.6008 |
| 1400 | 14.5978 | 17963.9 | 78.7011 | 92217.6 | -123970.4 | -143260.9 | 21.8288 | -296544.3 | 33.0402 |
| 1500 | 14.6357 | 19425.7 | 79.7096 | 100138.7 | -122508.7 | -143388.8 | 20.3373 | -296581.1 | 29.9540 |
| 1600 | 14.6671 | 20890.9 | 80.6552 | 108157.5 | -121043.5 | -143518.1 | 19.0312 | -296613.5 | 27.2533 |
| 1700 | 14.6933 | 22358.9 | 81.5452 | 116267.9 | -119575.4 | -143649.1 | 17.8775 | -296642.3 | 24.8700 |
| 1800 | 14.7155 | 23829.4 | 82.3857 | 124464.9 | -118104.9 | -143782.1 | 16.8511 | -296668.0 | 22.7513 |
| 1900 | 14.7344 | 25301.9 | 83.1818 | 132743.6 | -116632.4 | -143917.4 | 15.9320 | -296691.1 | 20.8555 |
| 2000 | 14.7506 | 26776.2 | 83.9380 | 141099.9 | -115158.2 | -144055.0 | 15.1040 | -296712.1 | 19.1492 |
| 2100 | 14.7646 | 28251.9 | 84.6581 | 149530.0 | -113682.4 | -144195.2 | 14.3539 | -296731.2 | 17.6053 |
| 2200 | 14.7768 | 29729.0 | 85.3452 | 158030.4 | -112205.3 | -144338.2 | 13.6715 | -296748.7 | 16.2016 |
| 2300 | 14.7874 | 31207.2 | 86.0023 | 166598.0 | -110727.1 | -144483.9 | 13.0478 | -296764.9 | 14.9199 |
| 2400 | 14.7968 | 32686.5 | 86.6318 | 175230.0 | -109247.9 | -144632.5 | 12.4755 | -296780.1 | 13.7450 |
| 2500 | 14.8051 | 34166.6 | 87.2360 | 183923.6 | -107767.8 | -144784.1 | 11.9483 | -296794.3 | 12.6640 |
| 2600 | 14.8125 | 35647.5 | 87.8169 | 192676.4 | -106286.9 | -144938.7 | 11.4614 | -296807.8 | 11.6661 |
| 2700 | 14.8191 | 37129.0 | 88.3760 | 201486.2 | -104805.3 | -145096.3 | 11.0100 | -296820.8 | 10.7541 |
| 2800 | 14.8250 | 38611.3 | 88.9151 | 210350.9 | -103323.1 | -145256.9 | 10.5903 | -296833.5 | 9.8840 |
| 2900 | 14.8304 | 40094.3 | 89.4354 | 219268.6 | -101840.3 | -145420.4 | 10.1992 | -296845.9 | 9.0851 |
| 3000 | 14.8352 | 41577.3 | 89.9382 | 228237.4 | -100357.0 | -145587.0 | 9.8336 | -296858.2 | 8.3395 |
| 3100 | 14.8395 | 43061.1 | 90.4248 | 237255.7 | -98873.3 | -145756.5 | 9.4914 | -296870.7 | 7.6419 |
| 3200 | 14.8435 | 44545.2 | 90.8960 | 246321.9 | -97389.1 | -145928.9 | 9.1702 | -296883.3 | 6.9878 |
| 3300 | 14.8471 | 46029.7 | 91.3528 | 255434.4 | -95904.6 | -146104.1 | 8.8678 | -296896.3 | 6.3734 |
| 3400 | 14.8504 | 47514.6 | 91.7961 | 264592.0 | -94419.7 | -146282.1 | 8.5831 | -296909.7 | 5.7951 |
| 3500 | 14.8534 | 48999.8 | 92.2266 | 273793.2 | -92934.5 | -146462.9 | 8.3143 | -296923.8 | 5.2499 |
| 3600 | 14.8562 | 50485.3 | 92.6450 | 283036.9 | -91449.0 | -146646.4 | 8.0601 | -296938.7 | 4.7348 |
| 3700 | 14.8587 | 51971.0 | 93.0521 | 292321.8 | -89963.3 | -146832.5 | 7.8193 | -296954.4 | 4.2477 |
| 3800 | 14.8611 | 53457.0 | 93.4484 | 301646.9 | -88477.3 | -147021.1 | 7.5911 | -296971.1 | 3.7861 |
| 3900 | 14.8633 | 54943.2 | 93.8345 | 311011.2 | -86991.1 | -147212.3 | 7.3741 | -296989.1 | 3.3481 |
| 4000 | 14.8653 | 56429.7 | 94.2108 | 320413.5 | -85504.6 | -147405.9 | 7.1678 | -297008.3 | 2.9321 |
| 4100 | 14.8672 | 57916.3 | 94.5779 | 329853.0 | -84018.0 | -147601.9 | 6.9712 | -297029.0 | 2.5363 |
| 4200 | 14.8689 | 59403.1 | 94.9362 | 339328.8 | -82531.2 | -147800.3 | 6.7837 | -297051.4 | 2.1593 |
| 4300 | 14.8705 | 60890.1 | 95.2861 | 348840.0 | -81044.2 | -148000.9 | 6.6047 | -297075.2 | 1.7998 |
| 4400 | 14.8721 | 62377.2 | 95.6279 | 358385.7 | -79557.1 | -148203.8 | 6.4336 | -297101.2 | 1.4567 |
| 4500 | 14.8735 | 63864.5 | 95.9622 | 367965.3 | -78069.8 | -148408.8 | 6.2700 | -297129.1 | 1.1287 |
| 4600 | 14.8748 | 65351.9 | 96.2891 | 377577.9 | -76582.4 | -148616.0 | 6.1131 | -297159.5 | 0.8150 |
| 4700 | 14.8760 | 66839.4 | 96.6090 | 387222.9 | -75094.9 | -148825.3 | 5.9629 | -297192.3 | 0.5146 |
| 4800 | 14.8772 | 68327.1 | 96.9222 | 396899.5 | -73607.2 | -149036.7 | 5.8185 | -297227.7 | 0.2267 |
| 4900 | 14.8783 | 69814.9 | 97.2290 | 406607.1 | -72119.4 | -149250.1 | 5.6800 | -297265.8 | -0.0495 |
| 5000 | 14.8793 | 71302.8 | 97.5296 | 416345.1 | -70631.6 | -149465.4 | 5.5469 | -297307.1 | -0.3146 |
| 5100 | 14.8803 | 72790.8 | 97.8242 | 426112.8 | -69143.6 | -149682.7 | 5.4186 | -297351.7 | -0.5694 |
| 5200 | 14.8812 | 74278.8 | 98.1132 | 435909.8 | -67655.5 | -149902.0 | 5.2952 | -297399.8 | -0.8145 |
| 5300 | 14.8821 | 75767.0 | 98.3967 | 445735.3 | -66167.3 | -150123.1 | 5.1763 | -297451.6 | -1.0503 |
| 5400 | 14.8829 | 77255.2 | 98.6748 | 455588.9 | -64679.1 | -150346.1 | 5.0615 | -297507.4 | -1.2775 |
| 5500 | 14.8837 | 78743.6 | 98.9479 | 465470.1 | -63190.7 | -150570.9 | 4.9507 | -297567.4 | -1.4964 |
| 5600 | 14.8844 | 80232.0 | 99.2161 | 475378.3 | -61702.3 | -150797.6 | 4.8438 | -297631.8 | -1.7076 |
| 5700 | 14.8851 | 81720.5 | 99.4796 | 485313.2 | -60213.9 | -151026.0 | 4.7405 | -297701.0 | -1.9114 |
| 5800 | 14.8858 | 83209.0 | 99.7385 | 495274.1 | -58725.3 | -151256.2 | 4.6407 | -297774.5 | -2.1082 |
| 5900 | 14.8864 | 84697.6 | 99.9929 | 505260.7 | -57236.7 | -151488.2 | 4.5440 | -297853.8 | -2.2984 |
| 6000 | 14.8870 | 86186.3 | 100.2431 | 515272.5 | -55748.0 | -151721.9 | 4.4503 | -297922.7 | -2.4822 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Al, 932° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(16) Ar (gas); molecular weight, 39.944

| T, °K | C_p , cal/mole °K | $H_T^o - H_0^o$, cal/mole | S_T^o , cal/mole °K | $-(F_T^o - H_0^o)$, cal/mole | H_T^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^o)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^o , cal/mole | $\log_{10} K$ |
| C | ----- | C | ----- | C | -14E1.3 | 0 | ----- | 0 | ----- |
| 1CC | 4.96E1 | 496.8 | 31.555E | 2658.8 | -584.4 | 0 | 0 | 0 | 0 |
| 2CC | 4.96E1 | 953.6 | 34.9594 | 600E.3 | -487.6 | 0 | 0 | 0 | 0 |
| 29E.15 | 4.96E1 | 1481.3 | 36.9831 | 9545.3 | C | 0 | 0 | 0 | 0 |
| 3CC | 4.96E1 | 1490.4 | 37.013E | 9613.7 | 5.2 | 0 | 0 | 0 | 0 |
| 4CC | 4.96E1 | 1987.3 | 38.4431 | 13390.0 | 506.0 | 0 | 0 | 0 | 0 |
| 5CC | 4.96E1 | 24E4.1 | 39.5517 | 17291.8 | 1002.8 | 0 | 0 | 0 | 0 |
| 6CC | 4.96E1 | 2980.9 | 40.4575 | 21253.6 | 1455.6 | 0 | 0 | 0 | 0 |
| 7CC | 4.96E1 | 3477.7 | 41.2233 | 25378.6 | 1956.5 | 0 | 0 | 0 | 0 |
| 8CC | 4.96E1 | 3974.5 | 41.8867 | 29534.9 | 2493.3 | 0 | 0 | 0 | 0 |
| 9CC | 4.96E1 | 4471.3 | 42.4719 | 33753.4 | 2950.1 | 0 | 0 | 0 | 0 |
| 10CC | 4.96E1 | 4968.1 | 42.9954 | 38027.2 | 3466.9 | 0 | 0 | 0 | 0 |
| 11CC | 4.96E1 | 5465.0 | 43.4685 | 42350.8 | 3983.7 | 0 | 0 | 0 | 0 |
| 12CC | 4.96E1 | 5961.8 | 43.9012 | 46715.6 | 4480.5 | 0 | 0 | 0 | 0 |
| 13CC | 4.96E1 | 6458.6 | 44.2988 | 51125.9 | 4977.3 | 0 | 0 | 0 | 0 |
| 14CC | 4.96E1 | 6955.4 | 44.6670 | 55578.4 | 5474.2 | 0 | 0 | 0 | 0 |
| 15CC | 4.96E1 | 7452.2 | 45.0098 | 60062.4 | 5971.0 | 0 | 0 | 0 | 0 |
| 16CC | 4.96E1 | 7949.0 | 45.3304 | 64579.6 | 6467.8 | 0 | 0 | 0 | 0 |
| 17CC | 4.96E1 | 8445.9 | 45.6316 | 69127.9 | 6964.6 | 0 | 0 | 0 | 0 |
| 18CC | 4.96E1 | 8942.7 | 45.9156 | 73705.3 | 7461.4 | 0 | 0 | 0 | 0 |
| 19CC | 4.96E1 | 9439.5 | 46.1842 | 78310.5 | 7958.2 | 0 | 0 | 0 | 0 |
| 20CC | 4.96E1 | 9936.3 | 46.4390 | 82941.7 | 8455.0 | 0 | 0 | 0 | 0 |
| 21CC | 4.96E1 | 10433.1 | 46.6814 | 87597.8 | 8951.9 | 0 | 0 | 0 | 0 |
| 22CC | 4.96E1 | 10929.9 | 46.9125 | 92277.6 | 9448.7 | 0 | 0 | 0 | 0 |
| 23CC | 4.96E1 | 11426.7 | 47.1234 | 96980.0 | 9945.5 | 0 | 0 | 0 | 0 |
| 24CC | 4.96E1 | 11923.6 | 47.3448 | 101704.0 | 10442.3 | 0 | 0 | 0 | 0 |
| 25CC | 4.96E1 | 12420.4 | 47.5476 | 106448.7 | 10939.1 | 0 | 0 | 0 | 0 |
| 26CC | 4.96E1 | 12917.2 | 47.7425 | 111213.3 | 11435.9 | 0 | 0 | 0 | 0 |
| 27CC | 4.96E1 | 13414.0 | 47.9300 | 115996.9 | 11932.8 | 0 | 0 | 0 | 0 |
| 28CC | 4.96E1 | 13910.8 | 48.1107 | 120759.0 | 12429.6 | 0 | 0 | 0 | 0 |
| 29CC | 4.96E1 | 14407.6 | 48.2850 | 125618.9 | 12926.4 | 0 | 0 | 0 | 0 |
| 30CC | 4.96E1 | 14904.4 | 48.4534 | 130455.8 | 13423.2 | 0 | 0 | 0 | 0 |
| 31CC | 4.96E1 | 15401.2 | 48.6163 | 135309.4 | 13920.0 | 0 | 0 | 0 | 0 |
| 32CC | 4.96E1 | 15898.1 | 48.7741 | 140178.9 | 14416.8 | 0 | 0 | 0 | 0 |
| 33CC | 4.96E1 | 16394.9 | 48.9265 | 145064.0 | 14913.6 | 0 | 0 | 0 | 0 |
| 34CC | 4.96E1 | 16891.7 | 49.0752 | 149964.1 | 15410.5 | 0 | 0 | 0 | 0 |
| 35CC | 4.96E1 | 17388.5 | 49.2192 | 154878.9 | 15907.3 | 0 | 0 | 0 | 0 |
| 36CC | 4.96E1 | 17885.3 | 49.3592 | 159807.9 | 16404.1 | 0 | 0 | 0 | 0 |
| 37CC | 4.96E1 | 18382.2 | 49.4953 | 164750.6 | 16900.9 | 0 | 0 | 0 | 0 |
| 38CC | 4.96E1 | 18879.0 | 49.6278 | 169706.8 | 17397.7 | 0 | 0 | 0 | 0 |
| 39CC | 4.96E1 | 19375.8 | 49.7565 | 174676.1 | 17894.5 | 0 | 0 | 0 | 0 |
| 40CC | 4.96E1 | 19872.6 | 49.8827 | 179658.1 | 18391.3 | 0 | 0 | 0 | 0 |
| 41CC | 4.96E1 | 20369.4 | 50.0052 | 184652.5 | 18888.2 | 0 | 0 | 0 | 0 |
| 42CC | 4.96E1 | 20866.2 | 50.1251 | 189659.1 | 19385.0 | 0 | 0 | 0 | 0 |
| 43CC | 4.96E1 | 21363.0 | 50.2420 | 194677.4 | 19881.8 | 0 | 0 | 0 | 0 |
| 44CC | 4.96E1 | 21859.8 | 50.3562 | 199707.4 | 20378.6 | 0 | 0 | 0 | 0 |
| 45CC | 4.96E1 | 22356.7 | 50.4678 | 204748.6 | 20875.4 | 0 | 0 | 0 | 0 |
| 46CC | 4.96E1 | 22853.5 | 50.5770 | 209800.8 | 21372.2 | 0 | 0 | 0 | 0 |
| 47CC | 4.96E1 | 23350.3 | 50.6835 | 214863.9 | 21869.1 | 0 | 0 | 0 | 0 |
| 48CC | 4.96E1 | 23847.1 | 50.7885 | 219937.5 | 22365.9 | 0 | 0 | 0 | 0 |
| 49CC | 4.96E1 | 24343.9 | 50.8905 | 225021.5 | 22862.7 | 0 | 0 | 0 | 0 |
| 50CC | 4.96E1 | 24840.7 | 50.9913 | 230115.7 | 23359.5 | 0 | 0 | 0 | 0 |
| 51CC | 4.96E1 | 25337.6 | 51.0897 | 235219.7 | 23856.3 | 0 | 0 | 0 | 0 |
| 52CC | 4.96E1 | 25834.4 | 51.1861 | 240333.5 | 24353.1 | 0 | 0 | 0 | 0 |
| 53CC | 4.96E2 | 26331.2 | 51.2808 | 245456.9 | 24849.9 | 0 | 0 | 0 | 0 |
| 54CC | 4.96E2 | 26828.0 | 51.3736 | 250589.6 | 25346.8 | 0 | 0 | 0 | 0 |
| 55CC | 4.96E2 | 27324.8 | 51.4648 | 255731.6 | 25843.6 | 0 | 0 | 0 | 0 |
| 56CC | 4.96E2 | 27821.6 | 51.5542 | 260882.5 | 26340.4 | 0 | 0 | 0 | 0 |
| 57CC | 4.96E2 | 28318.5 | 51.6422 | 266042.4 | 26837.2 | 0 | 0 | 0 | 0 |
| 58CC | 4.96E2 | 28815.3 | 51.7287 | 271210.9 | 27334.0 | 0 | 0 | 0 | 0 |
| 59CC | 4.96E2 | 29312.1 | 51.8136 | 276388.1 | 27830.8 | 0 | 0 | 0 | 0 |
| 60CC | 4.96E2 | 29808.9 | 51.8971 | 281573.6 | 28327.6 | 0 | 0 | 0 | 0 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(17) B (gas); molecular weight, 10.82

| T_f °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| C | ----- | C | ----- | 0 | 133489.0 | 123780.7 | ----- | 0 | ----- |
| 100 | 4.9931 | 524.9 | 31.2109 | 2596.2 | 134012.9 | 134299.5 | -286.6542 | 0 | 0 |
| 200 | 4.9742 | 1022.9 | 34.6638 | 5909.8 | 134512.0 | 134717.7 | -139.7586 | 0 | 0 |
| 298.15 | 4.9708 | 1511.0 | 36.6492 | 9416.0 | 135000.0 | 135000.0 | -91.2502 | 0 | 0 |
| 300 | 4.9708 | 1520.2 | 36.6799 | 9483.8 | 135005.2 | 135004.3 | -90.6401 | 0 | 0 |
| 400 | 4.9696 | 2017.2 | 38.1097 | 13226.7 | 135506.2 | 135174.9 | -66.6388 | 0 | 0 |
| 500 | 4.9691 | 2514.1 | 39.2186 | 17095.2 | 136003.1 | 135262.8 | -51.2634 | 0 | 0 |
| 600 | 4.9688 | 3011.0 | 40.1246 | 21063.7 | 136500.0 | 135298.7 | -41.4085 | 0 | 0 |
| 700 | 4.9686 | 3507.9 | 40.8905 | 25115.5 | 136996.9 | 135295.6 | -34.3681 | 0 | 0 |
| 800 | 4.9685 | 4004.7 | 41.5540 | 29238.4 | 137493.8 | 135261.5 | -29.0891 | 0 | 0 |
| 900 | 4.9684 | 4501.6 | 42.1392 | 33423.7 | 137990.6 | 135197.3 | -24.9843 | 0 | 0 |
| 1000 | 4.9684 | 4998.4 | 42.6626 | 37664.2 | 138487.4 | 135107.1 | -21.7024 | 0 | 0 |
| 1100 | 4.9683 | 5495.3 | 43.1362 | 41954.5 | 138984.3 | 134992.0 | -19.0192 | 0 | 0 |
| 1200 | 4.9683 | 5992.1 | 43.5685 | 46290.1 | 139481.1 | 134853.2 | -16.7854 | 0 | 0 |
| 1300 | 4.9683 | 6488.9 | 43.9662 | 50667.1 | 139977.9 | 134694.7 | -14.8972 | 0 | 0 |
| 1400 | 4.9683 | 6985.7 | 44.3343 | 55082.3 | 140474.8 | 134520.2 | -13.2810 | 0 | 0 |
| 1500 | 4.9683 | 7482.6 | 44.6771 | 59533.1 | 140971.6 | 134332.9 | -11.8820 | 0 | 0 |
| 1600 | 4.9682 | 7979.4 | 44.9978 | 64017.0 | 141468.4 | 134134.9 | -10.6596 | 0 | 0 |
| 1700 | 4.9682 | 8476.2 | 45.2990 | 68532.0 | 141965.2 | 133927.7 | -9.5827 | 0 | 0 |
| 1800 | 4.9682 | 8973.0 | 45.5829 | 73076.2 | 142462.1 | 133712.4 | -8.6270 | 0 | 0 |
| 1900 | 4.9682 | 9469.9 | 45.8516 | 77648.1 | 142958.9 | 133489.7 | -7.7733 | 0 | 0 |
| 2000 | 4.9682 | 9966.7 | 46.1064 | 82246.1 | 143455.7 | 133260.7 | -7.0061 | 0 | 0 |
| 2100 | 4.9682 | 10463.5 | 46.3488 | 86869.0 | 143952.5 | 133026.0 | -6.3134 | 0 | 0 |
| 2200 | 4.9682 | 10960.3 | 46.5799 | 91515.5 | 144449.4 | 132786.4 | -5.6848 | 0 | 0 |
| 2300 | 4.9682 | 11457.1 | 46.8008 | 96184.6 | 144946.2 | 132542.2 | -5.1117 | 0 | 0 |
| 2400 | 4.9682 | 11954.0 | 47.0122 | 100875.3 | 145443.0 | 126943.8 | -4.6059 | 0 | 0 |
| 2500 | 4.9683 | 12450.8 | 47.2150 | 105586.7 | 145939.8 | 126650.6 | -4.1440 | 0 | 0 |
| 2600 | 4.9683 | 12947.6 | 47.4099 | 110318.0 | 146436.7 | 126437.5 | -3.7184 | 0 | 0 |
| 2700 | 4.9684 | 13444.5 | 47.5974 | 115068.5 | 146933.5 | 126184.3 | -3.3252 | 0 | 0 |
| 2800 | 4.9685 | 13941.3 | 47.7781 | 119837.3 | 147430.3 | 125931.1 | -2.9608 | 0 | 0 |
| 2900 | 4.9687 | 14438.2 | 47.9524 | 124623.9 | 147927.2 | 125678.0 | -2.6222 | 0 | 0 |
| 3000 | 4.9689 | 14935.0 | 48.1209 | 129427.6 | 148424.1 | 125424.9 | -2.3070 | 0 | 0 |
| 3100 | 4.9693 | 15431.9 | 48.2838 | 134247.9 | 148921.0 | 125171.8 | -2.0124 | 0 | 0 |
| 3200 | 4.9698 | 15928.9 | 48.4416 | 139084.2 | 149417.9 | 124918.7 | -1.7371 | 0 | 0 |
| 3300 | 4.9704 | 16425.9 | 48.5945 | 143936.0 | 149914.9 | 124665.7 | -1.4786 | 0 | 0 |
| 3400 | 4.9712 | 16923.0 | 48.7429 | 148802.9 | 150412.0 | 124412.8 | -1.2361 | 0 | 0 |
| 3500 | 4.9722 | 17420.1 | 48.8870 | 153684.5 | 150909.2 | 124160.0 | -1.0080 | 0 | 0 |
| 3600 | 4.9735 | 17917.4 | 49.0271 | 158580.2 | 151406.5 | 123907.3 | -0.7928 | 0 | 0 |
| 3700 | 4.9750 | 18414.9 | 49.1634 | 163489.8 | 151903.9 | 123654.7 | -0.5896 | 0 | 0 |
| 3800 | 4.9769 | 18912.4 | 49.2961 | 168412.8 | 152401.5 | 123402.3 | -0.3976 | 0 | 0 |
| 3900 | 4.9791 | 19410.2 | 49.4254 | 173348.9 | 152899.3 | 123150.1 | -0.2158 | 0 | 0 |
| 4000 | 4.9818 | 19908.3 | 49.5515 | 178297.7 | 153397.3 | 122898.1 | -0.0435 | 0 | 0 |
| 4100 | 4.9849 | 20406.6 | 49.6746 | 183259.1 | 153895.7 | 122646.5 | 0.1202 | 0 | 0 |
| 4200 | 4.9885 | 20905.3 | 49.7947 | 188232.6 | 154394.3 | 122395.1 | 0.2756 | 0 | 0 |
| 4300 | 4.9926 | 21404.3 | 49.9122 | 193217.9 | 154893.4 | 122144.2 | 0.4234 | 0 | 0 |
| 4400 | 4.9972 | 21903.8 | 50.0270 | 198214.9 | 155392.8 | 121893.6 | 0.5645 | 0 | 0 |
| 4500 | 5.0025 | 22403.8 | 50.1393 | 203223.2 | 155892.8 | 121643.6 | 0.6990 | 0 | 0 |
| 4600 | 5.0083 | 22904.3 | 50.2494 | 208242.7 | 156393.4 | 121394.2 | 0.8272 | 0 | 0 |
| 4700 | 5.0149 | 23405.5 | 50.3571 | 213273.0 | 156894.5 | 121145.3 | 0.9497 | 0 | 0 |
| 4800 | 5.0221 | 23907.3 | 50.4628 | 218314.0 | 157396.4 | 120897.2 | 1.0669 | 0 | 0 |
| 4900 | 5.0300 | 24409.9 | 50.5664 | 223365.5 | 157899.0 | 120649.7 | 1.1792 | 0 | 0 |
| 5000 | 5.0387 | 24913.3 | 50.6681 | 228427.3 | 158402.4 | 120403.2 | 1.2866 | 0 | 0 |
| 5100 | 5.0481 | 25417.7 | 50.7680 | 233499.1 | 158906.7 | 120157.5 | 1.3898 | 0 | 0 |
| 5200 | 5.0583 | 25923.0 | 50.8661 | 238580.8 | 159412.0 | 119912.8 | 1.4887 | 0 | 0 |
| 5300 | 5.0694 | 26429.4 | 50.9626 | 243672.2 | 159918.4 | 119669.2 | 1.5836 | 0 | 0 |
| 5400 | 5.0812 | 26936.9 | 51.0574 | 248773.3 | 160425.9 | 119426.7 | 1.6750 | 0 | 0 |
| 5500 | 5.0939 | 27445.6 | 51.1508 | 253883.7 | 160934.7 | 119185.5 | 1.7627 | 0 | 0 |
| 5600 | 5.1074 | 27955.7 | 51.2427 | 259003.4 | 161444.7 | 118945.5 | 1.8472 | 0 | 0 |
| 5700 | 5.1218 | 28467.2 | 51.3332 | 264132.2 | 161956.2 | 118707.0 | 1.9287 | 0 | 0 |
| 5800 | 5.1370 | 28980.1 | 51.4224 | 269270.0 | 162469.1 | 118469.9 | 2.0070 | 0 | 0 |
| 5900 | 5.1532 | 29494.6 | 51.5104 | 274416.6 | 162983.6 | 118234.4 | 2.0826 | 0 | 0 |
| 6000 | 5.1702 | 30010.7 | 51.5971 | 279572.0 | 163499.8 | 118000.6 | 2.1555 | 0 | 0 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (18) B (amorphous, liquid); molecular weight, 10.82

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, ^a cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, ^a cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|----------------------------------------------------|------------------------------|-------------------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 378.3 | ----- | ----- | 86.6 | 378.3 | ----- | -133402.4 | ----- |
| 100 | 0.330 | 387.1 | 0.1318 | -373.9 | 95.4 | 381.0 | -0.3215 | -133918.5 | 285.8726 |
| 200 | 1.549 | 475.2 | 0.7006 | -335.1 | 183.5 | 389.2 | -0.4007 | -134328.5 | 139.3589 |
| 298.15 | 2.858 | 691.7 | 1.5640 | -225.4 | 400.0 | 400.0 | -0.2580 | -134600.0 | 90.9922 |
| 300 | 2.879 | 697.0 | 1.5817 | -222.5 | 405.3 | 400.4 | -0.2563 | -134603.3 | 90.3833 |
| 400 | 3.851 | 1039.3 | 2.560 | -15.3 | 747.6 | 416.3 | -0.1826 | -134758.5 | 55.8561 |
| 500 | 4.431 | 1455.3 | 3.485 | 287.2 | 1163.6 | 423.3 | -0.1372 | -134839.5 | 31.1263 |
| 600 | 4.854 | 1920.3 | 4.331 | 678.3 | 1628.6 | 427.3 | -0.1062 | -134871.4 | 41.3022 |
| 700 | 5.204 | 2424.3 | 5.107 | 1150.6 | 2132.5 | 431.3 | -0.0837 | -134864.3 | 34.2844 |
| 800 | 5.516 | 2960.3 | 5.827 | 1697.3 | 2668.6 | 436.3 | -0.0672 | -134825.2 | 29.2219 |
| 900 | 5.804 | 3526.3 | 6.489 | 2313.8 | 3234.6 | 441.3 | -0.0536 | -134756.0 | 24.9307 |
| 1000 | 6.079 | 4120.3 | 7.115 | 2994.7 | 3828.6 | 448.3 | -0.0427 | -134558.8 | 21.5597 |
| 1100 | 6.287 | 4738.9 | 7.704 | 3735.5 | 4447.2 | 454.9 | -0.0338 | -134537.1 | 18.9954 |
| 1200 | 6.463 | 5376.6 | 8.259 | 4534.2 | 5084.9 | 457.0 | -0.0262 | -134396.2 | 16.7092 |
| 1300 | 6.617 | 6030.8 | 8.783 | 5387.1 | 5739.1 | 455.9 | -0.0196 | -134238.8 | 14.8776 |
| 1400 | 6.750 | 6699.2 | 9.278 | 6290.0 | 6407.5 | 452.9 | -0.0143 | -134067.3 | 13.2666 |
| 1500 | 6.867 | 7380.2 | 9.748 | 7241.8 | 7088.5 | 449.8 | -0.0096 | -133883.1 | 11.8724 |
| 1600 | 6.969 | 8072.1 | 10.194 | 8238.3 | 7780.4 | 446.9 | -0.0055 | -133588.0 | 10.5541 |
| 1700 | 7.058 | 8773.6 | 10.620 | 9280.4 | 8481.9 | 444.4 | -0.0018 | -133483.3 | 9.5809 |
| 1800 | 7.137 | 9483.4 | 11.025 | 10361.6 | 9191.7 | 442.0 | 0.0012 | -133270.4 | 8.5282 |
| 1900 | 7.206 | 10200.6 | 11.413 | 11484.1 | 9908.9 | 439.7 | 0.0041 | -133050.0 | 7.7773 |
| 2000 | 7.268 | 10924.4 | 11.784 | 12643.6 | 10632.7 | 437.7 | 0.0066 | -132823.0 | 7.0127 |
| 2100 | 7.322 | 11653.9 | 12.140 | 13840.1 | 11362.2 | 435.7 | 0.0089 | -132590.3 | 6.3222 |
| 2200 | 7.371 | 12388.6 | 12.482 | 15071.8 | 12096.9 | 433.9 | 0.0109 | -132352.5 | 5.5955 |
| 2300 | 7.414 | 13127.9 | 12.811 | 16337.4 | 12836.2 | 432.2 | 0.0129 | -132110.0 | 5.1246 |
| b,c,2379 | 7.445 | 13714.9 | 13.061 | 17358.4 | 13423.2 | 430.8 | 0 | -131906.0 | 4.7080 |
| 2379 | 7.5 | 18633.4 | 15.129 | 17358.4 | 18341.7 | 0 | 0 | -126996.4 | 4.7080 |
| 2400 | 7.5 | 18790.9 | 15.195 | 17677.1 | 18499.2 | 0 | 0 | -126943.8 | 4.6059 |
| 2500 | 7.5 | 19540.9 | 15.501 | 19211.6 | 19249.2 | 0 | 0 | -126590.5 | 4.1440 |
| 2600 | 7.5 | 20290.9 | 15.795 | 20776.1 | 19999.2 | 0 | 0 | -126437.5 | 3.7184 |
| 2700 | 7.5 | 21040.9 | 16.078 | 22369.7 | 20749.2 | 0 | 0 | -126184.3 | 3.3252 |
| 2800 | 7.5 | 21790.9 | 16.351 | 23991.9 | 21499.2 | 0 | 0 | -125931.1 | 2.9508 |
| 2900 | 7.5 | 22540.9 | 16.614 | 25639.7 | 22249.2 | 0 | 0 | -125578.0 | 2.5222 |
| 3000 | 7.5 | 23290.9 | 16.869 | 27316.1 | 22999.2 | 0 | 0 | -125424.9 | 2.3070 |
| 3100 | 7.5 | 24040.9 | 17.114 | 29012.5 | 23749.2 | 0 | 0 | -125171.3 | 2.0124 |
| 3200 | 7.5 | 24790.9 | 17.353 | 30738.7 | 24499.2 | 0 | 0 | -124918.7 | 1.7371 |
| 3300 | 7.5 | 25540.9 | 17.583 | 32483.0 | 25249.2 | 0 | 0 | -124665.7 | 1.4786 |
| 3400 | 7.5 | 26290.9 | 17.807 | 34252.9 | 25999.2 | 0 | 0 | -124412.8 | 1.2361 |
| 3500 | 7.5 | 27040.9 | 18.025 | 36046.6 | 26749.2 | 0 | 0 | -124160.0 | 1.0080 |
| 3600 | 7.5 | 27790.9 | 18.236 | 37858.7 | 27499.2 | 0 | 0 | -123907.3 | 0.7928 |
| 3700 | 7.5 | 28540.9 | 18.441 | 39690.8 | 28249.2 | 0 | 0 | -123554.7 | 0.5896 |
| 3800 | 7.5 | 29290.9 | 18.641 | 41544.9 | 28999.2 | 0 | 0 | -123402.3 | 0.3976 |
| 3900 | 7.5 | 30040.9 | 18.836 | 43419.5 | 29749.2 | 0 | 0 | -123150.1 | 0.2158 |
| 4000 | 7.5 | 30790.9 | 19.026 | 45313.1 | 30499.2 | 0 | 0 | -122898.1 | 0.0435 |
| 4100 | 7.5 | 31540.9 | 19.211 | 47224.2 | 31249.2 | 0 | 0 | -122646.5 | -0.1202 |
| 4200 | 7.5 | 32290.9 | 19.392 | 49155.5 | 31999.2 | 0 | 0 | -122395.1 | -0.2756 |
| 4300 | 7.5 | 33040.9 | 19.569 | 51105.8 | 32749.2 | 0 | 0 | -122144.2 | -0.4234 |
| 4400 | 7.5 | 33790.9 | 19.741 | 53069.5 | 33499.2 | 0 | 0 | -121893.5 | -0.5645 |
| 4500 | 7.5 | 34540.9 | 19.909 | 55049.6 | 34249.2 | 0 | 0 | -121643.5 | -0.5990 |
| 4600 | 7.5 | 35290.9 | 20.074 | 57049.5 | 34999.2 | 0 | 0 | -121394.2 | -0.8272 |
| 4700 | 7.5 | 36040.9 | 20.236 | 59068.3 | 35749.2 | 0 | 0 | -121145.3 | -0.9497 |
| 4800 | 7.5 | 36790.9 | 20.394 | 61100.3 | 36499.2 | 0 | 0 | -120897.2 | -1.0559 |
| 4900 | 7.5 | 37540.9 | 20.548 | 63144.3 | 37249.2 | 0 | 0 | -120649.9 | -1.1732 |
| 5000 | 7.5 | 38290.9 | 20.700 | 65209.1 | 37999.2 | 0 | 0 | -120403.2 | -1.2855 |
| 5100 | 7.5 | 39040.9 | 20.848 | 67283.9 | 38749.2 | 0 | 0 | -120157.5 | -1.3898 |
| 5200 | 7.5 | 39790.9 | 20.994 | 69377.9 | 39499.2 | 0 | 0 | -119912.8 | -1.4887 |
| 5300 | 7.5 | 40540.9 | 21.137 | 71485.2 | 40249.2 | 0 | 0 | -119669.2 | -1.5835 |
| 5400 | 7.5 | 41290.9 | 21.277 | 73604.9 | 40999.2 | 0 | 0 | -119425.7 | -1.5750 |
| 5500 | 7.5 | 42040.9 | 21.415 | 75741.5 | 41749.2 | 0 | 0 | -119185.5 | -1.7627 |
| 5600 | 7.5 | 42790.9 | 21.550 | 77889.1 | 42499.2 | 0 | 0 | -118945.5 | -1.8472 |
| 5700 | 7.5 | 43540.9 | 21.682 | 80046.5 | 43249.2 | 0 | 0 | -118707.0 | -1.9297 |
| 5800 | 7.5 | 44290.9 | 21.813 | 82224.5 | 43999.2 | 0 | 0 | -118469.9 | -2.0070 |
| 5900 | 7.5 | 45040.9 | 21.941 | 84411.0 | 44749.2 | 0 | 0 | -118234.4 | -2.0826 |
| 6000 | 7.5 | 45790.9 | 22.067 | 86611.1 | 45499.2 | 0 | 0 | -118000.5 | -2.1555 |

^a H_0° refers to crystal state.

^bA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B (crystal), 2313° K.

^cMelting point of B (amorphous).

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(19) B (crystal, liquid); molecular weight, 10.82

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , ^a cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), ^a cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------------|---------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | C | 0 | 0 | -291.7 | 0 | ----- | -133780.7 | ----- |
| 100 | 0.256 | 6.1 | 0.081 | 2.0 | -285.6 | 0 | 0 | -134299.5 | 286.6942 |
| 200 | 1.447 | 86.0 | 0.588 | 31.6 | -205.7 | 0 | 0 | -134717.7 | 139.7586 |
| 298.15 | 2.650 | 291.7 | 1.403 | 126.6 | C | 0 | 0 | -135000.0 | 91.2502 |
| 300 | 2.667 | 296.6 | 1.420 | 129.4 | 4.9 | 0 | 0 | -135004.3 | 90.6401 |
| 400 | 3.762 | 623.0 | 2.355 | 319.0 | 331.3 | 0 | 0 | -135174.9 | 66.0388 |
| 500 | 4.381 | 1032.0 | 3.266 | 601.0 | 740.3 | 0 | 0 | -135262.8 | 51.2634 |
| 600 | 4.815 | 1493.0 | 4.105 | 970.0 | 1201.3 | 0 | 0 | -135298.7 | 41.4085 |
| 700 | 5.164 | 1953.0 | 4.874 | 1418.8 | 1701.3 | 0 | 0 | -135295.6 | 34.3681 |
| 800 | 5.465 | 2524.0 | 5.584 | 1943.2 | 2232.3 | 0 | 0 | -135261.5 | 29.0891 |
| 900 | 5.741 | 3085.0 | 6.244 | 2534.6 | 2793.3 | 0 | 0 | -135197.3 | 24.9843 |
| 1000 | 5.959 | 3672.0 | 6.862 | 3190.0 | 3380.3 | 0 | 0 | -135107.1 | 21.7024 |
| 1100 | 6.246 | 4284.0 | 7.445 | 3905.5 | 3992.3 | 0 | 0 | -134992.0 | 19.0192 |
| 1200 | 6.460 | 4915.6 | 7.998 | 4678.0 | 4627.9 | 0 | 0 | -134853.2 | 16.7854 |
| 1300 | 6.640 | 5574.9 | 8.522 | 5503.7 | 5283.2 | 0 | 0 | -134694.7 | 14.8972 |
| 1400 | 6.783 | 6246.3 | 9.020 | 6381.7 | 5954.6 | 0 | 0 | -134520.2 | 13.2810 |
| 1500 | 6.897 | 6930.4 | 9.492 | 7307.6 | 6638.7 | 0 | 0 | -134332.9 | 11.8820 |
| 1600 | 6.996 | 7625.2 | 9.940 | 8278.8 | 7333.5 | 0 | 0 | -134134.9 | 10.6596 |
| 1700 | 7.083 | 8329.2 | 10.367 | 9294.7 | 8037.5 | 0 | 0 | -133927.7 | 9.5827 |
| 1800 | 7.160 | 9041.4 | 10.774 | 10351.8 | 8749.7 | 0 | 0 | -133712.4 | 8.6270 |
| 1900 | 7.228 | 9760.9 | 11.163 | 11448.8 | 9469.2 | 0 | 0 | -133489.7 | 7.7733 |
| 2000 | 7.288 | 10486.7 | 11.535 | 12583.3 | 10195.0 | 0 | 0 | -133260.7 | 7.0061 |
| 2100 | 7.341 | 11218.2 | 11.892 | 13755.0 | 10926.5 | 0 | 0 | -133026.0 | 6.3134 |
| 2200 | 7.388 | 11954.7 | 12.235 | 14962.3 | 11663.0 | 0 | 0 | -132786.4 | 5.6848 |
| 2300 | 7.430 | 12695.7 | 12.564 | 16201.5 | 12404.0 | 0 | 0 | -132542.2 | 5.1117 |
| ^b 2313 | 7.435 | 12818.5 | 12.618 | 16366.9 | 12526.8 | 0 | 0 | -132509.5 | 5.0406 |
| 2313 | 7.5 | 18138.4 | 14.918 | 16366.9 | 17846.7 | 0 | 0 | -127158.4 | 5.0406 |
| 2400 | 7.5 | 18790.9 | 15.195 | 17677.1 | 18495.2 | 0 | 0 | -126943.8 | 4.6059 |
| 2500 | 7.5 | 19540.9 | 15.501 | 19211.6 | 19249.2 | 0 | 0 | -126690.6 | 4.1440 |
| 2600 | 7.5 | 20290.9 | 15.795 | 20776.1 | 19995.2 | 0 | 0 | -126437.5 | 3.7184 |
| 2700 | 7.5 | 21040.9 | 16.078 | 22369.7 | 20749.2 | 0 | 0 | -126184.3 | 3.3252 |
| 2800 | 7.5 | 21790.9 | 16.351 | 23991.9 | 21495.2 | 0 | 0 | -125931.1 | 2.9608 |
| 2900 | 7.5 | 22540.9 | 16.614 | 25639.7 | 22249.2 | 0 | 0 | -125678.0 | 2.6222 |
| 3000 | 7.5 | 23290.9 | 16.869 | 27316.1 | 22995.2 | 0 | 0 | -125424.9 | 2.3070 |
| 3100 | 7.5 | 24040.9 | 17.114 | 29012.5 | 23749.2 | 0 | 0 | -125171.8 | 2.0124 |
| 3200 | 7.5 | 24790.9 | 17.353 | 30738.7 | 24499.2 | 0 | 0 | -124918.7 | 1.7371 |
| 3300 | 7.5 | 25540.9 | 17.583 | 32483.0 | 25249.2 | 0 | 0 | -124665.7 | 1.4786 |
| 3400 | 7.5 | 26290.9 | 17.807 | 34252.9 | 25999.2 | 0 | 0 | -124412.8 | 1.2361 |
| 3500 | 7.5 | 27040.9 | 18.025 | 36046.6 | 26749.2 | 0 | 0 | -124160.0 | 1.0080 |
| 3600 | 7.5 | 27790.9 | 18.236 | 37858.7 | 27495.2 | 0 | 0 | -123907.3 | 0.7928 |
| 3700 | 7.5 | 28540.9 | 18.441 | 39690.8 | 28249.2 | 0 | 0 | -123654.7 | 0.5896 |
| 3800 | 7.5 | 29290.9 | 18.641 | 41544.9 | 28999.2 | 0 | 0 | -123402.3 | 0.3976 |
| 3900 | 7.5 | 30040.9 | 18.836 | 43419.5 | 29749.2 | 0 | 0 | -123150.1 | 0.2158 |
| 4000 | 7.5 | 30790.9 | 19.026 | 45313.1 | 30495.2 | 0 | 0 | -122898.1 | 0.0435 |
| 4100 | 7.5 | 31540.9 | 19.211 | 47224.2 | 31249.2 | 0 | 0 | -122646.5 | -0.1202 |
| 4200 | 7.5 | 32290.9 | 19.392 | 49155.5 | 31995.2 | 0 | 0 | -122395.1 | -0.2756 |
| 4300 | 7.5 | 33040.9 | 19.569 | 51105.8 | 32749.2 | 0 | 0 | -122144.2 | -0.4234 |
| 4400 | 7.5 | 33790.9 | 19.741 | 53069.5 | 33495.2 | 0 | 0 | -121893.6 | -0.5645 |
| 4500 | 7.5 | 34540.9 | 19.909 | 55049.6 | 34249.2 | 0 | 0 | -121643.6 | -0.6990 |
| 4600 | 7.5 | 35290.9 | 20.074 | 57049.5 | 34995.2 | 0 | 0 | -121394.2 | -0.8272 |
| 4700 | 7.5 | 36040.9 | 20.236 | 59068.3 | 35749.2 | 0 | 0 | -121145.3 | -0.9497 |
| 4800 | 7.5 | 36790.9 | 20.394 | 61100.3 | 36499.2 | 0 | 0 | -120897.2 | -1.0669 |
| 4900 | 7.5 | 37540.9 | 20.548 | 63144.3 | 37249.2 | 0 | 0 | -120649.8 | -1.1792 |
| 5000 | 7.5 | 38290.9 | 20.700 | 65209.1 | 37995.2 | 0 | 0 | -120403.2 | -1.2866 |
| 5100 | 7.5 | 39040.9 | 20.848 | 67283.9 | 38749.2 | 0 | 0 | -120157.5 | -1.3898 |
| 5200 | 7.5 | 39790.9 | 20.994 | 69377.9 | 39495.2 | 0 | 0 | -119912.8 | -1.4887 |
| 5300 | 7.5 | 40540.9 | 21.137 | 71485.2 | 40249.2 | 0 | 0 | -119669.2 | -1.5836 |
| 5400 | 7.5 | 41290.9 | 21.277 | 73604.9 | 40995.2 | 0 | 0 | -119426.7 | -1.6750 |
| 5500 | 7.5 | 42040.9 | 21.415 | 75741.6 | 41749.2 | 0 | 0 | -119185.5 | -1.7627 |
| 5600 | 7.5 | 42790.9 | 21.550 | 77889.1 | 42495.2 | 0 | 0 | -118945.5 | -1.8472 |
| 5700 | 7.5 | 43540.9 | 21.682 | 80046.5 | 43249.2 | 0 | 0 | -118707.0 | -1.9287 |
| 5800 | 7.5 | 44290.9 | 21.813 | 82224.5 | 43995.2 | 0 | 0 | -118469.9 | -2.0070 |
| 5900 | 7.5 | 45040.9 | 21.941 | 84411.0 | 44749.2 | 0 | 0 | -118234.4 | -2.0826 |
| 6000 | 7.5 | 45790.9 | 22.067 | 86611.1 | 45495.2 | 0 | 0 | -118000.6 | -2.1555 |

^aH₀^o refers to crystal state.^bMelting point.

TABLE III - Continued. THERMODYNAMIC PROPERTIES

(20) B₂ (gas); molecular weight, 21.64

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| C | ----- | 0 | ----- | 0 | 202978.1 | 203561.5 | ----- | -64000.0 | ----- |
| 100 | 6.9580 | 654.5 | 40.5431 | 3359.8 | 203672.6 | 204243.8 | -437.5281 | -64355.3 | 135.8602 |
| 200 | 7.0231 | 1392.1 | 45.3761 | 7683.1 | 204370.2 | 204781.5 | -214.1047 | -64653.8 | 65.4126 |
| 298.15 | 7.3005 | 2093.5 | 48.2261 | 12285.1 | 205071.6 | 205071.6 | -140.3883 | -64928.4 | 42.1122 |
| 300 | 7.3071 | 2107.1 | 48.2712 | 12374.3 | 205085.1 | 205075.3 | -139.4616 | -64933.2 | 41.8187 |
| 400 | 7.6668 | 2855.9 | 50.4225 | 17313.3 | 205833.9 | 205171.3 | -102.1049 | -65178.5 | 29.9726 |
| 500 | 7.9754 | 3638.6 | 52.1682 | 22445.5 | 206616.7 | 205136.1 | -79.6873 | -65389.6 | 22.8396 |
| 600 | 8.2116 | 4448.5 | 53.6442 | 27738.0 | 207426.6 | 205024.0 | -64.7472 | -65573.5 | 18.0698 |
| 700 | 8.3881 | 5278.9 | 54.9240 | 33167.9 | 208257.0 | 204854.4 | -54.0826 | -65736.8 | 14.6537 |
| 800 | 8.5211 | 6124.7 | 56.0531 | 38717.8 | 209102.8 | 204638.2 | -46.0927 | -65884.8 | 12.0855 |
| 900 | 8.6232 | 6982.1 | 57.0625 | 44374.5 | 209960.2 | 204373.6 | -39.8849 | -66021.0 | 10.0837 |
| 1000 | 8.7033 | 7848.6 | 57.9758 | 50127.2 | 210826.7 | 204066.1 | -34.9257 | -66148.2 | 8.4791 |
| 1100 | 8.7678 | 8722.3 | 58.8084 | 55967.0 | 211700.3 | 203715.7 | -30.8747 | -66268.2 | 7.1637 |
| 1200 | 8.8207 | 9601.8 | 59.5737 | 61886.6 | 212575.8 | 203324.0 | -27.5051 | -66382.4 | 6.0656 |
| 1300 | 8.8651 | 10486.1 | 60.2815 | 67879.8 | 213464.2 | 202897.8 | -24.6595 | -66491.7 | 5.1349 |
| 1400 | 8.9031 | 11374.6 | 60.9399 | 73941.3 | 214352.7 | 202443.5 | -22.2260 | -66596.9 | 4.3359 |
| 1500 | 8.9261 | 12266.6 | 61.5552 | 80066.4 | 215244.6 | 201967.2 | -20.1217 | -66698.6 | 3.6423 |
| 1600 | 8.9652 | 13161.7 | 62.1330 | 86251.1 | 216139.7 | 201472.7 | -18.2846 | -66797.1 | 3.0346 |
| 1700 | 8.9913 | 14059.5 | 62.6773 | 92491.9 | 217037.6 | 200962.6 | -16.6680 | -66892.9 | 2.4975 |
| 1800 | 9.0150 | 14959.8 | 63.1919 | 98785.6 | 217937.9 | 200438.5 | -15.2346 | -66986.2 | 2.0194 |
| 1900 | 9.0368 | 15862.5 | 63.6799 | 105129.4 | 218840.5 | 199902.1 | -13.9554 | -67077.3 | 1.5911 |
| 2000 | 9.0570 | 16767.2 | 64.1435 | 111520.7 | 219745.2 | 199355.2 | -12.8072 | -67166.2 | 1.2051 |
| 2100 | 9.0758 | 17673.8 | 64.5863 | 117957.4 | 220651.9 | 198798.9 | -11.7714 | -67253.2 | 0.8554 |
| 2200 | 9.0936 | 18582.3 | 65.0085 | 124437.3 | 221560.4 | 198234.4 | -10.8325 | -67338.4 | 0.5370 |
| 2300 | 9.1104 | 19452.5 | 65.4135 | 130958.6 | 222470.6 | 197662.6 | -9.9774 | -67421.8 | 0.2460 |
| 2400 | 9.1265 | 20404.3 | 65.8016 | 137519.5 | 223382.4 | 186384.0 | -9.2329 | -67503.6 | -0.0210 |
| 2500 | 9.1419 | 21317.8 | 66.1745 | 144118.4 | 224295.8 | 185757.4 | -8.5551 | -67583.8 | -0.2753 |
| 2600 | 9.1568 | 22232.7 | 66.5332 | 150753.9 | 225210.8 | 185212.4 | -7.9313 | -67662.5 | -0.4944 |
| 2700 | 9.1712 | 23149.1 | 66.8792 | 157424.7 | 226127.2 | 184628.8 | -7.3556 | -67739.8 | -0.7052 |
| 2800 | 9.1852 | 24066.9 | 67.2130 | 164129.4 | 227045.0 | 184046.6 | -6.8228 | -67815.7 | -0.9011 |
| 2900 | 9.1989 | 24986.1 | 67.5355 | 170866.9 | 227964.2 | 183465.8 | -6.3281 | -67890.2 | -1.0837 |
| 3000 | 9.2123 | 25906.7 | 67.8476 | 177636.1 | 228884.8 | 182886.4 | -5.8683 | -67963.4 | -1.2543 |
| 3100 | 9.2254 | 26828.6 | 68.1495 | 184436.1 | 229806.7 | 182308.3 | -5.4388 | -68035.3 | -1.4141 |
| 3200 | 9.2384 | 27751.8 | 68.4430 | 191265.8 | 230725.9 | 181731.5 | -5.0382 | -68106.0 | -1.5641 |
| 3300 | 9.2511 | 28676.3 | 68.7275 | 198124.4 | 231654.3 | 181155.9 | -4.6624 | -68175.6 | -1.7051 |
| 3400 | 9.2638 | 29602.0 | 69.0036 | 205011.0 | 232580.1 | 180581.7 | -4.3101 | -68244.0 | -1.8380 |
| 3500 | 9.2764 | 30529.0 | 69.2725 | 211924.9 | 233507.1 | 180008.7 | -3.9793 | -68311.3 | -1.9634 |
| 3600 | 9.2889 | 31457.3 | 69.5340 | 218865.3 | 234435.3 | 179436.9 | -3.6674 | -68377.6 | -2.0819 |
| 3700 | 9.3013 | 32386.8 | 69.7887 | 225831.5 | 235364.9 | 178866.5 | -3.3733 | -68442.9 | -2.1941 |
| 3800 | 9.3138 | 33317.5 | 70.0365 | 232822.8 | 236295.6 | 178297.2 | -3.0957 | -68507.3 | -2.3006 |
| 3900 | 9.3263 | 34249.5 | 70.2790 | 239838.6 | 237227.6 | 177729.2 | -2.8333 | -68570.9 | -2.4016 |
| 4000 | 9.3389 | 35182.8 | 70.5152 | 246878.4 | 238160.9 | 177162.5 | -2.5847 | -68633.8 | -2.4977 |
| 4100 | 9.3515 | 36117.3 | 70.7461 | 253941.5 | 239095.4 | 176597.0 | -2.3489 | -68695.9 | -2.5892 |
| 4200 | 9.3642 | 37053.1 | 70.9716 | 261027.4 | 240031.2 | 176032.8 | -2.1253 | -68757.5 | -2.6765 |
| 4300 | 9.3771 | 37990.2 | 71.1921 | 268135.7 | 240968.2 | 175469.8 | -1.9128 | -68818.5 | -2.7597 |
| 4400 | 9.3902 | 38928.5 | 71.4078 | 275265.7 | 241906.6 | 174908.2 | -1.7103 | -68879.1 | -2.8392 |
| 4500 | 9.4034 | 39868.2 | 71.6190 | 282417.1 | 242846.3 | 174347.5 | -1.5173 | -68939.4 | -2.9153 |
| 4600 | 9.4168 | 40809.2 | 71.8258 | 289589.3 | 243787.3 | 173788.9 | -1.3336 | -68999.4 | -2.9881 |
| 4700 | 9.4304 | 41751.6 | 72.0284 | 296782.1 | 244729.7 | 173231.3 | -1.1585 | -69059.4 | -3.0579 |
| 4800 | 9.4443 | 42695.3 | 72.2271 | 303994.9 | 245673.4 | 172675.0 | -0.9910 | -69119.3 | -3.1248 |
| 4900 | 9.4584 | 43640.4 | 72.4220 | 311227.4 | 246618.5 | 172120.1 | -0.8306 | -69179.4 | -3.1891 |
| 5000 | 9.4727 | 44587.0 | 72.6132 | 318479.2 | 247565.1 | 171566.7 | -0.6775 | -69239.7 | -3.2508 |
| 5100 | 9.4874 | 45535.0 | 72.8010 | 325749.9 | 248513.1 | 171014.7 | -0.5305 | -69300.4 | -3.3102 |
| 5200 | 9.5023 | 46484.5 | 72.9852 | 333039.3 | 249462.5 | 170464.2 | -0.3899 | -69361.5 | -3.3673 |
| 5300 | 9.5175 | 47435.5 | 73.1665 | 340346.9 | 250413.5 | 169915.1 | -0.2550 | -69423.3 | -3.4223 |
| 5400 | 9.5330 | 48388.0 | 73.3445 | 347672.4 | 251366.1 | 169367.7 | -0.1254 | -69485.8 | -3.4753 |
| 5500 | 9.5488 | 49342.1 | 73.5196 | 355015.7 | 252320.1 | 168821.7 | -0.0012 | -69549.2 | -3.5265 |
| 5600 | 9.5645 | 50297.8 | 73.6918 | 362376.3 | 253275.8 | 168277.4 | 0.1185 | -69613.6 | -3.5759 |
| 5700 | 9.5814 | 51255.1 | 73.8612 | 369753.9 | 254233.1 | 167734.7 | 0.2339 | -69679.2 | -3.6236 |
| 5800 | 9.5981 | 52214.0 | 74.0280 | 377148.4 | 255192.1 | 167193.7 | 0.3443 | -69746.1 | -3.6696 |
| 5900 | 9.6151 | 53174.7 | 74.1922 | 384559.5 | 256152.8 | 166654.4 | 0.4510 | -69814.5 | -3.7142 |
| 6000 | 9.6325 | 54137.1 | 74.3540 | 391986.8 | 257115.2 | 166116.7 | 0.5537 | -69884.4 | -3.7573 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
(21) BCl (gas); molecular weight, 46.277

| T, °K | C_p^0 , cal/mole °K | $H_f^0 - H_0^0$, cal/mole | S_f^0 , cal/mole °K | $-(F_f^0 - H_0^0)$, cal/mole | H_f^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| C | ----- | 0 | ----- | 0 | 42940.7 | 44329.1 | ----- | -118000.0 | ----- |
| 1C0 | 6.5593 | 655.C | 43.1543 | 3620.4 | 43635.7 | 44670.1 | -93.1421 | -118326.7 | 253.7799 |
| 2C0 | 7.1401 | 1356.8 | 48.0124 | 82C5.6 | 44337.6 | 44929.2 | -44.2106 | -118621.9 | 124.3590 |
| 298.15 | 7.5663 | 2118.C | 5C.9403 | 13C69.9 | 45C58.7 | 45058.7 | -28.0245 | -118891.9 | 81.6464 |
| 3C0 | 7.5745 | 2132.C | 5C.9872 | 12164.2 | 45C72.7 | 45060.3 | -27.8210 | -118896.8 | 81.1C90 |
| 4C0 | 7.9670 | 2910.C | 53.2226 | 18379.1 | 4585C.7 | 45097.2 | -19.6112 | -119146.1 | 59.4350 |
| 5C0 | 8.2479 | 3721.6 | 55.0325 | 23794.6 | 46662.3 | 45072.9 | -14.6845 | -119372.4 | 46.4044 |
| 6C0 | 8.4420 | 4556.7 | 56.5545 | 29376.0 | 47497.4 | 45012.5 | -11.4029 | -119578.6 | 37.7013 |
| 7C0 | 8.5786 | 54C8.1 | 57.8667 | 35098.6 | 48346.8 | 44924.7 | -9.0626 | -119767.6 | 31.4745 |
| 8C0 | 8.6777 | 6271.2 | 59.0190 | 4C944.C | 49211.9 | 44814.1 | -7.3117 | -119942.2 | 26.7973 |
| 9C0 | 8.7523 | 7142.8 | 6C.0456 | 46982.2 | 50C83.5 | 44679.5 | -5.9533 | -120104.4 | 23.1544 |
| 1CC0 | 8.81C2 | 8021.1 | 6C.9708 | 52949.8 | 50961.8 | 44523.5 | -4.8701 | -120256.3 | 20.2362 |
| 11C0 | 8.8565 | 89C4.5 | 61.8128 | 59C89.6 | 51845.2 | 44346.1 | -3.9872 | -120399.3 | 17.8456 |
| 12C0 | 8.8547 | 9792.1 | 62.5851 | 65310.0 | 52732.8 | 44147.9 | -3.2546 | -120534.9 | 15.8512 |
| 13C0 | 8.9268 | 10683.2 | 63.2982 | 71604.6 | 53623.9 | 43932.3 | -2.6375 | -120664.1 | 14.1617 |
| 14C0 | 8.9545 | 11577.3 | 63.9609 | 77968.0 | 54518.0 | 43702.4 | -2.1114 | -120787.7 | 12.7121 |
| 15C0 | 8.9789 | 12474.0 | 64.5796 | 84395.4 | 55414.7 | 43461.5 | -1.6578 | -120906.4 | 11.4545 |
| 16C0 | 9.CCC6 | 13373.C | 65.1596 | 90882.6 | 56313.7 | 43211.2 | -1.2631 | -121020.8 | 10.3531 |
| 17C0 | 9.0203 | 14274.1 | 65.7C6C | 97426.2 | 57214.8 | 42953.0 | -0.9170 | -121131.3 | 9.3803 |
| 18C0 | 9.0283 | 15177.0 | 66.2221 | 104C22.8 | 58117.7 | 42687.6 | -0.6111 | -121238.4 | 8.5148 |
| 19C0 | 9.0551 | 16081.7 | 66.7113 | 11C669.7 | 59C22.4 | 42415.8 | -0.3392 | -121342.4 | 7.7398 |
| 2000 | 9.07C8 | 16988.C | 67.1761 | 117364.3 | 59928.7 | 42138.6 | -0.0960 | -121443.6 | 7.0416 |
| 21C0 | 9.CC57 | 17895.8 | 67.6191 | 1241C4.2 | 60836.5 | 41856.4 | 0.1225 | -121542.1 | 6.4095 |
| 22C0 | 9.0599 | 188C5.1 | 68.0421 | 13C887.4 | 61745.8 | 41570.0 | 0.3198 | -121638.3 | 5.8343 |
| 2300 | 9.1134 | 19715.8 | 68.4465 | 137712.C | 62656.5 | 41279.8 | 0.4988 | -121732.1 | 5.3088 |
| 24C0 | 9.1265 | 20627.8 | 68.835C | 144576.2 | 63568.5 | 35635.9 | 0.6431 | -121823.9 | 4.8266 |
| 25C0 | 9.1351 | 21541.1 | 69.2076 | 151478.5 | 64481.8 | 35337.9 | 0.7724 | -121913.7 | 4.3828 |
| 2600 | 9.1514 | 22455.6 | 69.5665 | 158417.3 | 65396.3 | 35040.4 | 0.8908 | -122001.6 | 3.9727 |
| 27C0 | 9.1634 | 23371.3 | 69.9121 | 165391.4 | 66312.0 | 34743.5 | 0.9994 | -122087.8 | 3.5928 |
| 28C0 | 9.1751 | 24288.2 | 70.2456 | 172399.3 | 67229.0 | 34447.1 | 1.0994 | -122172.2 | 3.2397 |
| 2900 | 9.1865 | 252C6.3 | 70.5677 | 179440.1 | 68147.0 | 34151.2 | 1.1917 | -122255.1 | 2.9108 |
| 30C0 | 9.1978 | 26125.5 | 7C.8794 | 186512.5 | 69C66.3 | 33855.7 | 1.277C | -122336.4 | 2.6036 |
| 31C0 | 9.2C85 | 27045.9 | 71.1811 | 193615.6 | 69986.6 | 33560.7 | 1.3564 | -122416.2 | 2.3160 |
| 32C0 | 9.2198 | 27967.3 | 71.4737 | 200748.5 | 709C8.0 | 33266.2 | 1.4298 | -122494.6 | 2.0463 |
| 33C0 | 9.2206 | 28889.8 | 71.7576 | 207910.1 | 71830.6 | 32972.1 | 1.4985 | -122571.6 | 1.7927 |
| 34C0 | 9.2413 | 29813.4 | 72.0333 | 215099.7 | 72754.2 | 32678.4 | 1.5624 | -122647.3 | 1.5539 |
| 35C0 | 9.2519 | 30738.1 | 72.3013 | 222316.5 | 73678.8 | 32385.2 | 1.6221 | -122721.8 | 1.3286 |
| 36C0 | 9.2624 | 31663.8 | 72.5621 | 229559.7 | 74604.5 | 32092.4 | 1.678C | -122795.1 | 1.1157 |
| 37C0 | 9.2728 | 32590.6 | 72.8160 | 236828.7 | 75531.3 | 31799.9 | 1.7306 | -122867.2 | 0.9141 |
| 38C0 | 9.2831 | 33518.4 | 73.0634 | 244122.7 | 76459.1 | 31507.9 | 1.7798 | -122938.2 | 0.7231 |
| 3900 | 9.2933 | 34447.2 | 73.3C47 | 251441.2 | 77387.9 | 31216.3 | 1.8260 | -123008.2 | 0.5418 |
| 40C0 | 9.3035 | 35377.C | 73.5401 | 258783.5 | 78317.7 | 30925.0 | 1.8695 | -123077.2 | 0.3694 |
| 41C0 | 9.3136 | 363C7.9 | 73.770C | 266149.0 | 79248.6 | 30634.2 | 1.9105 | -123145.4 | C.2053 |
| 42C0 | 9.3237 | 37239.8 | 73.9945 | 273537.3 | 8018C.5 | 30343.7 | 1.9492 | -123212.6 | 0.0490 |
| 43C0 | 9.3337 | 38172.6 | 74.214C | 28C947.7 | 81113.3 | 30053.6 | 1.9856 | -123279.1 | -0.1001 |
| 44C0 | 9.3437 | 391C6.5 | 74.4287 | 288379.9 | 82047.2 | 29763.8 | 2.0202 | -123344.9 | -0.2426 |
| 45C0 | 9.3537 | 40041.4 | 74.6388 | 295833.3 | 82982.1 | 29474.5 | 2.0531 | -123410.0 | -0.3787 |
| 46C0 | 9.3636 | 40977.2 | 74.8445 | 3C3307.5 | 83917.9 | 29185.5 | 2.0840 | -123474.6 | -0.5091 |
| 47C0 | 9.3735 | 41914.1 | 75.046C | 310802.1 | 84854.8 | 28896.8 | 2.1132 | -123538.7 | -0.6339 |
| 48C0 | 9.3833 | 42851.9 | 75.2434 | 318316.6 | 85792.6 | 28608.5 | 2.1410 | -123602.3 | -0.7536 |
| 49C0 | 9.3932 | 43790.8 | 75.437C | 325850.7 | 86731.5 | 2832C.6 | 2.1676 | -123665.7 | -0.8685 |
| 50C0 | 9.4C30 | 44730.6 | 75.6269 | 333403.9 | 87671.3 | 28033.1 | 2.1926 | -123728.7 | -0.9788 |
| 51C0 | 9.4127 | 45671.3 | 75.8132 | 34C975.9 | 88612.0 | 27745.9 | 2.2167 | -123791.6 | -1.0849 |
| 52C0 | 9.4225 | 46613.1 | 75.9961 | 348566.4 | 89553.8 | 27459.0 | 2.2393 | -123854.4 | -1.1869 |
| 53C0 | 9.4222 | 47555.8 | 76.1756 | 356175.0 | 90496.5 | 27172.5 | 2.2610 | -123917.2 | -1.2852 |
| 54C0 | 9.4419 | 48459.5 | 76.352C | 363801.4 | 91440.3 | 26886.4 | 2.2816 | -123980.1 | -1.3798 |
| 55C0 | 9.4516 | 49444.2 | 76.5254 | 371445.3 | 92384.9 | 2660C.6 | 2.3012 | -124043.2 | -1.4710 |
| 56C0 | 9.4613 | 50389.9 | 76.6956 | 379106.4 | 93330.6 | 26315.1 | 2.3200 | -124106.6 | -1.5591 |
| 57C0 | 9.4710 | 51336.5 | 76.8633 | 386784.4 | 94277.2 | 26030.0 | 2.3381 | -124170.3 | -1.6441 |
| 58C0 | 9.4806 | 52284.1 | 77.0281 | 394479.0 | 95224.8 | 25745.2 | 2.3551 | -124234.4 | -1.7262 |
| 59C0 | 9.4903 | 53232.6 | 77.1903 | 4C2189.9 | 96173.3 | 2546C.8 | 2.3715 | -124299.1 | -1.8055 |
| 60C0 | 9.4999 | 54182.1 | 77.3498 | 4C9916.9 | 97122.8 | 25176.7 | 2.3872 | -124364.4 | -1.8823 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(22) BCl₂ (gas); molecular weight, 81.734

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -22407.6 | -15922.5 | ----- | -210800.0 | ----- |
| 1CC | 8.8545 | 818.5 | 54.392C | 4620.3 | -21588.7 | -19805.6 | 45.2848 | -211499.6 | 452.4346 |
| 2CC | 10.4314 | 1788.4 | 61.0486 | 10421.4 | -20619.3 | -19641.7 | 23.7140 | -212026.2 | 221.0945 |
| 298.15 | 11.4680 | 2866.3 | 65.420C | 16638.7 | -19541.3 | -19541.3 | 16.6676 | -212442.6 | 144.7592 |
| 3CC | 11.4840 | 2887.5 | 65.491C | 16759.8 | -19520.1 | -19540.0 | 16.5792 | -212449.8 | 143.7989 |
| 4CC | 12.1917 | 4073.7 | 68.8986 | 23485.7 | -18333.9 | -19509.5 | 13.0234 | -212821.3 | 105.0772 |
| 5CC | 12.6602 | 5317.5 | 71.673C | 30518.6 | -17089.7 | -19528.3 | 10.8908 | -213155.9 | 81.8050 |
| 6CC | 12.9730 | 6600.6 | 74.0107 | 37805.8 | -15807.0 | -19575.4 | 9.4668 | -213458.9 | 66.2668 |
| 7CC | 13.1871 | 7909.3 | 76.0276 | 45310.1 | -14498.4 | -19645.3 | 8.4468 | -213734.3 | 55.1530 |
| 8CC | 13.3381 | 9235.9 | 77.7985 | 53003.2 | -13171.7 | -19735.0 | 7.6783 | -213986.0 | 46.8073 |
| 9CC | 13.4476 | 10575.5 | 79.3766 | 60863.4 | -11832.1 | -19846.9 | 7.0778 | -214217.4 | 40.3088 |
| 10CC | 13.5292 | 11924.5 | 80.7978 | 68873.3 | -10483.1 | -19979.3 | 6.5944 | -214431.7 | 35.1046 |
| 11CC | 13.5914 | 13280.7 | 82.0903 | 77018.7 | -9126.9 | -20132.8 | 6.1961 | -214631.7 | 30.8425 |
| 12CC | 13.6398 | 14642.4 | 83.2751 | 85287.8 | -7765.3 | -20307.2 | 5.8613 | -214819.6 | 27.2875 |
| 13CC | 13.6781 | 16008.3 | 84.3685 | 93670.7 | -6399.3 | -20499.4 | 5.5757 | -214997.4 | 24.2769 |
| 14CC | 13.7089 | 17377.7 | 85.3833 | 102158.9 | -5029.9 | -20706.4 | 5.3282 | -215166.5 | 21.6943 |
| 15CC | 13.7241 | 18749.9 | 86.330C | 110745.0 | -3657.7 | -20925.4 | 5.1116 | -215328.2 | 19.4543 |
| 16CC | 13.7549 | 20124.4 | 87.217C | 119422.9 | -2283.2 | -21154.6 | 4.9201 | -215483.7 | 17.4929 |
| 17CC | 13.7722 | 21500.8 | 88.0515 | 128186.7 | -906.8 | -21392.9 | 4.7492 | -215633.7 | 15.7610 |
| 18CC | 13.7868 | 22878.8 | 88.8391 | 137031.6 | 471.1 | -21639.5 | 4.5955 | -215779.1 | 14.2204 |
| 19CC | 13.7993 | 24258.1 | 89.5848 | 145953.1 | 1850.4 | -21893.6 | 4.4565 | -215920.3 | 12.8412 |
| 20CC | 13.8099 | 25638.5 | 90.2929 | 154947.3 | 3230.9 | -22154.3 | 4.3299 | -216057.9 | 11.5990 |
| 21CC | 13.8191 | 27020.0 | 90.9665 | 164010.6 | 4612.4 | -22421.3 | 4.2139 | -216192.4 | 10.4744 |
| 22CC | 13.8272 | 28402.3 | 91.610C | 173139.7 | 5994.7 | -22693.9 | 4.1071 | -216324.1 | 9.4515 |
| 23CC | 13.8342 | 29785.4 | 92.2248 | 182331.6 | 7377.8 | -22971.7 | 4.0086 | -216453.3 | 8.5169 |
| 24CC | 13.8403 | 31169.1 | 92.8137 | 191583.8 | 8761.5 | -28604.4 | 3.8986 | -216580.3 | 7.6597 |
| 25CC | 13.8458 | 32553.5 | 93.3788 | 200893.6 | 10145.8 | -28892.7 | 3.7939 | -216705.3 | 6.8706 |
| 26CC | 13.8507 | 33938.3 | 93.922C | 210258.8 | 11530.7 | -29181.8 | 3.6964 | -216828.6 | 6.1418 |
| 27CC | 13.8550 | 35323.6 | 94.4448 | 219677.3 | 12915.9 | -29471.9 | 3.6051 | -216950.2 | 5.4666 |
| 28CC | 13.8585 | 36709.3 | 94.9487 | 229147.1 | 14301.6 | -29762.9 | 3.5194 | -217070.4 | 4.8393 |
| 29CC | 13.8623 | 38095.3 | 95.4351 | 238666.4 | 15687.7 | -30054.8 | 3.4390 | -217189.4 | 4.2549 |
| 30CC | 13.8655 | 39481.7 | 95.9051 | 248233.6 | 17074.1 | -30347.8 | 3.3629 | -217307.1 | 3.7092 |
| 31CC | 13.8684 | 40868.4 | 96.3598 | 257847.0 | 18460.8 | -30641.7 | 3.2915 | -217423.8 | 3.1984 |
| 32CC | 13.8709 | 42255.4 | 96.8001 | 267505.1 | 19847.8 | -30936.7 | 3.2235 | -217539.5 | 2.7193 |
| 33CC | 13.8733 | 43642.6 | 97.227C | 277206.5 | 21235.0 | -31232.7 | 3.1593 | -217654.4 | 2.2690 |
| 34CC | 13.8755 | 45030.0 | 97.6412 | 286950.0 | 22622.4 | -31529.8 | 3.0982 | -217768.5 | 1.8450 |
| 35CC | 13.8774 | 46417.7 | 98.0434 | 296734.4 | 24010.1 | -31828.0 | 3.0399 | -217882.0 | 1.4449 |
| 36CC | 13.8793 | 47805.5 | 98.4344 | 306558.4 | 25397.9 | -32127.2 | 2.9845 | -217994.8 | 1.0669 |
| 37CC | 13.8809 | 49193.5 | 98.8147 | 316420.9 | 26785.9 | -32427.6 | 2.9316 | -218107.1 | 0.7092 |
| 38CC | 13.8825 | 50581.7 | 99.1845 | 326321.0 | 28174.1 | -32729.0 | 2.8810 | -218219.0 | 0.3701 |
| 39CC | 13.8839 | 51970.0 | 99.5455 | 336257.6 | 29562.4 | -33031.6 | 2.8325 | -218330.5 | 0.0482 |
| 40CC | 13.8852 | 53358.5 | 99.8971 | 346229.8 | 30950.9 | -33335.4 | 2.7860 | -218441.8 | -0.2577 |
| 41CC | 13.8865 | 54747.1 | 100.2395 | 356236.7 | 32339.4 | -33640.2 | 2.7414 | -218552.8 | -0.5489 |
| 42CC | 13.8876 | 56135.8 | 100.5746 | 366277.5 | 33728.1 | -33946.2 | 2.6984 | -218663.7 | -0.8263 |
| 43CC | 13.8887 | 57524.6 | 100.9014 | 376351.3 | 35117.0 | -34253.4 | 2.6571 | -218774.6 | -1.0910 |
| 44CC | 13.8897 | 58913.5 | 101.2207 | 386457.5 | 36505.9 | -34561.7 | 2.6174 | -218885.5 | -1.3437 |
| 45CC | 13.8906 | 60302.5 | 101.5328 | 396595.2 | 37894.9 | -34871.1 | 2.5792 | -218996.5 | -1.5854 |
| 46CC | 13.8914 | 61691.6 | 101.8381 | 406763.8 | 39284.0 | -35181.8 | 2.5422 | -219107.7 | -1.8167 |
| 47CC | 13.8923 | 63080.8 | 102.1365 | 416962.7 | 40673.2 | -35493.6 | 2.5063 | -219219.2 | -2.0382 |
| 48CC | 13.8930 | 64470.1 | 102.4294 | 427191.0 | 42062.4 | -35806.5 | 2.4718 | -219331.1 | -2.2506 |
| 49CC | 13.8937 | 65859.4 | 102.7159 | 437448.3 | 43451.8 | -36120.7 | 2.4385 | -219443.5 | -2.4545 |
| 50CC | 13.8944 | 67248.8 | 102.9966 | 447734.0 | 44841.2 | -36436.0 | 2.4060 | -219556.4 | -2.6502 |
| 51CC | 13.8950 | 68638.3 | 103.2717 | 458047.5 | 46230.7 | -36752.5 | 2.3748 | -219670.0 | -2.8385 |
| 52CC | 13.8956 | 70027.8 | 103.5415 | 468388.2 | 47620.2 | -37070.2 | 2.3443 | -219784.2 | -3.0195 |
| 53CC | 13.8962 | 71417.4 | 103.8062 | 478755.6 | 49009.8 | -37389.1 | 2.3147 | -219899.4 | -3.1939 |
| 54CC | 13.8967 | 72807.1 | 104.0660 | 489149.2 | 50399.4 | -37709.2 | 2.2861 | -220015.4 | -3.3618 |
| 55CC | 13.8973 | 74196.8 | 104.3210 | 499568.6 | 51789.1 | -38030.4 | 2.2582 | -220132.5 | -3.5237 |
| 56CC | 13.8977 | 75586.5 | 104.5714 | 510013.3 | 53178.9 | -38352.9 | 2.2311 | -220250.7 | -3.6800 |
| 57CC | 13.8982 | 76976.3 | 104.8174 | 520482.8 | 54568.7 | -38676.5 | 2.2049 | -220370.0 | -3.8308 |
| 58CC | 13.8986 | 78366.0 | 105.0591 | 530976.6 | 55958.5 | -39001.4 | 2.1791 | -220490.7 | -3.9765 |
| 59CC | 13.8990 | 79756.0 | 105.2967 | 541494.4 | 57348.4 | -39327.4 | 2.1541 | -220612.8 | -4.1174 |
| 60CC | 13.8994 | 81146.0 | 105.5303 | 552035.8 | 58738.3 | -39654.7 | 2.1298 | -220736.4 | -4.2536 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(23) BCl_3 (gas); molecular weight, 117.191

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| C | ----- | 0 | ----- | 0 | -100471.8 | -96885.9 | ----- | -316315.8 | ----- |
| 100 | 9.7260 | 841.6 | 55.9395 | 4752.4 | -99620.2 | -97098.3 | 209.6044 | -317489.6 | 676.9820 |
| 200 | 12.9219 | 1985.2 | 63.7385 | 10762.6 | -98486.6 | -97123.1 | 103.4849 | -318341.1 | 329.6763 |
| 298.15 | 14.9549 | 3361.8 | 65.3115 | 17303.4 | -97110.0 | -97110.0 | 68.5517 | -318961.9 | 215.0639 |
| 300 | 15.0268 | 3389.6 | 65.4043 | 17431.7 | -97082.2 | -97109.6 | 68.1126 | -318972.3 | 213.6221 |
| 400 | 16.4385 | 4967.6 | 73.9343 | 24606.1 | -95504.2 | -97102.0 | 50.4275 | -319482.2 | 155.4887 |
| 500 | 17.3734 | 6661.4 | 77.7101 | 32193.6 | -93810.4 | -97098.1 | 39.8171 | -319908.1 | 120.5568 |
| 600 | 17.9579 | 8432.0 | 80.9365 | 40129.9 | -92035.8 | -97091.7 | 32.7441 | -320267.6 | 97.2399 |
| 700 | 18.4256 | 10254.5 | 83.7450 | 48367.0 | -90217.3 | -97087.1 | 27.6925 | -320572.8 | 80.5677 |
| 800 | 18.7273 | 12113.0 | 86.2262 | 56868.0 | -88358.8 | -97087.6 | 23.9034 | -320833.4 | 68.0524 |
| 900 | 18.9463 | 13997.2 | 88.4453 | 65603.6 | -86474.6 | -97100.1 | 20.9565 | -321057.1 | 58.3109 |
| 1000 | 19.1094 | 15900.4 | 90.4503 | 74550.0 | -84571.4 | -97125.5 | 18.5985 | -321250.6 | 50.5126 |
| 1100 | 19.2237 | 17817.8 | 92.2777 | 83687.7 | -82654.0 | -97166.6 | 16.6685 | -321419.0 | 44.1286 |
| 1200 | 19.3205 | 19746.2 | 93.9556 | 93000.5 | -80725.6 | -97224.5 | 15.0594 | -321566.5 | 38.8059 |
| 1300 | 19.4071 | 21683.2 | 95.5066 | 102474.6 | -78788.6 | -97257.1 | 13.6970 | -321696.7 | 34.3002 |
| 1400 | 19.4688 | 23627.1 | 96.9466 | 112098.1 | -76844.7 | -97382.2 | 12.5281 | -321812.2 | 30.4367 |
| 1500 | 19.5191 | 25576.6 | 98.2915 | 121860.7 | -74895.2 | -97477.4 | 11.5142 | -321915.2 | 27.0872 |
| 1600 | 19.5606 | 27530.6 | 99.5526 | 131753.6 | -72941.1 | -97581.5 | 10.6262 | -322007.7 | 24.1555 |
| 1700 | 19.5953 | 29488.5 | 100.7396 | 141768.8 | -70983.3 | -97693.7 | 9.8417 | -322091.0 | 21.5680 |
| 1800 | 19.6245 | 31449.5 | 101.8605 | 151899.3 | -69022.3 | -97813.3 | 9.1435 | -322166.5 | 19.2674 |
| 1900 | 19.6494 | 33413.2 | 102.9222 | 162138.9 | -67058.5 | -97935.9 | 8.5181 | -322235.2 | 17.2085 |
| 2000 | 19.6708 | 35379.3 | 103.9306 | 172482.0 | -65092.5 | -98072.9 | 7.9546 | -322297.9 | 15.3551 |
| 2100 | 19.6892 | 37347.3 | 104.8908 | 182923.4 | -63124.5 | -98211.8 | 7.4439 | -322355.4 | 13.6780 |
| 2200 | 19.7052 | 39317.0 | 105.8071 | 193458.7 | -61154.7 | -98356.1 | 6.9789 | -322408.2 | 12.1530 |
| 2300 | 19.7193 | 41288.3 | 106.6834 | 204083.5 | -59183.5 | -98505.6 | 6.5539 | -322457.0 | 10.7604 |
| 2400 | 19.7316 | 43260.8 | 107.5225 | 214794.1 | -57210.9 | -104010.2 | 6.1451 | -322502.1 | 9.4837 |
| 2500 | 19.7425 | 45234.6 | 108.3286 | 225587.0 | -55237.2 | -104170.4 | 5.7660 | -322544.0 | 8.3090 |
| 2600 | 19.7522 | 47209.3 | 109.1031 | 236458.8 | -53262.5 | -104331.6 | 5.4155 | -322583.0 | 7.2245 |
| 2700 | 19.7609 | 49185.0 | 109.8487 | 247406.6 | -51286.8 | -104494.0 | 5.0905 | -322619.3 | 6.2202 |
| 2800 | 19.7686 | 51161.4 | 110.5675 | 258427.7 | -49310.3 | -104657.5 | 4.7881 | -322653.3 | 5.2876 |
| 2900 | 19.7756 | 53138.7 | 111.2614 | 269519.3 | -47333.1 | -104822.3 | 4.5063 | -322685.1 | 4.4191 |
| 3000 | 19.7819 | 55116.6 | 111.9319 | 280679.1 | -45355.2 | -104988.4 | 4.2426 | -322715.0 | 3.6085 |
| 3100 | 19.7876 | 57095.0 | 112.5806 | 291905.0 | -43376.7 | -105155.9 | 3.9959 | -322743.1 | 2.8501 |
| 3200 | 19.7928 | 59074.1 | 113.2090 | 303194.6 | -41397.7 | -105324.8 | 3.7639 | -322769.7 | 2.1391 |
| 3300 | 19.7975 | 61053.6 | 113.8181 | 314546.1 | -39418.2 | -105495.1 | 3.5459 | -322794.8 | 1.4711 |
| 3400 | 19.8019 | 63033.6 | 114.4092 | 325957.6 | -37438.2 | -105666.9 | 3.3402 | -322818.6 | 0.8424 |
| 3500 | 19.8058 | 65013.9 | 114.9832 | 337427.4 | -35457.8 | -105840.3 | 3.1459 | -322841.3 | 0.2495 |
| 3600 | 19.8095 | 66994.7 | 115.5412 | 348953.7 | -33477.1 | -106015.1 | 2.9622 | -322862.9 | -0.3105 |
| 3700 | 19.8128 | 68975.0 | 116.0840 | 360535.1 | -31495.9 | -106191.6 | 2.7882 | -322883.6 | -0.8402 |
| 3800 | 19.8159 | 70957.3 | 116.6125 | 372170.1 | -29514.5 | -106369.6 | 2.6230 | -322903.4 | -1.3421 |
| 3900 | 19.8188 | 72939.0 | 117.1272 | 383857.1 | -27532.8 | -106549.2 | 2.4660 | -322922.5 | -1.8183 |
| 4000 | 19.8214 | 74921.0 | 117.6290 | 395595.1 | -25550.8 | -106730.5 | 2.3166 | -322941.0 | -2.2707 |
| 4100 | 19.8239 | 76903.3 | 118.1185 | 407382.5 | -23568.5 | -106913.4 | 2.1743 | -322959.0 | -2.7010 |
| 4200 | 19.8261 | 78885.8 | 118.5962 | 419218.4 | -21586.0 | -107097.5 | 2.0384 | -322976.6 | -3.1109 |
| 4300 | 19.8283 | 80868.5 | 119.0628 | 431101.4 | -19603.3 | -107284.2 | 1.9086 | -322993.9 | -3.5017 |
| 4400 | 19.8303 | 82851.4 | 119.5186 | 443030.6 | -17620.4 | -107472.1 | 1.7847 | -323010.9 | -3.8748 |
| 4500 | 19.8321 | 84834.5 | 119.9643 | 455004.8 | -15637.2 | -107661.7 | 1.6661 | -323027.9 | -4.2313 |
| 4600 | 19.8338 | 86817.8 | 120.4002 | 467023.1 | -13653.9 | -107853.0 | 1.5523 | -323044.8 | -4.5724 |
| 4700 | 19.8355 | 88801.3 | 120.8268 | 479084.5 | -11670.5 | -108046.0 | 1.4430 | -323061.8 | -4.8989 |
| 4800 | 19.8370 | 90784.9 | 121.2444 | 491188.2 | -9686.8 | -108240.7 | 1.3382 | -323079.0 | -5.2119 |
| 4900 | 19.8384 | 92768.7 | 121.6534 | 503333.1 | -7703.1 | -108437.2 | 1.2377 | -323096.5 | -5.5121 |
| 5000 | 19.8398 | 94752.6 | 122.0542 | 515518.6 | -5719.2 | -108635.3 | 1.1408 | -323114.3 | -5.8003 |
| 5100 | 19.8410 | 96736.7 | 122.4471 | 527743.7 | -3735.1 | -108835.3 | 1.0477 | -323132.7 | -6.0772 |
| 5200 | 19.8422 | 98720.8 | 122.8324 | 540007.7 | -1751.0 | -109036.9 | 0.9579 | -323151.6 | -6.3435 |
| 5300 | 19.8434 | 100705.1 | 123.2104 | 552310.0 | 233.3 | -109240.4 | 0.8713 | -323171.2 | -6.5998 |
| 5400 | 19.8444 | 102689.5 | 123.5813 | 564649.6 | 2217.7 | -109445.6 | 0.7878 | -323191.6 | -6.8465 |
| 5500 | 19.8455 | 104674.0 | 123.9455 | 577026.0 | 4202.2 | -109652.5 | 0.7072 | -323212.9 | -7.0844 |
| 5600 | 19.8464 | 106658.6 | 124.3030 | 589438.5 | 6186.8 | -109861.2 | 0.6293 | -323235.1 | -7.3137 |
| 5700 | 19.8473 | 108643.3 | 124.6543 | 601886.4 | 8171.5 | -110071.7 | 0.5542 | -323258.5 | -7.5350 |
| 5800 | 19.8482 | 110628.1 | 124.9955 | 614369.1 | 10156.3 | -110284.0 | 0.4812 | -323283.0 | -7.7487 |
| 5900 | 19.8490 | 112612.9 | 125.3388 | 626886.1 | 12141.1 | -110498.0 | 0.4108 | -323308.9 | -7.9552 |
| 6000 | 19.8498 | 114597.9 | 125.6724 | 639436.7 | 14126.1 | -110713.8 | 0.3425 | -323336.1 | -8.1548 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(24) BF (gas); molecular weight, 29.82

| T_f , °K | C_p^0 , cal/mole °K | $H_f^0 - H_0^0$, cal/mole | S_f^0 , cal/mole °K | $-(F_f^0 - H_0^0)$, cal/mole | H_f^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|---------------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| C | ----- | 0 | ----- | 0 | -45210.8 | -43864.3 | ----- | -196000.0 | ----- |
| 1CC | 6.9571 | 654.2 | 40.268E | 3332.7 | -44516.6 | -43523.6 | 99.4519 | -196329.2 | 424.0175 |
| 20C | 6.9681 | 1350.2 | 45.0927 | 7628.4 | -43820.6 | -43257.5 | 52.0169 | -196657.1 | 209.3537 |
| 29E.15 | 7.0724 | 2078.0 | 47.8896 | 12200.3 | -43132.7 | -43132.7 | 36.4811 | -196990.9 | 138.5614 |
| 3CC | 7.0757 | 2091.1 | 47.9334 | 12288.9 | -43119.6 | -43131.5 | 36.2860 | -196997.1 | 137.6710 |
| 4CC | 7.3084 | 2809.6 | 49.958E | 17189.9 | -42401.2 | -43124.5 | 28.4325 | -197315.7 | 101.7679 |
| 5CC | 7.5806 | 3554.1 | 51.658E | 22275.4 | -41656.7 | -43191.7 | 23.7171 | -197600.3 | 80.1926 |
| 6CC | 7.8214 | 4325.0 | 53.0637 | 27513.2 | -40885.8 | -43297.5 | 20.5674 | -197851.2 | 65.7893 |
| 7CC | 8.0414 | 5119.0 | 54.2872 | 32882.1 | -40091.8 | -43428.7 | 18.3116 | -198073.3 | 55.4889 |
| 8CC | 8.2112 | 5931.9 | 55.3725 | 38366.1 | -39278.9 | -43578.8 | 16.6137 | -198272.3 | 47.7554 |
| 9CC | 8.3475 | 6760.1 | 56.347E | 43952.9 | -38450.7 | -43749.0 | 15.2887 | -198452.7 | 41.7346 |
| 10CC | 8.4571 | 7600.5 | 57.2331 | 49632.6 | -37610.3 | -43937.1 | 14.2242 | -198618.5 | 36.9138 |
| 11CC | 8.5463 | 8450.8 | 58.0435 | 55397.0 | -36759.9 | -44143.7 | 13.3494 | -198772.4 | 32.9663 |
| 12CC | 8.6196 | 9309.2 | 58.7504 | 61239.2 | -35901.5 | -44368.7 | 12.6167 | -198916.7 | 29.6742 |
| 13CC | 8.6807 | 10174.3 | 59.482E | 67153.3 | -35036.4 | -44609.1 | 11.9936 | -199053.1 | 26.8867 |
| 14CC | 8.7222 | 11045.1 | 60.1280 | 73134.2 | -34165.7 | -44862.2 | 11.4564 | -199182.8 | 24.4957 |
| 15CC | 8.7763 | 11920.5 | 60.7320 | 79177.5 | -33290.2 | -45125.1 | 10.9882 | -199307.0 | 22.4223 |
| 16CC | 8.8144 | 12800.1 | 61.2597 | 85279.4 | -32410.7 | -45396.3 | 10.5762 | -199426.4 | 20.6069 |
| 17CC | 8.8478 | 13683.3 | 61.8351 | 91436.4 | -31527.5 | -45674.8 | 10.2103 | -199541.6 | 19.0041 |
| 18CC | 8.8772 | 14569.5 | 62.3417 | 97645.5 | -30641.2 | -45959.8 | 9.8831 | -199653.3 | 17.5787 |
| 19CC | 8.9036 | 15458.6 | 62.8224 | 103903.9 | -29752.2 | -46250.8 | 9.5885 | -199761.7 | 16.3025 |
| 20CC | 8.9274 | 16350.2 | 63.2797 | 110209.2 | -28860.6 | -46547.0 | 9.3218 | -199867.2 | 15.1534 |
| 21CC | 8.9490 | 17244.0 | 63.7158 | 116559.1 | -27966.8 | -46847.8 | 9.0788 | -199970.2 | 14.1132 |
| 22CC | 8.9688 | 18139.5 | 64.1325 | 122951.7 | -27070.9 | -47152.9 | 8.8564 | -200070.9 | 13.1670 |
| 23CC | 8.9871 | 19037.7 | 64.5316 | 129385.0 | -26173.1 | -47461.7 | 8.6522 | -200169.3 | 12.3027 |
| 24CC | 9.0041 | 19937.3 | 64.9145 | 135857.4 | -25273.5 | -47772.2 | 8.4451 | -200265.9 | 11.5100 |
| 25CC | 9.0201 | 20838.5 | 65.2824 | 142367.4 | -24372.3 | -48083.6 | 8.2511 | -200360.6 | 10.7804 |
| 26CC | 9.0351 | 21741.3 | 65.6364 | 148913.5 | -23469.5 | -48395.4 | 8.0709 | -200453.5 | 10.1066 |
| 27CC | 9.0493 | 22645.5 | 65.9777 | 155494.3 | -22565.3 | -48707.4 | 7.9031 | -200544.9 | 9.4825 |
| 28CC | 9.0628 | 23551.1 | 66.3070 | 162108.6 | -21659.7 | -49020.1 | 7.7463 | -200634.8 | 8.9026 |
| 29CC | 9.0757 | 24458.0 | 66.6253 | 168755.3 | -20752.7 | -49332.6 | 7.5995 | -200723.2 | 8.3625 |
| 30CC | 9.0880 | 25366.2 | 66.9332 | 175433.3 | -19844.6 | -49645.1 | 7.4616 | -200810.4 | 7.8582 |
| 31CC | 9.0999 | 26275.6 | 67.2314 | 182141.6 | -18935.2 | -49957.6 | 7.3321 | -200896.2 | 7.3862 |
| 32CC | 9.1114 | 27186.2 | 67.5205 | 188879.3 | -18024.6 | -50270.1 | 7.2097 | -200980.8 | 6.9435 |
| 33CC | 9.1225 | 28097.9 | 67.8010 | 195645.4 | -17112.9 | -50582.6 | 7.0944 | -201064.2 | 6.5275 |
| 34CC | 9.1333 | 29010.2 | 68.0735 | 202439.2 | -16200.1 | -50895.1 | 6.9850 | -201146.6 | 6.1358 |
| 35CC | 9.1438 | 29924.5 | 68.3384 | 209259.9 | -15286.2 | -51207.6 | 6.8813 | -201227.9 | 5.7663 |
| 36CC | 9.1541 | 30839.4 | 68.5961 | 216106.6 | -14371.3 | -51520.1 | 6.7829 | -201308.2 | 5.4173 |
| 37CC | 9.1641 | 31755.3 | 68.8471 | 222978.9 | -13455.4 | -51832.6 | 6.6894 | -201387.6 | 5.0869 |
| 38CC | 9.1739 | 32672.2 | 69.0916 | 229875.8 | -12538.5 | -52145.1 | 6.6002 | -201466.1 | 4.7738 |
| 39CC | 9.1835 | 33590.1 | 69.3300 | 236797.0 | -11620.7 | -52457.6 | 6.5151 | -201543.8 | 4.4767 |
| 40CC | 9.1930 | 34508.9 | 69.5626 | 243741.7 | -10701.8 | -52770.1 | 6.4338 | -201620.7 | 4.1943 |
| 41CC | 9.2023 | 35428.7 | 69.789E | 250709.3 | -9782.1 | -53082.6 | 6.3561 | -201697.0 | 3.9256 |
| 42CC | 9.2115 | 36349.4 | 70.0116 | 257699.4 | -8861.4 | -53395.1 | 6.2816 | -201772.6 | 3.6695 |
| 43CC | 9.2205 | 37271.0 | 70.2285 | 264711.5 | -7939.8 | -53707.6 | 6.2102 | -201847.6 | 3.4253 |
| 44CC | 9.2295 | 38193.5 | 70.4406 | 271745.0 | -7017.3 | -54020.1 | 6.1418 | -201922.2 | 3.1922 |
| 45CC | 9.2383 | 39116.9 | 70.6481 | 278799.4 | -6093.9 | -54332.6 | 6.0761 | -201996.3 | 2.9692 |
| 46CC | 9.2471 | 40041.1 | 70.8512 | 285874.4 | -5169.6 | -54645.1 | 6.0129 | -202070.1 | 2.7559 |
| 47CC | 9.2558 | 40966.3 | 71.0502 | 292969.5 | -4244.5 | -54957.6 | 5.9518 | -202143.5 | 2.5517 |
| 48CC | 9.2644 | 41892.3 | 71.2451 | 300084.3 | -3318.5 | -55270.1 | 5.8932 | -202216.8 | 2.3558 |
| 49CC | 9.2729 | 42819.2 | 71.4362 | 307218.4 | -2391.6 | -55582.6 | 5.8368 | -202290.0 | 2.1679 |
| 50CC | 9.2814 | 43746.9 | 71.6237 | 314371.5 | -1463.9 | -55895.1 | 5.7821 | -202363.1 | 1.9874 |
| 51CC | 9.2899 | 44675.5 | 71.8076 | 321543.1 | -535.3 | -56207.6 | 5.7296 | -202436.2 | 1.8139 |
| 52CC | 9.2983 | 45604.9 | 71.9880 | 328732.9 | 394.1 | -56520.1 | 5.6786 | -202509.5 | 1.6471 |
| 53CC | 9.3068 | 46535.1 | 72.1652 | 335940.6 | 1324.4 | -56832.6 | 5.6293 | -202582.9 | 1.4865 |
| 54CC | 9.3152 | 47466.2 | 72.3393 | 343165.8 | 2255.4 | -57145.1 | 5.5816 | -202656.7 | 1.3318 |
| 55CC | 9.3235 | 48398.1 | 72.5103 | 350408.3 | 3187.4 | -57457.6 | 5.5354 | -202730.8 | 1.1826 |
| 56CC | 9.3315 | 49330.9 | 72.6783 | 357667.8 | 4120.2 | -57770.1 | 5.4907 | -202805.4 | 1.0387 |
| 57CC | 9.3404 | 50264.5 | 72.8436 | 364943.9 | 5053.8 | -58082.6 | 5.4475 | -202880.5 | 0.8999 |
| 58CC | 9.3488 | 51199.0 | 73.0061 | 372236.4 | 5986.2 | -58395.1 | 5.4052 | -202956.2 | 0.7657 |
| 59CC | 9.3572 | 52124.3 | 73.1660 | 379545.0 | 6923.5 | -58707.6 | 5.3644 | -203032.6 | 0.6361 |
| 60CC | 9.3657 | 53070.4 | 73.3233 | 386869.5 | 7859.7 | -59020.1 | 5.3247 | -203109.9 | 0.5107 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(25) BF_2 (gas); molecular weight, 48.82

| T, °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -137510.6 | -135109.3 | ----- | -305600.0 | ----- |
| 10C | 8.0451 | 796.3 | 49.5190 | 4155.6 | -136714.3 | -135013.8 | 296.9688 | -306325.7 | 659.4059 |
| 20C | 8.8902 | 1639.0 | 55.3263 | 9426.3 | -135871.6 | -134951.1 | 149.4700 | -307032.6 | 324.3850 |
| 298.15 | 9.8434 | 2559.0 | 59.0563 | 15048.6 | -134951.6 | -134951.6 | 100.9296 | -307667.9 | 213.8399 |
| 300 | 9.8604 | 2577.2 | 59.1172 | 15157.9 | -134952.1 | -134952.1 | 100.3194 | -307679.0 | 212.4492 |
| 40C | 10.6594 | 3606.6 | 62.0726 | 21222.5 | -133904.0 | -135019.3 | 75.7372 | -308226.9 | 156.3693 |
| 50C | 11.3718 | 4711.5 | 64.5355 | 27556.2 | -132799.1 | -135128.8 | 60.9781 | -308683.1 | 122.6656 |
| 60C | 11.8699 | 5875.8 | 66.6567 | 34118.2 | -131634.8 | -135256.9 | 51.1302 | -309065.5 | 100.1657 |
| 70C | 12.2833 | 7085.3 | 68.5205 | 40879.0 | -130425.2 | -135397.7 | 44.0892 | -309391.4 | 84.0758 |
| 80C | 12.5822 | 8329.3 | 70.1811 | 47815.6 | -129181.3 | -135548.9 | 38.8022 | -309674.3 | 71.9964 |
| 90C | 12.8113 | 9599.5 | 71.6765 | 54909.7 | -127911.1 | -135714.5 | 34.6857 | -309924.6 | 62.5932 |
| 100C | 12.9691 | 10889.8 | 73.0363 | 62146.4 | -126620.7 | -135894.2 | 31.3882 | -310149.7 | 55.0649 |
| 110C | 13.1289 | 12156.0 | 74.2811 | 69513.2 | -125314.6 | -136089.9 | 28.6866 | -310355.2 | 48.9011 |
| 120C | 13.2403 | 13514.7 | 75.4284 | 76599.4 | -123995.9 | -136302.4 | 26.4317 | -310545.1 | 43.7613 |
| 130C | 13.3302 | 14843.4 | 76.4915 | 84596.1 | -122667.2 | -136529.4 | 24.5209 | -310722.5 | 39.4097 |
| 140C | 13.4037 | 16180.2 | 77.4825 | 92295.3 | -121330.4 | -136768.7 | 22.8800 | -310889.8 | 35.6776 |
| 150C | 13.4644 | 17523.7 | 78.4094 | 100090.4 | -119986.9 | -137017.9 | 21.4554 | -311048.8 | 32.4415 |
| 160C | 13.5150 | 18872.7 | 79.2800 | 107975.3 | -118637.9 | -137275.6 | 20.2067 | -311200.9 | 29.6085 |
| 170C | 13.5577 | 20226.4 | 80.1007 | 115944.8 | -117284.2 | -137541.2 | 19.1026 | -311347.1 | 27.1076 |
| 180C | 13.5939 | 21584.0 | 80.8767 | 123994.0 | -115926.5 | -137814.0 | 18.1194 | -311488.5 | 24.8835 |
| 190C | 13.6249 | 22945.0 | 81.6125 | 132118.8 | -114565.5 | -138093.7 | 17.2379 | -311625.7 | 22.8926 |
| 200C | 13.6516 | 24308.9 | 82.3121 | 140315.3 | -113201.7 | -138379.4 | 16.4430 | -311759.2 | 21.1001 |
| 210C | 13.6748 | 25675.2 | 82.9787 | 148580.1 | -111835.3 | -138671.0 | 15.7222 | -311889.7 | 19.4775 |
| 220C | 13.6951 | 27043.8 | 83.6154 | 156910.0 | -110466.8 | -138967.9 | 15.0654 | -312017.4 | 18.0019 |
| 230C | 13.7128 | 28414.2 | 84.2245 | 165302.3 | -109096.4 | -139269.8 | 14.4647 | -312142.8 | 16.6541 |
| 240C | 13.7285 | 29786.2 | 84.8085 | 173754.1 | -107724.3 | -144926.6 | 13.8942 | -312266.1 | 15.4180 |
| 250C | 13.7424 | 31159.8 | 85.3692 | 182263.2 | -106350.8 | -145239.0 | 13.3658 | -312387.5 | 14.2804 |
| 260C | 13.7548 | 32534.7 | 85.9084 | 190827.2 | -104975.9 | -145552.4 | 12.8770 | -312507.3 | 13.2300 |
| 270C | 13.7659 | 33910.7 | 86.4278 | 199444.2 | -103599.8 | -145866.8 | 12.4234 | -312625.6 | 12.2569 |
| 280C | 13.7759 | 35287.8 | 86.9286 | 208112.2 | -102222.7 | -146182.4 | 12.0012 | -312742.7 | 11.3530 |
| 290C | 13.7848 | 36665.9 | 87.4121 | 216829.3 | -100844.7 | -146499.2 | 11.6074 | -312858.5 | 10.5112 |
| 300C | 13.7929 | 38044.8 | 87.8796 | 225594.1 | -99465.8 | -146817.2 | 11.2389 | -312973.3 | 9.7251 |
| 310C | 13.8003 | 39424.4 | 88.3320 | 234404.8 | -98086.1 | -147136.6 | 10.8937 | -313087.2 | 8.9895 |
| 320C | 13.8070 | 40804.8 | 88.7702 | 243260.0 | -96705.8 | -147457.4 | 10.5690 | -313200.2 | 8.2997 |
| 330C | 13.8131 | 42185.8 | 89.1952 | 252158.4 | -95324.8 | -147779.6 | 10.2637 | -313312.5 | 7.6514 |
| 340C | 13.8186 | 43567.4 | 89.6076 | 261098.6 | -93943.2 | -148103.3 | 9.9755 | -313424.1 | 7.0410 |
| 350C | 13.8238 | 44949.5 | 90.0083 | 270079.5 | -92561.1 | -148428.5 | 9.7031 | -313535.1 | 6.4653 |
| 360C | 13.8285 | 46332.1 | 90.3978 | 279099.9 | -91178.4 | -148755.2 | 9.4455 | -313645.7 | 5.9214 |
| 370C | 13.8328 | 47715.2 | 90.7767 | 288158.7 | -89795.4 | -149083.5 | 9.2012 | -313755.8 | 5.4068 |
| 380C | 13.8368 | 49098.7 | 91.1457 | 297254.9 | -88411.9 | -149413.4 | 8.9693 | -313865.5 | 4.9190 |
| 390C | 13.8405 | 50482.6 | 91.5051 | 306387.5 | -87028.0 | -149744.9 | 8.7486 | -313975.0 | 4.4561 |
| 400C | 13.8440 | 51866.8 | 91.8556 | 315555.6 | -85643.8 | -150078.1 | 8.5386 | -314084.2 | 4.0162 |
| 410C | 13.8471 | 53251.3 | 92.1975 | 324758.4 | -84259.2 | -150412.9 | 8.3384 | -314193.4 | 3.5976 |
| 420C | 13.8501 | 54636.2 | 92.5312 | 333994.9 | -82874.4 | -150749.4 | 8.1473 | -314302.4 | 3.1987 |
| 430C | 13.8529 | 56021.4 | 92.8571 | 343264.3 | -81489.2 | -151087.5 | 7.9646 | -314411.5 | 2.8183 |
| 440C | 13.8555 | 57406.8 | 93.1756 | 352566.0 | -80103.8 | -151427.4 | 7.7899 | -314520.7 | 2.4551 |
| 450C | 13.8579 | 58792.4 | 93.4870 | 361899.2 | -78718.1 | -151769.0 | 7.6227 | -314630.1 | 2.1079 |
| 460C | 13.8601 | 60178.3 | 93.7916 | 371263.2 | -77332.2 | -152112.3 | 7.4623 | -314739.7 | 1.7757 |
| 470C | 13.8622 | 61564.5 | 94.0897 | 380657.3 | -75946.1 | -152457.4 | 7.3082 | -314849.7 | 1.4575 |
| 480C | 13.8642 | 62950.8 | 94.3816 | 390081.0 | -74559.8 | -152804.2 | 7.1603 | -314960.1 | 1.1524 |
| 490C | 13.8661 | 64337.3 | 94.6675 | 399535.5 | -73173.3 | -153152.8 | 7.0183 | -315071.1 | 0.8597 |
| 500C | 13.8679 | 65724.0 | 94.9477 | 409014.3 | -71786.6 | -153503.1 | 6.8815 | -315182.6 | 0.5786 |
| 510C | 13.8695 | 67110.9 | 95.2223 | 418522.8 | -70399.7 | -153855.2 | 6.7499 | -315294.8 | 0.3085 |
| 520C | 13.8711 | 68497.9 | 95.4916 | 428058.6 | -69012.7 | -154209.1 | 6.6229 | -315407.8 | 0.0486 |
| 530C | 13.8726 | 69885.1 | 95.7559 | 437621.0 | -67625.5 | -154564.7 | 6.5004 | -315521.7 | -0.2015 |
| 540C | 13.8740 | 71272.4 | 96.0152 | 447209.6 | -66238.2 | -154922.2 | 6.3823 | -315636.5 | -0.4425 |
| 550C | 13.8753 | 72659.9 | 96.2698 | 456823.8 | -64850.7 | -155281.5 | 6.2681 | -315752.4 | -0.6748 |
| 560C | 13.8765 | 74047.5 | 96.5198 | 466463.4 | -63463.1 | -155642.5 | 6.1578 | -315869.4 | -0.8989 |
| 570C | 13.8777 | 75435.2 | 96.7654 | 476127.7 | -62075.4 | -156005.4 | 6.0513 | -315987.7 | -1.1152 |
| 580C | 13.8788 | 76823.0 | 97.0066 | 485816.3 | -60687.6 | -156370.1 | 5.9479 | -316107.3 | -1.3241 |
| 590C | 13.8799 | 78210.9 | 97.2440 | 495528.9 | -59299.6 | -156736.6 | 5.8480 | -316228.3 | -1.5260 |
| 600C | 13.8809 | 79599.0 | 97.4773 | 505265.0 | -57911.6 | -157104.9 | 5.7511 | -316350.9 | -1.7213 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(26) BF_3 (gas); molecular weight, 67.82

| T, °K | C_p^0 , cal/mole °K | $H_f^0 - H_0^0$, cal/mole | S_f^0 , cal/mole °K | $-(F_f^0 - H_0^0)$, cal/mole | H_f^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| C | ----- | 0 | ----- | C | -272883.8 | -269427.7 | ----- | -458273.4 | ----- |
| 1CC | 8.1477 | 797.7 | 5C.161E | 4218.5 | -272086.1 | -269678.2 | 586.9571 | -459496.2 | 987.2656 |
| 2CC | 1C.C2CC | 1657.C | 56.3194 | 9566.8 | -271186.8 | -269909.0 | 292.1785 | -460672.4 | 484.6716 |
| 298.15 | 12.C569 | 2783.8 | 6C.7135 | 15317.9 | -270100.0 | -270100.0 | 195.0598 | -461674.5 | 318.8002 |
| 3CC | 12.0514 | 2806.2 | 6C.7882 | 15430.3 | -270777.7 | -270103.3 | 193.8387 | -461691.5 | 316.7134 |
| 4CC | 13.7519 | 41C1.6 | 64.503E | 21699.8 | -268782.2 | -27C289.4 | 144.6325 | -462513.4 | 232.5613 |
| 5CC | 15.0437 | 5544.2 | 67.7173 | 28314.4 | -267339.6 | -270464.0 | 115.0889 | -463164.0 | 181.9884 |
| 6CC | 16.0257 | 7100.2 | 7C.5514 | 35230.7 | -265783.6 | -270616.2 | 95.3812 | -463679.7 | 148.2302 |
| 7CC | 16.7766 | 8742.2 | 73.0811 | 42414.6 | -264141.6 | -270749.6 | 81.2971 | -464092.3 | 124.0929 |
| 8CC | 17.3439 | 10449.5 | 75.3601 | 49838.5 | -262434.3 | -270869.5 | 70.7285 | -464427.0 | 105.9753 |
| 9CC | 17.7791 | 12206.6 | 77.4291 | 57479.6 | -260677.2 | -270985.6 | 62.5053 | -464702.1 | 91.8745 |
| 10CC | 18.1169 | 1402C.1 | 79.3205 | 65318.4 | -258881.7 | -2711C1.7 | 55.9239 | -464931.5 | 80.5878 |
| 11CC | 18.3827 | 15827.6 | 81.0602 | 73338.7 | -257C56.2 | -271223.0 | 50.5368 | -465125.0 | 71.3490 |
| 12CC | 18.5947 | 17676.8 | 82.6692 | 81526.1 | -255207.0 | -271352.7 | 46.0453 | -465290.2 | 63.6470 |
| 13CC | 18.7658 | 19545.2 | 84.1645 | 89868.7 | -253338.6 | -27149C.3 | 42.2431 | -465432.6 | 57.1278 |
| 14CC | 18.9C57 | 21429.C | 85.5605 | 98355.7 | -251454.8 | -271635.0 | 38.9822 | -465556.6 | 51.5383 |
| 15CC | 19.C213 | 23325.5 | 86.8689 | 106977.9 | -24955E.3 | -271785.4 | 36.1546 | -465665.4 | 46.6928 |
| 16CC | 19.1178 | 25232.6 | 88.0997 | 115726.9 | -247651.2 | -271941.1 | 33.6792 | -465761.5 | 42.4521 |
| 17CC | 19.159C | 27148.6 | 89.2612 | 124595.5 | -245735.3 | -272102.1 | 31.4936 | -465847.1 | 38.7096 |
| 18CC | 19.268C | 29072.C | 9C.36C6 | 133577.1 | -243811.8 | -272268.2 | 29.5497 | -465923.7 | 35.3824 |
| 19CC | 19.3271 | 310C1.E | 91.404C | 142665.8 | -241882.0 | -272439.6 | 27.8094 | -465992.7 | 32.4049 |
| 20CC | 19.37E1 | 32937.2 | 92.3967 | 15185E.2 | -239946.7 | -272615.8 | 26.2422 | -466055.1 | 29.7247 |
| 21CC | 19.4223 | 34877.2 | 93.3432 | 161143.6 | -2380C6.6 | -272796.8 | 24.8232 | -466111.8 | 27.2996 |
| 22CC | 19.46C9 | 36821.4 | 94.2477 | 17C523.5 | -236C62.4 | -272982.4 | 23.5322 | -466163.6 | 25.0946 |
| 23CC | 19.4548 | 38769.2 | 95.1135 | 179991.8 | -234114.6 | -273172.6 | 22.3529 | -466211.1 | 23.0812 |
| 24CC | 19.5247 | 4072C.3 | 95.9435 | 189545.C | -232163.6 | -278717.3 | 21.2525 | -466254.7 | 21.2353 |
| 25CC | 19.5513 | 42674.1 | 96.7414 | 195179.5 | -23C2C9.7 | -278917.5 | 20.237C | -466295.0 | 19.5370 |
| 26CC | 19.5749 | 4463C.4 | 97.5087 | 208892.3 | -228253.4 | -279118.6 | 19.2990 | -466332.2 | 17.9692 |
| 27CC | 19.5960 | 46589.C | 98.2475 | 218680.3 | -226294.8 | -279320.7 | 18.4297 | -466366.8 | 16.5174 |
| 28CC | 19.6150 | 48549.5 | 98.9605 | 228541.0 | -224334.3 | -279524.1 | 17.622C | -466399.0 | 15.1692 |
| 29CC | 19.6321 | 50511.9 | 99.6495 | 238471.7 | -222371.9 | -279729.0 | 16.8694 | -466429.0 | 13.9139 |
| 30CC | 19.6476 | 52475.5 | 100.3153 | 248470.1 | -220407.9 | -279935.4 | 16.1663 | -466457.1 | 12.7422 |
| 31CC | 19.6616 | 54441.4 | 10C.9598 | 258534.0 | -218442.4 | -280143.5 | 15.5085 | -466483.5 | 11.6461 |
| 32CC | 19.6744 | 564C8.2 | 101.5842 | 268661.4 | -216475.6 | -280353.4 | 14.8909 | -466508.3 | 10.6184 |
| 33CC | 19.6860 | 58376.2 | 102.1898 | 27885C.3 | -214507.6 | -280565.2 | 14.3107 | -466531.7 | 9.6529 |
| 34CC | 19.6967 | 6C345.4 | 102.7777 | 289C98.8 | -21253E.5 | -280775.C | 13.7640 | -466553.8 | 8.7442 |
| 35CC | 19.7064 | 62315.5 | 103.3488 | 2994C5.2 | -21C56E.3 | -280994.8 | 13.2480 | -466574.8 | 7.8874 |
| 36CC | 19.7154 | 64286.6 | 103.9C41 | 309768.0 | -208597.2 | -281212.7 | 12.7605 | -466594.8 | 7.0781 |
| 37CC | 19.7237 | 66258.6 | 104.4444 | 32C185.6 | -206625.2 | -281432.8 | 12.2991 | -466613.9 | 6.3126 |
| 38CC | 19.7313 | 68231.3 | 104.9705 | 33C656.4 | -204652.5 | -281655.1 | 11.8614 | -466632.2 | 5.5873 |
| 39CC | 19.7384 | 702C4.8 | 105.4831 | 341179.2 | -202679.0 | -281879.7 | 11.4459 | -466649.8 | 4.8991 |
| 40CC | 19.7450 | 72179.C | 105.9829 | 351752.6 | -200704.8 | -282106.6 | 11.0508 | -466666.8 | 4.2454 |
| 41CC | 19.7510 | 74153.8 | 106.4705 | 362375.4 | -198730.0 | -282335.9 | 10.6748 | -466683.4 | 3.6235 |
| 42CC | 19.7567 | 76129.2 | 106.9466 | 373046.3 | -196754.6 | -282567.5 | 10.3163 | -466699.6 | 3.0313 |
| 43CC | 19.7620 | 781C5.1 | 107.4115 | 383764.3 | -19477E.7 | -282801.5 | 9.9741 | -466715.5 | 2.4665 |
| 44CC | 19.7669 | 8C081.6 | 107.8659 | 394528.3 | -1928C2.2 | -283038.0 | 9.6474 | -466731.2 | 1.9274 |
| 45CC | 19.7715 | 82C58.5 | 108.3101 | 405337.1 | -190825.3 | -283277.0 | 9.3356 | -466746.9 | 1.4123 |
| 46CC | 19.7758 | 84C35.9 | 108.7448 | 416190.C | -188847.9 | -283518.5 | 9.0358 | -466762.5 | 0.9195 |
| 47CC | 19.7799 | 86C13.7 | 109.1701 | 427C85.8 | -18687C.2 | -283762.4 | 8.7489 | -466778.3 | 0.4477 |
| 48CC | 19.7837 | 87951.8 | 109.5866 | 438C23.7 | -184892.0 | -2840C9.C | 8.4739 | -466794.3 | -0.0045 |
| 49CC | 19.7872 | 8997C.4 | 109.9945 | 449002.E | -182913.4 | -284258.C | 8.2100 | -466810.7 | -0.4383 |
| 50CC | 19.7906 | 91949.3 | 110.3943 | 460C22.3 | -180934.5 | -2845C9.7 | 7.9562 | -466827.4 | -0.8547 |
| 51CC | 19.7938 | 93928.5 | 110.7863 | 471081.4 | -178955.3 | -284763.9 | 7.7124 | -466844.6 | -1.2547 |
| 52CC | 19.7967 | 959C8.C | 111.17C6 | 482179.3 | -176975.8 | -28502C.8 | 7.4776 | -466862.5 | -1.6395 |
| 53CC | 19.7996 | 97887.8 | 111.5478 | 493315.3 | -174596.0 | -28528C.2 | 7.2514 | -466881.1 | -2.0097 |
| 54CC | 19.8022 | 99867.9 | 111.9175 | 504488.7 | -173C15.9 | -285542.3 | 7.0335 | -466900.4 | -2.3662 |
| 55CC | 19.8047 | 101848.3 | 112.2813 | 515698.7 | -171035.5 | -285807.1 | 6.8233 | -466920.7 | -2.7097 |
| 56CC | 19.8071 | 1C3828.9 | 112.6381 | 526944.7 | -169C54.9 | -286074.5 | 6.6204 | -466942.0 | -3.0411 |
| 57CC | 19.8094 | 1C58C9.7 | 112.9887 | 538226.1 | -167C74.1 | -286344.5 | 6.4246 | -466964.5 | -3.3607 |
| 58CC | 19.8115 | 1C7790.8 | 113.3333 | 549542.2 | -165C93.1 | -286617.2 | 6.2351 | -466988.1 | -3.6694 |
| 59CC | 19.8136 | 1C9772.C | 113.672C | 560892.5 | -163111.8 | -286892.7 | 6.0520 | -467013.1 | -3.9677 |
| 60CC | 19.8155 | 111753.5 | 114.0C5C | 572276.4 | -16113C.3 | -28717C.8 | 5.8748 | -467039.4 | -4.2560 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(27) BFC1 (gas); molecular weight, 65.277

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| C | ----- | 0 | ----- | 0 | -79959.1 | -77515.9 | ----- | -258200.0 | ----- |
| 1CC | 8.3266 | 8C2.4 | 53.3474 | 4532.3 | -79156.7 | -77414.9 | 171.4423 | -258917.8 | 556.2357 |
| 2CC | 9.6258 | 1700.2 | 55.5180 | 10203.4 | -78256.9 | -77309.5 | 86.8975 | -259542.9 | 273.0453 |
| 298.15 | 10.6908 | 2699.5 | 62.5691 | 16253.6 | -77259.6 | -77259.6 | 59.0991 | -260068.4 | 179.6001 |
| 3CC | 10.7083 | 2719.3 | 63.6353 | 16371.3 | -77239.8 | -77259.1 | 58.7497 | -260077.5 | 178.4245 |
| 4CC | 11.5191 | 3832.8 | 66.8325 | 22900.4 | -76126.3 | -77271.8 | 44.6788 | -260531.5 | 131.0217 |
| 5CC | 12.1041 | 5015.6 | 65.4695 | 29719.4 | -74943.5 | -77327.7 | 36.2325 | -260918.6 | 102.5334 |
| 6CC | 12.5201 | 6248.0 | 71.7156 | 36781.4 | -73711.1 | -77406.4 | 30.5970 | -261252.4 | 83.5147 |
| 7CC | 12.8179 | 7515.7 | 73.6652 | 44052.8 | -72443.4 | -77503.1 | 26.5672 | -261544.5 | 69.9135 |
| 8CC | 13.0246 | 8808.9 | 75.3557 | 51507.7 | -71150.2 | -77615.7 | 23.5403 | -261803.9 | 59.7019 |
| 9CC | 13.1954 | 10120.7 | 76.9407 | 59125.9 | -69838.4 | -77747.4 | 21.1827 | -262037.7 | 51.7519 |
| 10CC | 13.3172 | 11446.6 | 78.3376 | 66890.9 | -68512.5 | -77857.2 | 19.2931 | -262251.2 | 45.3866 |
| 11CC | 13.4113 | 12783.3 | 79.6114 | 74789.3 | -67175.8 | -78066.4 | 17.7440 | -262448.5 | 40.1744 |
| 12CC | 13.4851 | 14128.2 | 80.7816 | 82809.7 | -65830.9 | -78255.0 | 16.4500 | -262632.6 | 35.8279 |
| 13CC | 13.5441 | 15479.8 | 81.8634 | 90942.7 | -64475.3 | -78460.4 | 15.3524 | -262806.0 | 32.1475 |
| 14CC | 13.5918 | 16836.7 | 82.8690 | 99179.9 | -63122.4 | -78679.9 | 14.4089 | -262970.4 | 28.9908 |
| 15CC | 13.6309 | 18197.9 | 83.8081 | 107514.3 | -61761.2 | -78910.6 | 13.5889 | -263127.4 | 26.2534 |
| 16CC | 13.6634 | 19562.6 | 84.6885 | 115939.6 | -60396.5 | -79151.1 | 12.8694 | -263278.2 | 23.8567 |
| 17CC | 13.6905 | 20930.4 | 85.5181 | 124450.3 | -59026.7 | -79400.3 | 12.2324 | -263423.7 | 21.7408 |
| 18CC | 13.7135 | 22300.6 | 86.3013 | 133041.6 | -57658.5 | -79657.5 | 11.6645 | -263564.6 | 19.8590 |
| 19CC | 13.7331 | 23673.0 | 87.0432 | 141709.2 | -56286.1 | -79922.2 | 11.1547 | -263701.6 | 18.1744 |
| 20CC | 13.7500 | 25047.1 | 87.7481 | 150449.1 | -54912.0 | -80193.4 | 10.6943 | -263835.1 | 16.6574 |
| 21CC | 13.7645 | 26422.9 | 88.4193 | 159257.7 | -53536.2 | -80470.9 | 10.2763 | -263965.8 | 15.2843 |
| 22CC | 13.7772 | 27800.0 | 89.0600 | 168131.9 | -52159.1 | -80753.9 | 9.8949 | -264093.8 | 14.0353 |
| 23CC | 13.7884 | 29178.3 | 89.6726 | 177068.8 | -50780.8 | -81042.2 | 9.5456 | -264219.6 | 12.8945 |
| 24CC | 13.7982 | 30557.6 | 90.2597 | 186065.6 | -49401.5 | -81330.5 | 9.2057 | -264343.3 | 11.8482 |
| 25CC | 13.8068 | 31927.9 | 90.8231 | 195119.9 | -48021.2 | -81618.6 | 8.8895 | -264465.2 | 10.8851 |
| 26CC | 13.8145 | 33319.0 | 91.3648 | 204229.5 | -46640.1 | -81906.6 | 8.5965 | -264585.5 | 9.9957 |
| 27CC | 13.8214 | 34700.8 | 91.8863 | 213392.2 | -45258.3 | -82194.7 | 8.3244 | -264704.3 | 9.1719 |
| 28CC | 13.8276 | 36083.2 | 92.3890 | 222606.1 | -43875.9 | -82482.8 | 8.0707 | -264821.9 | 8.4065 |
| 29CC | 13.8332 | 37466.3 | 92.8744 | 231869.4 | -42492.8 | -82770.9 | 7.8338 | -264938.3 | 7.6936 |
| 30CC | 13.8382 | 38849.8 | 93.3434 | 241180.4 | -41109.3 | -83059.0 | 7.6117 | -265053.6 | 7.0280 |
| 31CC | 13.8428 | 40233.9 | 93.7972 | 250537.6 | -39725.2 | -83347.1 | 7.4036 | -265168.0 | 6.4050 |
| 3200 | 13.8469 | 41618.4 | 94.2366 | 259939.4 | -38340.7 | -83635.2 | 7.2074 | -265281.6 | 5.8207 |
| 3300 | 13.8507 | 43003.3 | 94.6630 | 269384.5 | -36955.8 | -83923.3 | 7.0229 | -265394.4 | 5.2716 |
| 3400 | 13.8541 | 44388.5 | 95.0765 | 278871.6 | -35570.6 | -84211.4 | 6.8484 | -265506.5 | 4.7546 |
| 3500 | 13.8573 | 45774.1 | 95.4781 | 288399.4 | -34185.0 | -84500.0 | 6.6882 | -265618.1 | 4.2669 |
| 3600 | 13.8602 | 47159.9 | 95.8685 | 297966.8 | -32795.2 | -84788.1 | 6.5268 | -265729.1 | 3.8061 |
| 3700 | 13.8629 | 48546.1 | 96.2483 | 307572.8 | -31413.0 | -85076.2 | 6.3785 | -265839.7 | 3.3700 |
| 3800 | 13.8653 | 49932.5 | 96.6181 | 317216.2 | -30026.6 | -85364.3 | 6.2373 | -265949.9 | 2.9567 |
| 3900 | 13.8676 | 51319.2 | 96.9783 | 326896.1 | -28639.9 | -85652.4 | 6.1029 | -266059.9 | 2.5645 |
| 4000 | 13.8697 | 52706.0 | 97.3294 | 336611.5 | -27253.1 | -85940.5 | 5.9747 | -266169.6 | 2.1917 |
| 4100 | 13.8717 | 54093.1 | 97.6715 | 346361.6 | -25866.0 | -86228.6 | 5.8525 | -266279.2 | 1.8369 |
| 4200 | 13.8735 | 55480.4 | 98.0062 | 356145.6 | -24478.7 | -86516.7 | 5.7355 | -266388.7 | 1.4989 |
| 4300 | 13.8752 | 56867.8 | 98.3327 | 365962.6 | -23091.3 | -86804.8 | 5.6236 | -266498.2 | 1.1765 |
| 4400 | 13.8768 | 58255.4 | 98.6517 | 375811.9 | -21703.7 | -87092.9 | 5.5166 | -266607.8 | 0.8686 |
| 4500 | 13.8783 | 59643.2 | 98.9635 | 385692.7 | -20315.9 | -87381.0 | 5.4140 | -266717.6 | 0.5743 |
| 4600 | 13.8797 | 61031.1 | 99.2686 | 395604.4 | -18928.0 | -87669.1 | 5.3154 | -266827.6 | 0.2926 |
| 4700 | 13.8810 | 62419.1 | 99.5671 | 405546.2 | -17540.0 | -87957.2 | 5.2205 | -266938.0 | 0.0229 |
| 4800 | 13.8822 | 63807.3 | 99.8592 | 415517.6 | -16151.8 | -88245.3 | 5.1294 | -267048.8 | -0.2358 |
| 4900 | 13.8834 | 65195.6 | 100.1456 | 425517.9 | -14763.5 | -88533.4 | 5.0418 | -267160.1 | -0.4840 |
| 5000 | 13.8845 | 66584.0 | 100.4261 | 435546.5 | -13375.1 | -88821.5 | 4.9572 | -267271.9 | -0.7223 |
| 5100 | 13.8855 | 67972.5 | 100.7011 | 445602.9 | -11986.6 | -89109.6 | 4.8759 | -267384.5 | -0.9514 |
| 5200 | 13.8864 | 69361.1 | 100.9707 | 455686.5 | -10598.0 | -89397.7 | 4.7972 | -267497.8 | -1.1718 |
| 5300 | 13.8874 | 70749.7 | 101.2352 | 465796.9 | -9209.4 | -89685.8 | 4.7213 | -267612.0 | -1.3840 |
| 5400 | 13.8882 | 72138.5 | 101.4946 | 475933.4 | -7820.6 | -89973.9 | 4.6480 | -267727.2 | -1.5884 |
| 5500 | 13.8890 | 73527.4 | 101.7490 | 486095.7 | -6431.7 | -90262.0 | 4.5770 | -267843.4 | -1.7854 |
| 5600 | 13.8898 | 74916.3 | 101.9995 | 496283.2 | -5042.8 | -90550.1 | 4.5084 | -267960.7 | -1.9755 |
| 5700 | 13.8905 | 76305.3 | 102.2458 | 506495.5 | -3653.8 | -90838.2 | 4.4421 | -268079.3 | -2.1590 |
| 5800 | 13.8912 | 77694.4 | 102.4874 | 516732.2 | -2264.7 | -91126.3 | 4.3776 | -268199.2 | -2.3362 |
| 5900 | 13.8919 | 79083.6 | 102.7248 | 526992.9 | -875.5 | -91414.4 | 4.3152 | -268320.5 | -2.5076 |
| 6000 | 13.8925 | 80472.8 | 102.9583 | 537277.0 | 513.7 | -91702.5 | 4.2546 | -268443.3 | -2.6732 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(28) BH (gas); molecular weight, 11.828

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| C | ----- | 0 | ----- | 0 | 114905.5 | 116209.1 | ----- | -69200.0 | ----- |
| 1CC | 6.5616 | 684.4 | 33.4382 | 2659.4 | 115589.9 | 116507.9 | -249.9907 | -69537.3 | 147.6529 |
| 2CC | 6.9655 | 1380.7 | 38.2647 | 6272.2 | 116286.2 | 116823.0 | -122.5348 | -69835.9 | 71.5435 |
| 258.15 | 6.9743 | 2064.7 | 41.0471 | 10173.5 | 116970.2 | 116970.2 | -80.4837 | -70127.5 | 46.3772 |
| 3CC | 6.9746 | 2077.6 | 41.0902 | 10249.5 | 116983.1 | 116971.9 | -79.9552 | -70133.0 | 46.0602 |
| 4CC | 7.0139 | 2776.6 | 43.1010 | 14463.7 | 117682.2 | 116997.2 | -58.6499 | -70427.8 | 33.2635 |
| 5CC | 7.1081 | 3482.3 | 44.6751 | 18855.3 | 118387.8 | 116944.5 | -45.8680 | -70715.9 | 25.5532 |
| 6CC | 7.2515 | 4199.9 | 45.9832 | 23390.0 | 119105.5 | 116851.2 | -37.3519 | -70992.0 | 20.3923 |
| 7CC | 7.4220 | 4933.5 | 47.1136 | 28046.1 | 119839.0 | 116733.6 | -31.2744 | -71252.1 | 16.6919 |
| 8CC | 7.5990 | 5684.5 | 48.1162 | 32808.5 | 120590.1 | 116600.9 | -26.7216 | -71494.7 | 13.9067 |
| 9CC | 7.7695 | 6453.0 | 49.0212 | 37666.1 | 121358.6 | 116452.9 | -23.1844 | -71719.9 | 11.7333 |
| 10CC | 7.9269 | 7238.0 | 49.8481 | 42610.1 | 122143.5 | 116291.8 | -20.3583 | -71928.6 | 9.9893 |
| 11CC | 8.0688 | 8037.9 | 50.6104 | 47633.5 | 122943.4 | 116116.5 | -18.0497 | -72122.3 | 8.5584 |
| 12CC | 8.1954 | 8851.2 | 51.3180 | 52730.4 | 123756.8 | 115926.4 | -16.1288 | -72302.6 | 7.3629 |
| 13CC | 8.3076 | 9676.5 | 51.9785 | 57895.6 | 124582.0 | 115723.5 | -14.5060 | -72471.0 | 6.3488 |
| 14CC | 8.4072 | 10512.3 | 52.5979 | 63124.7 | 125417.9 | 115509.8 | -13.1180 | -72628.8 | 5.4777 |
| 15CC | 8.4956 | 11357.6 | 53.1810 | 68413.9 | 126263.1 | 115287.4 | -11.9170 | -72777.2 | 4.7211 |
| 16CC | 8.5744 | 12211.1 | 53.7316 | 73759.8 | 127116.7 | 115057.4 | -10.8681 | -72917.3 | 4.0578 |
| 17CC | 8.6451 | 13072.2 | 54.2538 | 79159.3 | 127977.7 | 114820.9 | -9.9446 | -73049.9 | 3.4714 |
| 1800 | 8.7087 | 13939.9 | 54.7498 | 84609.7 | 128845.5 | 114578.4 | -9.1254 | -73175.8 | 2.9492 |
| 19CC | 8.7664 | 14813.7 | 55.2222 | 90108.5 | 129719.3 | 114329.6 | -8.3939 | -73295.6 | 2.4813 |
| 20CC | 8.8189 | 15693.0 | 55.6732 | 95653.4 | 130598.6 | 114075.5 | -7.7372 | -73410.0 | 2.0594 |
| 21CC | 8.8671 | 16577.4 | 56.1047 | 101242.5 | 131482.9 | 113816.5 | -7.1443 | -73519.2 | 1.6772 |
| 22CC | 8.9115 | 17466.3 | 56.5182 | 106873.8 | 132371.9 | 113553.3 | -6.6067 | -73623.9 | 1.3291 |
| 23CC | 8.9526 | 18359.5 | 56.9153 | 112545.6 | 133265.1 | 113285.8 | -6.1166 | -73724.3 | 1.0110 |
| 24CC | 8.9908 | 19256.7 | 57.2971 | 118256.3 | 134162.3 | 113064.6 | -5.6873 | -73820.8 | 0.7189 |
| 25CC | 9.0267 | 20157.6 | 57.6645 | 124004.5 | 135063.2 | 112858.9 | -5.2955 | -73913.5 | 0.4498 |
| 26CC | 9.0604 | 21062.0 | 58.0196 | 129788.9 | 135967.5 | 112711.3 | -4.9349 | -74002.8 | 0.2012 |
| 27CC | 9.0922 | 21969.6 | 58.3621 | 135608.1 | 136875.2 | 112583.1 | -4.6018 | -74088.8 | -0.0293 |
| 28CC | 9.1224 | 22880.4 | 58.6933 | 141460.9 | 137785.9 | 112462.8 | -4.2935 | -74171.7 | -0.2436 |
| 29CC | 9.1511 | 23794.1 | 59.0135 | 147346.4 | 138699.6 | 112348.7 | -4.0070 | -74251.7 | -0.4433 |
| 30CC | 9.1785 | 24710.6 | 59.3246 | 153263.4 | 139616.1 | 112240.6 | -3.7404 | -74328.9 | -0.6300 |
| 31CC | 9.2049 | 25629.7 | 59.6260 | 159211.0 | 140535.3 | 112137.2 | -3.4915 | -74403.5 | -0.8047 |
| 32CC | 9.2302 | 26551.5 | 59.9187 | 165188.3 | 141457.0 | 112036.8 | -3.2591 | -74475.5 | -0.9687 |
| 33CC | 9.2546 | 27475.7 | 60.2031 | 171194.4 | 142381.3 | 111938.6 | -3.0409 | -74545.1 | -1.1229 |
| 34CC | 9.2782 | 28402.4 | 60.4797 | 177228.7 | 143307.9 | 111841.0 | -2.8363 | -74612.3 | -1.2682 |
| 35CC | 9.3011 | 29331.4 | 60.7490 | 183290.1 | 144236.9 | 111743.7 | -2.6441 | -74677.3 | -1.4052 |
| 36CC | 9.3233 | 30262.6 | 61.0112 | 189378.2 | 145168.1 | 111646.9 | -2.4626 | -74740.2 | -1.5348 |
| 37CC | 9.3450 | 31196.0 | 61.2671 | 195492.2 | 146101.5 | 111550.6 | -2.2916 | -74801.0 | -1.6575 |
| 38CC | 9.3661 | 32131.5 | 61.5166 | 201631.4 | 147037.1 | 111454.8 | -2.1300 | -74859.9 | -1.7738 |
| 39CC | 9.3867 | 33069.2 | 61.7601 | 207795.3 | 147974.7 | 111359.3 | -1.9774 | -74916.8 | -1.8842 |
| 40CC | 9.4070 | 34008.9 | 61.9980 | 213983.3 | 148914.4 | 111264.6 | -1.8324 | -74972.0 | -1.9892 |
| 41CC | 9.4268 | 34950.6 | 62.2306 | 220194.7 | 149856.1 | 111170.4 | -1.6951 | -75025.5 | -2.0892 |
| 42CC | 9.4462 | 35894.2 | 62.4580 | 226429.2 | 150799.8 | 111077.5 | -1.5644 | -75077.3 | -2.1844 |
| 43CC | 9.4654 | 36839.8 | 62.6805 | 232686.2 | 151745.3 | 110985.7 | -1.4404 | -75127.6 | -2.2753 |
| 44CC | 9.4842 | 37787.3 | 62.8983 | 238965.1 | 152692.8 | 110894.2 | -1.3222 | -75176.4 | -2.3621 |
| 45CC | 9.5028 | 38736.6 | 63.1116 | 245265.7 | 153642.2 | 110803.4 | -1.2095 | -75223.8 | -2.4451 |
| 46CC | 9.5211 | 39687.8 | 63.3207 | 251587.3 | 154593.4 | 110713.0 | -1.1022 | -75270.0 | -2.5245 |
| 47CC | 9.5391 | 40640.8 | 63.5256 | 257929.7 | 155546.4 | 110623.1 | -0.9998 | -75314.9 | -2.6007 |
| 48CC | 9.5570 | 41595.7 | 63.7267 | 264292.3 | 156501.2 | 110533.6 | -0.9017 | -75358.8 | -2.6736 |
| 49CC | 9.5747 | 42552.2 | 63.9235 | 270674.9 | 157457.8 | 110444.6 | -0.8079 | -75401.6 | -2.7437 |
| 50CC | 9.5921 | 43510.6 | 64.1175 | 277077.0 | 158416.1 | 110356.1 | -0.7183 | -75443.5 | -2.8109 |
| 51CC | 9.6094 | 44470.7 | 64.3076 | 283498.3 | 159376.2 | 110268.0 | -0.6321 | -75484.6 | -2.8756 |
| 52CC | 9.6266 | 45432.5 | 64.4944 | 289938.4 | 160338.0 | 110180.5 | -0.5498 | -75524.9 | -2.9378 |
| 53CC | 9.6436 | 46396.0 | 64.6775 | 296397.0 | 161301.5 | 110093.6 | -0.4709 | -75564.6 | -2.9977 |
| 54CC | 9.6605 | 47361.2 | 64.8583 | 302873.9 | 162266.7 | 110007.1 | -0.3946 | -75603.7 | -3.0555 |
| 55CC | 9.6772 | 48328.1 | 65.0358 | 309368.6 | 163233.6 | 109921.1 | -0.3218 | -75642.4 | -3.1111 |
| 56CC | 9.6938 | 49296.6 | 65.2103 | 315880.9 | 164202.2 | 109835.6 | -0.2515 | -75680.7 | -3.1648 |
| 57CC | 9.7104 | 50266.8 | 65.3820 | 322410.6 | 165172.4 | 109750.6 | -0.1838 | -75718.3 | -3.2166 |
| 58CC | 9.7268 | 51238.7 | 65.5510 | 328957.2 | 166144.2 | 109666.1 | -0.1190 | -75756.7 | -3.2667 |
| 59CC | 9.7431 | 52212.2 | 65.7174 | 335520.7 | 167117.7 | 109582.1 | -0.0562 | -75794.5 | -3.3151 |
| 60CC | 9.7593 | 53187.3 | 65.8812 | 342100.6 | 168092.8 | 109498.6 | 0.0041 | -75832.3 | -3.3619 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(29) BH₃ (gas); molecular weight, 13.844

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| C | ----- | 0 | ----- | 0 | 15579.1 | 18906.5 | ----- | -269759.5 | ----- |
| 100 | 7.5516 | 754.9 | 35.9836 | 2803.4 | 16374.0 | 18556.9 | -40.7024 | -270979.9 | 578.8400 |
| 200 | 8.1588 | 1557.0 | 41.5355 | 6710.1 | 17176.1 | 18374.9 | -20.4791 | -272166.3 | 282.2385 |
| 298.15 | 8.6573 | 2420.9 | 44.8806 | 10960.2 | 18000.0 | 18000.0 | -13.9224 | -273293.2 | 184.1597 |
| 300 | 8.6660 | 2437.0 | 44.9342 | 11043.3 | 18016.0 | 17992.0 | -13.8415 | -273314.0 | 182.9244 |
| 400 | 9.3045 | 3334.7 | 47.5123 | 15670.3 | 18913.7 | 17521.4 | -10.6041 | -274403.8 | 133.0588 |
| 500 | 10.0477 | 4301.5 | 49.6667 | 20531.9 | 19880.5 | 17031.4 | -8.7143 | -275424.3 | 103.0225 |
| 600 | 10.8630 | 5346.6 | 51.5695 | 25595.3 | 20925.7 | 16565.5 | -7.4896 | -276366.5 | 82.9261 |
| 700 | 11.6584 | 6474.7 | 53.3073 | 30840.3 | 22053.8 | 16140.3 | -6.6383 | -277225.7 | 68.5243 |
| 800 | 12.5096 | 7685.5 | 54.9228 | 36252.7 | 23264.5 | 15761.7 | -6.0159 | -278002.3 | 57.6908 |
| 900 | 13.2676 | 8974.9 | 56.4406 | 41821.7 | 24553.9 | 15423.4 | -5.5422 | -278700.2 | 49.2423 |
| 1000 | 13.9576 | 10336.7 | 57.8748 | 47538.1 | 25915.8 | 15121.1 | -5.1707 | -279325.6 | 42.4674 |
| 1100 | 14.5751 | 11764.0 | 59.2346 | 53354.1 | 27343.0 | 14846.7 | -4.8734 | -279885.7 | 36.9125 |
| 1200 | 15.1219 | 13249.4 | 60.5268 | 59382.8 | 28828.4 | 14593.1 | -4.6297 | -280387.5 | 32.2746 |
| 1300 | 15.6033 | 14786.2 | 61.7566 | 65497.4 | 30365.2 | 14355.9 | -4.4265 | -280838.0 | 28.3436 |
| 1400 | 16.0257 | 16368.1 | 62.9287 | 71732.1 | 31947.1 | 14132.2 | -4.2563 | -281243.4 | 24.9689 |
| 1500 | 16.3961 | 17989.6 | 64.0473 | 78081.4 | 33568.6 | 13918.9 | -4.1101 | -281609.2 | 22.0403 |
| 1600 | 16.7210 | 19645.8 | 65.1161 | 84539.9 | 35224.8 | 13714.2 | -3.9839 | -281940.2 | 19.4745 |
| 1700 | 17.0066 | 21332.5 | 66.1385 | 91103.1 | 36911.5 | 13516.2 | -3.8745 | -282240.8 | 17.2080 |
| 1800 | 17.2582 | 23046.0 | 67.1179 | 97766.2 | 38625.0 | 13323.4 | -3.7786 | -282514.6 | 15.1913 |
| 1900 | 17.4803 | 24783.1 | 68.0571 | 104525.3 | 40362.2 | 13131.6 | -3.6939 | -282764.7 | 13.3853 |
| 2000 | 17.6771 | 26541.2 | 68.9588 | 111376.4 | 42120.2 | 12941.1 | -3.6192 | -282993.9 | 11.7584 |
| 2100 | 17.8519 | 28317.8 | 69.8256 | 118315.9 | 43896.9 | 12750.7 | -3.5522 | -283204.5 | 10.2854 |
| 2200 | 18.0077 | 30110.9 | 70.6597 | 125340.4 | 45690.0 | 12560.2 | -3.4927 | -283398.6 | 8.9453 |
| 2300 | 18.1470 | 31918.8 | 71.4633 | 132446.8 | 47497.9 | 12368.0 | -3.4383 | -283578.0 | 7.7209 |
| 2400 | 18.2719 | 33739.9 | 72.2383 | 139632.1 | 49318.9 | 12184.2 | -3.4087 | -283744.2 | 6.5979 |
| 2500 | 18.3843 | 35572.8 | 72.9865 | 146893.6 | 51151.8 | 12011.1 | -3.3840 | -283898.6 | 5.5641 |
| 2600 | 18.4856 | 37416.4 | 73.7096 | 154228.6 | 52995.4 | 11841.1 | -3.3622 | -284042.3 | 4.6093 |
| 2700 | 18.5773 | 39269.6 | 74.4090 | 161634.7 | 54848.6 | 11674.4 | -3.3422 | -284176.4 | 3.7249 |
| 2800 | 18.6604 | 41131.5 | 75.0861 | 169109.6 | 56710.6 | 11516.6 | -3.3248 | -284301.7 | 2.9032 |
| 2900 | 18.7260 | 43001.4 | 75.7423 | 176651.2 | 58580.5 | 11362.2 | -3.3088 | -284419.1 | 2.1379 |
| 3000 | 18.8050 | 44878.5 | 76.3787 | 184257.4 | 60457.6 | 11211.1 | -3.2941 | -284529.3 | 1.4233 |
| 3100 | 18.8880 | 46762.2 | 76.9963 | 191926.3 | 62341.3 | 11061.1 | -3.2810 | -284633.0 | 0.7546 |
| 3200 | 18.9257 | 48651.5 | 77.5963 | 199656.1 | 64231.0 | 10911.1 | -3.2695 | -284730.7 | 0.1274 |
| 3300 | 18.9787 | 50547.2 | 78.1795 | 207445.0 | 66126.3 | 10761.1 | -3.2586 | -284822.9 | -0.4619 |
| 3400 | 19.0275 | 52447.5 | 78.7468 | 215291.5 | 68026.6 | 10611.1 | -3.2491 | -284910.0 | -1.0168 |
| 3500 | 19.0724 | 54352.6 | 79.2990 | 223193.9 | 69931.6 | 10461.1 | -3.2406 | -284992.6 | -1.5401 |
| 3600 | 19.1139 | 56261.9 | 79.8369 | 231150.8 | 71841.0 | 10311.1 | -3.2324 | -285071.0 | -2.0344 |
| 3700 | 19.1524 | 58175.2 | 80.3611 | 239160.8 | 73754.3 | 10161.1 | -3.2254 | -285145.5 | -2.5022 |
| 3800 | 19.1880 | 60092.3 | 80.8723 | 247222.6 | 75671.3 | 10011.1 | -3.2190 | -285216.5 | -2.9455 |
| 3900 | 19.2211 | 62012.8 | 81.3712 | 255334.9 | 77591.8 | 9861.1 | -3.2139 | -285284.3 | -3.3661 |
| 4000 | 19.2519 | 63936.4 | 81.8582 | 263496.4 | 79515.5 | 9711.1 | -3.2082 | -285349.1 | -3.7658 |
| 4100 | 19.2805 | 65863.1 | 82.3335 | 271706.1 | 81442.1 | 9561.1 | -3.2041 | -285411.3 | -4.1461 |
| 4200 | 19.3073 | 67792.5 | 82.7989 | 279962.8 | 83371.5 | 9411.1 | -3.1994 | -285471.0 | -4.5084 |
| 4300 | 19.3323 | 69724.5 | 83.2535 | 288265.5 | 85303.5 | 9261.1 | -3.1960 | -285528.5 | -4.8538 |
| 4400 | 19.3557 | 71658.9 | 83.6982 | 296613.2 | 87237.9 | 9111.1 | -3.1929 | -285584.0 | -5.1837 |
| 4500 | 19.3777 | 73595.6 | 84.1334 | 305004.9 | 89174.6 | 8961.1 | -3.1902 | -285637.7 | -5.4989 |
| 4600 | 19.3982 | 75534.4 | 84.5596 | 313439.6 | 91112.4 | 8811.1 | -3.1880 | -285689.9 | -5.8005 |
| 4700 | 19.4176 | 77475.2 | 84.9765 | 321916.5 | 93054.2 | 8661.1 | -3.1861 | -285740.7 | -6.0893 |
| 4800 | 19.4358 | 79417.8 | 85.3855 | 330434.7 | 94996.9 | 8511.1 | -3.1842 | -285790.3 | -6.3661 |
| 4900 | 19.4529 | 81362.3 | 85.7865 | 338993.4 | 96941.3 | 8361.1 | -3.1830 | -285838.9 | -6.6317 |
| 5000 | 19.4691 | 83308.4 | 86.1800 | 347591.8 | 98887.5 | 8211.1 | -3.1821 | -285886.7 | -6.8867 |
| 5100 | 19.4843 | 85256.1 | 86.5657 | 356229.2 | 100835.1 | 8061.1 | -3.1810 | -285933.8 | -7.1317 |
| 5200 | 19.4987 | 87205.2 | 86.9442 | 364904.7 | 102784.3 | 7911.1 | -3.1806 | -285980.4 | -7.3674 |
| 5300 | 19.5124 | 89155.8 | 87.3158 | 373617.8 | 104734.9 | 7761.1 | -3.1808 | -286026.6 | -7.5941 |
| 5400 | 19.5253 | 91107.7 | 87.6806 | 382367.7 | 106686.7 | 7611.1 | -3.1800 | -286072.7 | -7.8126 |
| 5500 | 19.5375 | 93060.8 | 88.0390 | 391153.7 | 108635.9 | 7461.1 | -3.1805 | -286118.8 | -8.0231 |
| 5600 | 19.5491 | 95015.2 | 88.3911 | 399975.3 | 110594.2 | 7311.1 | -3.1807 | -286164.9 | -8.2261 |
| 5700 | 19.5601 | 96970.6 | 88.7372 | 408831.7 | 112549.7 | 7161.1 | -3.1811 | -286211.4 | -8.4221 |
| 5800 | 19.5705 | 98927.2 | 89.0775 | 417722.5 | 114506.2 | 7011.1 | -3.1821 | -286258.2 | -8.6113 |
| 5900 | 19.5805 | 100884.7 | 89.4122 | 426647.0 | 116463.8 | 6861.1 | -3.1826 | -286305.6 | -8.7941 |
| 6000 | 19.5900 | 102843.2 | 89.7413 | 435604.8 | 118422.3 | 6711.1 | -3.1841 | -286353.7 | -8.9709 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(30) BN (gas); molecular weight, 24.828

| T , °K | C_p^0 , cal/mole °K | $H_T^0 - H_0^0$, cal/mole | S_T^0 , cal/mole °K | $-(F_T^0 - H_0^0)$, cal/mole | H_T^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| C | ----- | 0 | ----- | 0 | 152732.4 | 154060.2 | ----- | -92300.0 | ----- |
| 1CC | 6.9571 | 694.0 | 43.0957 | 3615.5 | 153426.4 | 154401.3 | -332.1981 | -92627.7 | 198.2096 |
| 2CC | 6.9636 | 1389.9 | 47.9189 | 8193.9 | 154122.3 | 154669.5 | -163.3610 | -92926.7 | 96.8692 |
| 29B.15 | 7.0369 | 2076.0 | 50.7093 | 12042.9 | 154808.4 | 154808.4 | -107.6982 | -93216.2 | 63.3970 |
| 3CC | 7.0394 | 2089.1 | 50.7528 | 13136.8 | 154821.4 | 154810.1 | -106.9986 | -93221.5 | 62.9756 |
| 4CC | 7.2325 | 2801.9 | 52.8020 | 18319.0 | 155534.2 | 154847.9 | -78.8015 | -93502.6 | 45.9750 |
| 5CC | 7.4625 | 3537.4 | 54.4424 | 23683.8 | 156269.8 | 154823.1 | -61.8824 | -93760.7 | 35.7448 |
| 6CC | 7.7278 | 4258.2 | 55.8287 | 29199.0 | 157030.5 | 154766.3 | -50.6058 | -93993.7 | 28.9065 |
| 7CC | 7.9421 | 5081.9 | 57.0365 | 34843.6 | 157814.3 | 154686.5 | -42.5545 | -94203.6 | 24.0104 |
| 8CC | 8.1203 | 5885.4 | 58.1090 | 40601.9 | 158617.7 | 154587.3 | -36.5199 | -94393.9 | 20.3306 |
| 9CC | 8.2661 | 6704.9 | 59.0742 | 46461.8 | 159437.3 | 154466.3 | -31.8294 | -94568.0 | 17.4629 |
| 10CC | 8.3851 | 7537.7 | 59.9514 | 52413.8 | 160270.1 | 154324.9 | -28.0802 | -94728.9 | 15.1646 |
| 11CC | 8.4827 | 8381.2 | 60.7554 | 58449.7 | 161113.6 | 154162.3 | -25.0157 | -94879.0 | 13.2812 |
| 12CC | 8.5636 | 9233.7 | 61.4970 | 64562.8 | 161966.1 | 153979.0 | -22.4648 | -95020.2 | 11.7092 |
| 1300 | 8.6313 | 10053.5 | 62.1852 | 70747.3 | 162825.9 | 153778.0 | -20.3090 | -95154.0 | 10.3772 |
| 1400 | 8.6686 | 10959.6 | 62.8270 | 76998.3 | 163692.0 | 153562.3 | -18.4639 | -95281.6 | 9.2338 |
| 15CC | 8.7376 | 11831.0 | 63.4282 | 83311.3 | 164563.3 | 153335.2 | -16.8670 | -95403.8 | 8.2417 |
| 16CC | 8.7801 | 12706.9 | 63.9935 | 89682.7 | 165439.3 | 153098.2 | -15.4717 | -95521.5 | 7.3724 |
| 17CC | 8.8172 | 13586.8 | 64.5269 | 96109.0 | 166319.2 | 152852.9 | -14.2426 | -95635.3 | 6.6045 |
| 18CC | 8.8500 | 14470.2 | 65.0318 | 102587.1 | 167202.6 | 152600.0 | -13.1518 | -95745.6 | 5.9211 |
| 19CC | 8.8793 | 15356.7 | 65.5111 | 109114.5 | 168089.1 | 152340.5 | -12.1775 | -95852.7 | 5.3089 |
| 20CC | 8.9056 | 16245.9 | 65.9673 | 115688.6 | 168978.3 | 152075.2 | -11.3021 | -95957.2 | 4.7574 |
| 21CC | 8.9295 | 17137.7 | 66.4024 | 122307.2 | 169870.1 | 151804.8 | -10.5115 | -96059.2 | 4.2578 |
| 22CC | 8.9514 | 18031.8 | 66.8183 | 128968.4 | 170764.2 | 151529.9 | -9.7942 | -96159.0 | 3.8032 |
| 2300 | 8.9715 | 18927.9 | 67.2166 | 135670.3 | 171660.3 | 151251.1 | -9.1402 | -96256.8 | 3.3877 |
| 24CC | 8.9902 | 19826.0 | 67.5985 | 142411.2 | 172558.4 | 145618.5 | -8.5605 | -96352.9 | 3.0064 |
| 25CC | 9.0077 | 20725.9 | 67.9662 | 149189.6 | 173458.3 | 145331.7 | -8.0306 | -96447.4 | 2.6553 |
| 26CC | 9.0241 | 21627.5 | 68.3198 | 156004.0 | 174359.9 | 145045.4 | -7.5424 | -96540.6 | 2.3309 |
| 27CC | 9.0396 | 22530.7 | 68.6607 | 162853.1 | 175263.1 | 144759.6 | -7.0913 | -96632.6 | 2.0302 |
| 2800 | 9.0544 | 23435.4 | 68.9897 | 169735.7 | 176167.8 | 144474.3 | -6.6733 | -96723.8 | 1.7507 |
| 29CC | 9.0685 | 24341.6 | 69.3077 | 176650.7 | 177074.0 | 144189.6 | -6.2848 | -96814.2 | 1.4903 |
| 30CC | 9.0820 | 25249.1 | 69.6153 | 183596.9 | 177981.5 | 143905.4 | -5.9231 | -96904.1 | 1.2470 |
| 31CC | 9.0951 | 26158.0 | 69.9134 | 190573.4 | 178890.4 | 143621.7 | -5.5851 | -96993.7 | 1.0192 |
| 3200 | 9.1078 | 27068.1 | 70.2023 | 197579.3 | 179800.5 | 143338.6 | -5.2692 | -97083.3 | 0.8054 |
| 33CC | 9.1203 | 27979.5 | 70.4826 | 204613.6 | 180711.9 | 143056.1 | -4.9726 | -97173.1 | 0.6044 |
| 34CC | 9.1324 | 28892.2 | 70.7552 | 211675.6 | 181624.5 | 142774.1 | -4.6943 | -97263.3 | 0.4150 |
| 35CC | 9.1445 | 29806.0 | 71.0201 | 218764.4 | 182536.4 | 142492.8 | -4.4325 | -97354.2 | 0.2363 |
| 36CC | 9.1564 | 30721.1 | 71.2775 | 225879.4 | 183453.4 | 142212.1 | -4.1855 | -97446.1 | 0.0674 |
| 37CC | 9.1683 | 31637.3 | 71.5285 | 233019.8 | 184369.7 | 141932.0 | -3.9523 | -97539.1 | -0.0926 |
| 38CC | 9.1801 | 32554.7 | 71.7736 | 240185.0 | 185287.1 | 141652.6 | -3.7319 | -97633.5 | -0.2443 |
| 39CC | 9.1921 | 33473.3 | 72.0122 | 247374.3 | 186205.7 | 141374.0 | -3.5233 | -97729.6 | -0.3883 |
| 40CC | 9.2041 | 34393.1 | 72.2451 | 254587.2 | 187125.5 | 141096.0 | -3.3254 | -97827.6 | -0.5253 |
| 41CC | 9.2163 | 35314.1 | 72.4725 | 261823.1 | 188046.5 | 140818.9 | -3.1376 | -97927.7 | -0.6557 |
| 42CC | 9.2286 | 36236.4 | 72.6947 | 269081.5 | 188968.8 | 140542.5 | -2.9591 | -98030.2 | -0.7800 |
| 4300 | 9.2412 | 37159.9 | 72.9120 | 276361.9 | 189892.3 | 140267.0 | -2.7893 | -98135.3 | -0.8987 |
| 44CC | 9.2540 | 38084.6 | 73.1246 | 283663.8 | 190817.0 | 139992.3 | -2.6273 | -98243.3 | -1.0121 |
| 45CC | 9.2672 | 39010.7 | 73.3328 | 290986.7 | 191743.1 | 139718.6 | -2.4729 | -98354.2 | -1.1206 |
| 46CC | 9.2806 | 39938.1 | 73.5366 | 298330.2 | 192670.5 | 139445.8 | -2.3255 | -98468.4 | -1.2245 |
| 4700 | 9.2943 | 40866.8 | 73.7363 | 305693.9 | 193599.2 | 139174.0 | -2.1849 | -98586.0 | -1.3241 |
| 48CC | 9.3084 | 41797.0 | 73.9321 | 313077.3 | 194529.3 | 138903.3 | -2.0502 | -98707.2 | -1.4197 |
| 49CC | 9.3229 | 42728.5 | 74.1242 | 320480.2 | 195460.9 | 138633.7 | -1.9211 | -98832.1 | -1.5115 |
| 50CC | 9.3378 | 43661.6 | 74.3127 | 327902.0 | 196393.9 | 138365.2 | -1.7977 | -98961.0 | -1.5997 |
| 51CC | 9.3530 | 44596.1 | 74.4978 | 335342.6 | 197328.5 | 138097.8 | -1.6791 | -99093.9 | -1.6845 |
| 5200 | 9.3686 | 45532.2 | 74.6796 | 342801.5 | 198264.6 | 137831.7 | -1.5655 | -99230.9 | -1.7663 |
| 53CC | 9.3847 | 46469.8 | 74.8582 | 350278.4 | 199202.2 | 137566.9 | -1.4563 | -99372.3 | -1.8450 |
| 54CC | 9.4012 | 47409.1 | 75.0337 | 357773.0 | 200141.5 | 137303.3 | -1.3513 | -99518.1 | -1.9209 |
| 55CC | 9.4180 | 48350.1 | 75.2064 | 365285.1 | 201082.5 | 137041.1 | -1.2505 | -99668.3 | -1.9942 |
| 56CC | 9.4353 | 49292.7 | 75.3762 | 372814.2 | 202025.1 | 136780.3 | -1.1533 | -99823.2 | -2.0650 |
| 5700 | 9.4530 | 50237.2 | 75.5434 | 380360.2 | 202969.5 | 136520.9 | -1.0596 | -99982.7 | -2.1334 |
| 58CC | 9.4711 | 51183.4 | 75.7080 | 387922.8 | 203915.7 | 136263.0 | -0.9695 | -100146.9 | -2.1995 |
| 59CC | 9.4896 | 52131.4 | 75.8700 | 395501.7 | 204863.8 | 136006.5 | -0.8826 | -100315.8 | -2.2635 |
| 60CC | 9.5084 | 53081.3 | 76.0297 | 403096.7 | 205813.7 | 135751.6 | -0.7987 | -100489.6 | -2.3255 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(48) BeF₂ (gas); molecular weight, 47.013

| T, °K | C _p , cal/mole °K | H _f ^o -H ₀ ^o , cal/mole | S _f ^o , cal/mole °K | -(F _f ^o -H ₀ ^o), cal/mole | H _f ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -193444.9 | -190866.6 | ----- | -304464.1 | ----- |
| 100 | 6.9713 | 695.7 | 44.0349 | 3707.8 | -192749.2 | -190875.5 | 417.8393 | -305262.3 | 656.7780 |
| 200 | 7.7105 | 1419.3 | 49.0218 | 8385.1 | -192025.7 | -190991.6 | 209.2335 | -306087.1 | 322.8706 |
| 298.15 | 9.1338 | 2244.9 | 52.3617 | 13366.7 | -191200.0 | -191200.0 | 140.5004 | -306816.3 | 212.6496 |
| 300 | 9.1605 | 2261.9 | 52.4183 | 13463.6 | -191183.1 | -191204.0 | 139.6361 | -306828.7 | 211.2628 |
| 400 | 10.4603 | 3245.4 | 55.2388 | 18850.1 | -190199.5 | -191429.1 | 104.7960 | -307422.2 | 155.3332 |
| 500 | 11.4538 | 4343.6 | 57.6851 | 24499.0 | -189101.4 | -191638.4 | 83.8679 | -307885.1 | 121.7169 |
| 600 | 12.1896 | 5527.6 | 59.8418 | 30377.5 | -187917.4 | -191828.1 | 69.9011 | -308247.7 | 99.2756 |
| 700 | 12.7343 | 6775.1 | 61.7638 | 36459.6 | -186669.8 | -192002.8 | 59.9154 | -308535.5 | 83.2291 |
| 800 | 13.1416 | 8069.9 | 63.4921 | 42723.8 | -185375.1 | -192167.9 | 52.4194 | -308767.6 | 71.1841 |
| 900 | 13.4505 | 9400.2 | 65.0586 | 49152.6 | -184044.8 | -192329.9 | 46.5842 | -308957.7 | 61.8093 |
| 1000 | 13.6885 | 10757.6 | 66.4886 | 55731.0 | -182687.3 | -192494.8 | 41.9122 | -309115.7 | 54.3052 |
| 1100 | 13.8747 | 12136.2 | 67.8024 | 62446.5 | -181308.8 | -192667.3 | 38.0862 | -309248.8 | 48.1626 |
| 1200 | 14.0226 | 13531.3 | 69.0162 | 69288.2 | -179913.6 | -192850.6 | 34.8950 | -309362.2 | 43.0418 |
| 1300 | 14.1417 | 14939.7 | 70.1435 | 76246.8 | -178505.2 | -193047.3 | 32.1920 | -309459.9 | 38.7072 |
| 1400 | 14.2388 | 16358.9 | 71.1952 | 83314.3 | -177086.0 | -193259.3 | 29.8726 | -309544.8 | 34.9908 |
| 1500 | 14.3188 | 17786.9 | 72.1804 | 90483.6 | -175658.0 | -193488.2 | 27.8603 | -309619.3 | 31.7691 |
| 1600 | 14.3855 | 19222.2 | 73.1067 | 97748.4 | -174222.7 | -192732.3 | 26.0851 | -309685.1 | 28.9495 |
| 1700 | 14.4416 | 20663.7 | 73.9805 | 105103.2 | -172781.3 | -192426.1 | 24.4997 | -309743.6 | 26.4611 |
| 1800 | 14.4892 | 22110.3 | 74.8074 | 112543.0 | -171334.7 | -192171.8 | 23.0890 | -309796.0 | 24.2488 |
| 1900 | 14.5300 | 23561.3 | 75.5919 | 120063.3 | -169883.6 | -191807.9 | 21.8257 | -309843.1 | 22.2690 |
| 2000 | 14.5651 | 25016.1 | 76.3381 | 127660.1 | -168428.9 | -191496.9 | 20.6876 | -309885.8 | 20.4870 |
| 2100 | 14.5955 | 26474.2 | 77.0495 | 135329.7 | -166970.8 | -191185.2 | 19.6567 | -309924.6 | 18.8744 |
| 2200 | 14.6221 | 27935.1 | 77.7291 | 143068.9 | -165509.9 | -190873.2 | 18.7188 | -309960.1 | 17.4083 |
| 2300 | 14.6454 | 29398.5 | 78.3796 | 150874.6 | -164046.5 | -190561.2 | 17.8616 | -309992.8 | 16.0695 |
| 2400 | 14.6659 | 30864.0 | 79.0033 | 158743.9 | -162580.9 | -190249.3 | 17.0752 | -310023.0 | 14.8422 |
| 2500 | 14.6841 | 32331.6 | 79.6024 | 166674.4 | -161113.4 | -189937.7 | 16.3510 | -310051.2 | 13.7130 |
| 2600 | 14.7004 | 33800.8 | 80.1786 | 174663.7 | -159644.1 | -189626.7 | 15.6819 | -310077.8 | 12.6705 |
| 2700 | 14.7149 | 35271.6 | 80.7337 | 182709.5 | -158173.4 | -189316.4 | 15.0616 | -310103.1 | 11.7051 |
| 2800 | 14.7279 | 36743.7 | 81.2691 | 190809.7 | -156701.2 | -189006.9 | 14.4852 | -310127.4 | 10.8087 |
| 2900 | 14.7397 | 38217.1 | 81.7861 | 198962.7 | -155227.8 | -188698.4 | 13.9479 | -310151.2 | 9.9740 |
| 3000 | 14.7503 | 39691.6 | 82.2860 | 207166.4 | -153753.3 | -188390.8 | 13.4460 | -310174.9 | 9.1949 |
| 3100 | 14.7599 | 41167.1 | 82.7698 | 215419.3 | -152277.8 | -200084.3 | 12.9761 | -310198.9 | 8.4660 |
| 3200 | 14.7686 | 42643.6 | 83.2386 | 223719.9 | -150801.4 | -200279.1 | 12.5352 | -310223.6 | 7.7826 |
| 3300 | 14.7766 | 44120.8 | 83.6932 | 232066.6 | -149324.1 | -200475.0 | 12.1205 | -310249.4 | 7.1405 |
| 3400 | 14.7839 | 45598.9 | 84.1344 | 240458.1 | -147846.1 | -200672.2 | 11.7298 | -310277.0 | 6.5362 |
| 3500 | 14.7906 | 47077.6 | 84.5630 | 248893.0 | -146367.3 | -200870.8 | 11.3610 | -310306.8 | 5.9664 |
| 3600 | 14.7968 | 48557.0 | 84.9798 | 257370.3 | -144887.9 | -201070.8 | 11.0126 | -310339.2 | 5.4281 |
| 3700 | 14.8025 | 50037.0 | 85.3853 | 265888.6 | -143408.0 | -201272.2 | 10.6824 | -310375.0 | 4.9189 |
| 3800 | 14.8077 | 51517.5 | 85.7801 | 274447.0 | -141927.5 | -201475.1 | 10.3694 | -310414.5 | 4.4365 |
| 3900 | 14.8126 | 52998.5 | 86.1648 | 283044.3 | -140446.5 | -201679.4 | 10.0722 | -310458.4 | 3.9787 |
| 4000 | 14.8170 | 54480.0 | 86.5399 | 291679.6 | -138965.0 | -201885.3 | 9.7896 | -310507.2 | 3.5437 |
| 4100 | 14.8212 | 55961.9 | 86.9058 | 300352.0 | -137483.1 | -202092.8 | 9.5204 | -310561.5 | 3.1299 |
| 4200 | 14.8251 | 57444.2 | 87.2630 | 309060.5 | -136000.7 | -202301.8 | 9.2639 | -310621.8 | 2.7358 |
| 4300 | 14.8287 | 58926.9 | 87.6119 | 317804.3 | -134518.0 | -202512.5 | 9.0188 | -310688.8 | 2.3599 |
| 4400 | 14.8321 | 60409.9 | 87.9529 | 326582.6 | -133035.0 | -202724.7 | 8.7849 | -310762.8 | 2.0009 |
| 4500 | 14.8352 | 61893.3 | 88.2862 | 335394.6 | -131551.6 | -202938.6 | 8.5610 | -310844.4 | 1.6579 |
| 4600 | 14.8382 | 63377.0 | 88.6123 | 344239.6 | -130068.0 | -203154.1 | 8.3467 | -310934.1 | 1.3297 |
| 4700 | 14.8410 | 64860.9 | 88.9314 | 353116.9 | -128584.0 | -203371.4 | 8.1412 | -311032.4 | 1.0153 |
| 4800 | 14.8436 | 66345.2 | 89.2439 | 362025.7 | -127099.8 | -203590.3 | 7.9440 | -311139.7 | 0.7140 |
| 4900 | 14.8460 | 67829.7 | 89.5500 | 370965.4 | -125615.3 | -203810.9 | 7.7548 | -311256.4 | 0.4248 |
| 5000 | 14.8483 | 69314.4 | 89.8500 | 379935.5 | -124130.6 | -204033.2 | 7.5728 | -311382.8 | 0.1471 |
| 5100 | 14.8505 | 70799.3 | 90.1440 | 388935.2 | -122645.6 | -204257.2 | 7.3979 | -311519.4 | -0.1198 |
| 5200 | 14.8525 | 72284.5 | 90.4324 | 397964.1 | -121160.5 | -204483.0 | 7.2295 | -311666.3 | -0.3765 |
| 5300 | 14.8544 | 73769.8 | 90.7153 | 407021.5 | -119675.1 | -204710.5 | 7.0673 | -311823.9 | -0.6237 |
| 5400 | 14.8563 | 75255.3 | 90.9930 | 416107.0 | -118189.6 | -204939.7 | 6.9108 | -311992.4 | -0.8619 |
| 5500 | 14.8580 | 76741.1 | 91.2656 | 425219.9 | -116703.9 | -205170.7 | 6.7599 | -312171.9 | -1.0915 |
| 5600 | 14.8596 | 78226.9 | 91.5334 | 434359.9 | -115218.0 | -205403.5 | 6.6142 | -312362.6 | -1.3131 |
| 5700 | 14.8612 | 79713.0 | 91.7964 | 443526.5 | -113732.0 | -205638.1 | 6.4736 | -312564.7 | -1.5270 |
| 5800 | 14.8627 | 81199.2 | 92.0549 | 452719.1 | -112245.8 | -205874.4 | 6.3376 | -312778.1 | -1.7337 |
| 5900 | 14.8641 | 82685.5 | 92.3090 | 461937.3 | -110759.4 | -206112.5 | 6.2061 | -313002.9 | -1.9335 |
| 6000 | 14.8654 | 84172.0 | 92.5588 | 471180.7 | -109273.0 | -206352.4 | 6.0788 | -313239.1 | -2.1269 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Be, 1560° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(47) BeF (gas): molecular weight, 28.013

| T, °K | C_p^0 , cal/mole °K | $H_T^0 - H_0^0$, cal/mole | S_T^0 , cal/mole °K | $-(F_T^0 - H_0^0)$, cal/mole | H_T^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -51682.1 | -50158.6 | ----- | -145401.0 | ----- |
| 100 | 6.9575 | 694.2 | 41.5155 | 3457.3 | -50987.8 | -49821.5 | 113.4771 | -145702.1 | 314.5443 |
| 200 | 6.9801 | 1390.5 | 46.3412 | 7877.7 | -50291.5 | -49614.8 | 59.1422 | -146028.4 | 155.2013 |
| 298-15 | 7.1397 | 2082.1 | 49.1523 | 12572.7 | -49600.0 | -49600.0 | 41.3021 | -146358.2 | 102.6212 |
| 300 | 7.1443 | 2095.3 | 49.1965 | 12663.7 | -49586.8 | -49600.8 | 41.0778 | -146364.2 | 101.9597 |
| 400 | 7.4310 | 2823.6 | 51.2896 | 17692.3 | -48858.5 | -49696.1 | 32.0379 | -146672.9 | 75.2784 |
| 500 | 7.7262 | 3581.7 | 52.9801 | 22908.4 | -48100.4 | -49842.7 | 26.6006 | -146943.7 | 59.2375 |
| 600 | 7.9775 | 4367.3 | 54.4117 | 28279.7 | -47314.8 | -50015.1 | 22.9639 | -147179.7 | 48.5249 |
| 700 | 8.1776 | 5175.5 | 55.6571 | 33784.5 | -46506.6 | -50204.1 | 20.3569 | -147387.7 | 40.8614 |
| 800 | 8.3342 | 6001.4 | 56.7597 | 39406.4 | -45680.7 | -50405.9 | 18.3940 | -147573.6 | 35.1061 |
| 900 | 8.4571 | 6841.2 | 57.7487 | 45132.7 | -44840.9 | -50621.0 | 16.8610 | -147742.4 | 30.6244 |
| 1000 | 8.5546 | 7691.9 | 58.6450 | 50953.1 | -43990.1 | -50851.1 | 15.6292 | -147897.8 | 27.0350 |
| 1100 | 8.6331 | 8551.4 | 59.4642 | 56859.1 | -43130.6 | -51097.6 | 14.6166 | -148042.5 | 24.0953 |
| 1200 | 8.6973 | 9418.1 | 60.2182 | 62843.7 | -42264.0 | -51361.7 | 13.7685 | -148178.6 | 21.6432 |
| 1300 | 8.7507 | 10290.6 | 60.9165 | 68900.9 | -41391.5 | -51644.1 | 13.0471 | -148307.5 | 19.5665 |
| 1400 | 8.7958 | 11167.9 | 61.5667 | 75025.4 | -40514.1 | -51945.6 | 12.4250 | -148430.6 | 17.7849 |
| 1500 | 8.8344 | 12049.5 | 62.1749 | 81212.8 | -39632.6 | -52266.6 | 11.8829 | -148548.7 | 16.2397 |
| 1600 | 8.8680 | 12934.7 | 62.7461 | 87459.2 | -38747.4 | -52610.9 | 11.3932 | -148662.5 | 14.8865 |
| 1700 | 8.8974 | 13823.0 | 63.2847 | 93761.0 | -37859.1 | -52939.2 | 10.9413 | -148772.6 | 13.6916 |
| 1800 | 8.9237 | 14714.0 | 63.7940 | 100115.1 | -36968.0 | -53268.2 | 10.5375 | -148879.4 | 12.6287 |
| 1900 | 8.9472 | 15607.6 | 64.2771 | 106518.9 | -36074.5 | -53596.2 | 10.1744 | -148983.3 | 11.6771 |
| 2000 | 8.9686 | 16503.4 | 64.7366 | 112969.8 | -35178.7 | -53925.3 | 9.8461 | -149084.7 | 10.8200 |
| 2100 | 8.9883 | 17401.3 | 65.1747 | 119465.5 | -34280.8 | -54254.7 | 9.5473 | -149183.7 | 10.0440 |
| 2200 | 9.0064 | 18301.0 | 65.5932 | 126004.0 | -33381.1 | -54584.2 | 9.2744 | -149280.7 | 9.3381 |
| 2300 | 9.0233 | 19202.5 | 65.9939 | 132583.5 | -32479.6 | -54913.6 | 9.0241 | -149375.8 | 8.6931 |
| 2400 | 9.0391 | 20105.6 | 66.3783 | 139202.3 | -31576.4 | -55243.0 | 8.7935 | -149469.2 | 8.1016 |
| 2500 | 9.0540 | 21010.3 | 66.7476 | 145858.7 | -30671.8 | -55572.4 | 8.5803 | -149561.2 | 7.5570 |
| 2600 | 9.0682 | 21916.4 | 67.1030 | 152551.3 | -29765.7 | -55901.8 | 8.3827 | -149651.9 | 7.0540 |
| 2700 | 9.0817 | 22823.9 | 67.4455 | 159278.9 | -28858.2 | -56231.2 | 8.1986 | -149741.7 | 6.5880 |
| 2800 | 9.0946 | 23732.7 | 67.7760 | 166040.0 | -27949.3 | -56560.6 | 8.0269 | -149830.7 | 6.1550 |
| 2900 | 9.1070 | 24642.8 | 68.0953 | 172833.7 | -27039.3 | -56890.0 | 7.8663 | -149919.3 | 5.7516 |
| 3000 | 9.1191 | 25554.1 | 68.4043 | 179658.8 | -26128.0 | -57219.4 | 7.7157 | -150007.8 | 5.3749 |
| 3100 | 9.1307 | 26466.6 | 68.7035 | 186514.2 | -25215.5 | -57548.8 | 7.5742 | -150096.5 | 5.0223 |
| 3200 | 9.1421 | 27380.2 | 68.9936 | 193399.2 | -24301.8 | -57878.2 | 7.4410 | -150185.8 | 4.6915 |
| 3300 | 9.1532 | 28295.0 | 69.2751 | 200312.7 | -23387.0 | -58207.6 | 7.3151 | -150276.0 | 4.3806 |
| 3400 | 9.1641 | 29210.9 | 69.5485 | 207253.9 | -22471.2 | -58537.0 | 7.1962 | -150367.7 | 4.0879 |
| 3500 | 9.1749 | 30127.8 | 69.8143 | 214222.1 | -21554.2 | -58866.4 | 7.0834 | -150461.2 | 3.8116 |
| 3600 | 9.1855 | 31045.9 | 70.0729 | 221216.5 | -20636.2 | -59195.8 | 6.9767 | -150557.1 | 3.5506 |
| 3700 | 9.1961 | 31964.9 | 70.3247 | 228236.5 | -19717.1 | -59525.2 | 6.8749 | -150655.9 | 3.3035 |
| 3800 | 9.2066 | 32885.1 | 70.5701 | 235281.2 | -18797.0 | -59854.6 | 6.7783 | -150758.0 | 3.0692 |
| 3900 | 9.2171 | 33806.3 | 70.8094 | 242350.3 | -17875.8 | -60184.0 | 6.6861 | -150863.9 | 2.8468 |
| 4000 | 9.2276 | 34728.5 | 71.0429 | 249442.9 | -16953.6 | -60513.4 | 6.5983 | -150974.3 | 2.6354 |
| 4100 | 9.2383 | 35651.8 | 71.2708 | 256558.7 | -16030.3 | -60842.8 | 6.5142 | -151089.5 | 2.4342 |
| 4200 | 9.2490 | 36576.2 | 71.4936 | 263696.9 | -15105.9 | -61172.2 | 6.4339 | -151210.2 | 2.2423 |
| 4300 | 9.2599 | 37501.6 | 71.7113 | 270857.2 | -14180.5 | -61501.6 | 6.3568 | -151336.7 | 2.0593 |
| 4400 | 9.2710 | 38428.1 | 71.9244 | 278039.0 | -13253.9 | -61831.0 | 6.2832 | -151469.6 | 1.8844 |
| 4500 | 9.2823 | 39355.8 | 72.1328 | 285241.9 | -12326.3 | -62160.4 | 6.2123 | -151609.4 | 1.7172 |
| 4600 | 9.2939 | 40284.6 | 72.3370 | 292465.4 | -11397.4 | -62489.8 | 6.1443 | -151756.5 | 1.5570 |
| 4700 | 9.3058 | 41214.6 | 72.5370 | 299709.2 | -10467.5 | -62819.2 | 6.0788 | -151911.3 | 1.4035 |
| 4800 | 9.3180 | 42145.8 | 72.7330 | 306972.7 | -9536.3 | -63148.6 | 6.0158 | -152074.2 | 1.2563 |
| 4900 | 9.3306 | 43078.2 | 72.9253 | 314255.7 | -8603.9 | -63478.0 | 5.9552 | -152245.5 | 1.1149 |
| 5000 | 9.3435 | 44011.9 | 73.1139 | 321557.6 | -7670.1 | -63807.4 | 5.8966 | -152425.6 | 0.9790 |
| 5100 | 9.3569 | 44946.9 | 73.2991 | 328878.3 | -6735.1 | -64136.8 | 5.8403 | -152614.7 | 0.8483 |
| 5200 | 9.3707 | 45883.3 | 73.4809 | 336217.3 | -5798.8 | -64466.2 | 5.7857 | -152813.1 | 0.7225 |
| 5300 | 9.3850 | 46821.1 | 73.6595 | 343574.4 | -4861.0 | -64795.6 | 5.7331 | -153020.9 | 0.6012 |
| 5400 | 9.3998 | 47760.3 | 73.8351 | 350949.1 | -3921.7 | -65125.0 | 5.6821 | -153238.3 | 0.4843 |
| 5500 | 9.4151 | 48701.1 | 74.0077 | 358341.3 | -2981.0 | -65454.4 | 5.6328 | -153465.5 | 0.3715 |
| 5600 | 9.4309 | 49643.4 | 74.1775 | 365750.6 | -2038.7 | -65783.8 | 5.5851 | -153702.5 | 0.2625 |
| 5700 | 9.4473 | 50587.3 | 74.3446 | 373176.7 | -1094.8 | -66113.2 | 5.5389 | -153949.4 | 0.1572 |
| 5800 | 9.4642 | 51532.9 | 74.5090 | 380619.4 | -149.2 | -66442.6 | 5.4942 | -154206.2 | 0.0553 |
| 5900 | 9.4817 | 52480.1 | 74.6709 | 388078.4 | 798.1 | -66772.0 | 5.4507 | -154472.8 | -0.0432 |
| 6000 | 9.4998 | 53429.2 | 74.8305 | 395553.5 | 1747.2 | -67101.4 | 5.4085 | -154749.2 | -0.1387 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Be, 1560° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (46) BeCl₂ (gas); molecular weight, 79.927

| T, °K | C _p ^o , cal/mole °K | H _f ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| C | ----- | C | ----- | C | -86600.2 | -83938.0 | ----- | -217922.3 | ----- |
| 10C | 7.4191 | 703.4 | 47.8335 | 4079.9 | -85896.8 | -83940.4 | 184.0005 | -218709.3 | 467.6518 |
| 20C | 9.7224 | 1560.3 | 53.6790 | 9175.5 | -85039.9 | -83948.6 | 92.2774 | -219347.3 | 228.3802 |
| 258.15 | 11.3383 | 2600.2 | 57.8878 | 14659.1 | -84000.0 | -84000.0 | 62.0734 | -219801.3 | 149.4038 |
| 30C | 11.3620 | 2621.2 | 57.9580 | 14766.2 | -83979.0 | -84001.1 | 61.6937 | -219808.8 | 148.4103 |
| 40C | 12.3892 | 3812.5 | 61.3782 | 20738.8 | -82787.7 | -84077.6 | 46.3895 | -220174.9 | 108.3483 |
| 50C | 13.0597 | 5087.3 | 64.2195 | 27022.7 | -81512.9 | -84158.8 | 37.1983 | -220478.8 | 84.2740 |
| 60C | 13.5104 | 6417.2 | 66.6434 | 33568.9 | -80183.0 | -84240.0 | 31.0648 | -220734.5 | 68.2039 |
| 70C | 13.8220 | 7784.7 | 68.7505 | 40340.9 | -78815.5 | -84323.0 | 26.6796 | -220951.0 | 56.7129 |
| 80C | 14.0438 | 9178.6 | 70.6118 | 47310.8 | -77421.6 | -84410.2 | 23.3873 | -221135.4 | 48.0868 |
| 90C | 14.2059 | 10591.5 | 72.2758 | 54456.7 | -76008.7 | -84505.2 | 20.8239 | -221293.4 | 41.3724 |
| 100C | 14.3273 | 12018.5 | 73.7791 | 61760.7 | -74581.7 | -84612.0 | 18.7708 | -221429.8 | 35.9972 |
| 110C | 14.4203 | 13456.0 | 75.1492 | 69208.1 | -73144.2 | -84733.2 | 17.0886 | -221548.3 | 31.5969 |
| 120C | 14.4930 | 14901.8 | 76.4072 | 76786.8 | -71698.3 | -84870.8 | 15.6847 | -221652.1 | 27.9281 |
| 130C | 14.5507 | 16354.1 | 77.5696 | 84486.3 | -70246.1 | -85026.0 | 14.4947 | -221743.5 | 24.8223 |
| 140C | 14.5972 | 17811.6 | 78.6497 | 92297.9 | -68788.6 | -85200.1 | 13.4726 | -221824.6 | 22.1592 |
| 150C | 14.6352 | 19273.3 | 79.6581 | 100213.9 | -67326.9 | -85393.8 | 12.5850 | -221896.8 | 19.8504 |
| 160C | 14.6667 | 20738.4 | 80.6037 | 108227.5 | -65861.8 | -85615.0 | 11.7942 | -221961.6 | 17.8296 |
| 170C | 14.6930 | 22206.4 | 81.4937 | 116332.8 | -64393.7 | -85826.7 | 11.0777 | -222020.0 | 16.0460 |
| 180C | 14.7152 | 23676.9 | 82.3341 | 124524.6 | -62923.3 | -86029.5 | 10.4395 | -222072.9 | 14.4602 |
| 190C | 14.7341 | 25149.4 | 83.1303 | 132798.1 | -61450.8 | -86250.9 | 9.8676 | -222120.9 | 13.0410 |
| 200C | 14.7503 | 26623.6 | 83.8865 | 141149.3 | -59976.6 | -86475.1 | 9.3520 | -222164.8 | 11.7634 |
| 210C | 14.7644 | 28099.4 | 84.6065 | 149574.2 | -58500.8 | -86713.3 | 8.8844 | -222205.1 | 10.6073 |
| 220C | 14.7766 | 29576.4 | 85.2936 | 158069.5 | -57023.8 | -86964.7 | 8.4587 | -222242.2 | 9.5561 |
| 230C | 14.7873 | 31054.6 | 85.9507 | 166631.9 | -55545.6 | -87236.3 | 8.0694 | -222276.5 | 8.5962 |
| 240C | 14.7967 | 32533.8 | 86.5802 | 175258.7 | -54066.4 | -87519.3 | 7.7119 | -222308.5 | 7.7161 |
| 250C | 14.8050 | 34013.9 | 87.1844 | 183947.1 | -52586.3 | -87806.9 | 7.3823 | -222338.5 | 6.9064 |
| 260C | 14.8124 | 35494.8 | 87.7652 | 192694.8 | -51105.4 | -88104.0 | 7.0777 | -222366.8 | 6.1588 |
| 270C | 14.8190 | 36976.4 | 88.3244 | 201499.5 | -49623.8 | -88411.7 | 6.7949 | -222393.9 | 5.4665 |
| 280C | 14.8249 | 38458.6 | 88.8634 | 210359.0 | -48141.6 | -88730.2 | 6.5319 | -222419.9 | 4.8233 |
| 290C | 14.8303 | 39941.3 | 89.3837 | 219271.5 | -46658.8 | -89059.5 | 6.2866 | -222445.5 | 4.2249 |
| 300C | 14.8351 | 41424.6 | 89.8866 | 228235.2 | -45175.6 | -89399.8 | 6.0573 | -222470.8 | 3.6661 |
| 310C | 14.8394 | 42908.3 | 90.3731 | 237248.3 | -43691.9 | -89741.9 | 5.8423 | -222496.5 | 3.1433 |
| 320C | 14.8434 | 44392.5 | 90.8443 | 246309.3 | -42207.7 | -90084.7 | 5.6406 | -222522.8 | 2.6531 |
| 330C | 14.8470 | 45877.0 | 91.3011 | 255416.7 | -40723.2 | -90438.0 | 5.4505 | -222550.2 | 2.1926 |
| 340C | 14.8503 | 47361.9 | 91.7444 | 264569.1 | -39238.3 | -90791.6 | 5.2714 | -222579.3 | 1.7591 |
| 350C | 14.8533 | 48847.1 | 92.1745 | 273765.1 | -37753.1 | -91146.3 | 5.1021 | -222610.5 | 1.3503 |
| 360C | 14.8561 | 50332.5 | 92.5934 | 283003.6 | -36267.7 | -91502.0 | 4.9422 | -222644.4 | 0.9641 |
| 370C | 14.8587 | 51818.3 | 93.0005 | 292283.4 | -34781.9 | -91858.7 | 4.7903 | -222681.6 | 0.5988 |
| 380C | 14.8610 | 53304.3 | 93.3967 | 301603.4 | -33295.9 | -92215.4 | 4.6463 | -222722.4 | 0.2527 |
| 390C | 14.8632 | 54790.5 | 93.7828 | 310962.4 | -31809.7 | -92572.1 | 4.5094 | -222767.6 | -0.0758 |
| 400C | 14.8652 | 56276.9 | 94.1591 | 320359.6 | -30323.3 | -92928.8 | 4.3791 | -222817.7 | -0.3879 |
| 410C | 14.8671 | 57763.5 | 94.5262 | 329794.0 | -28836.7 | -93285.5 | 4.2545 | -222873.2 | -0.6849 |
| 420C | 14.8689 | 59250.3 | 94.8845 | 339264.6 | -27345.9 | -93642.2 | 4.1365 | -222934.8 | -0.9677 |
| 430C | 14.8705 | 60737.3 | 95.2344 | 348770.6 | -25862.9 | -93998.9 | 4.0232 | -223002.8 | -1.2375 |
| 440C | 14.8720 | 62224.4 | 95.5763 | 358311.2 | -24375.8 | -94355.6 | 3.9151 | -223078.0 | -1.4952 |
| 450C | 14.8734 | 63711.7 | 95.9105 | 367885.6 | -22888.5 | -94712.3 | 3.8114 | -223160.7 | -1.7414 |
| 460C | 14.8748 | 65199.1 | 96.2374 | 377493.0 | -21401.1 | -95069.0 | 3.7121 | -223251.4 | -1.9771 |
| 470C | 14.8760 | 66686.6 | 96.5572 | 387132.8 | -19913.5 | -95425.7 | 3.6168 | -223350.8 | -2.2028 |
| 480C | 14.8772 | 68174.3 | 96.8705 | 396804.3 | -18425.9 | -95782.4 | 3.5252 | -223459.0 | -2.4192 |
| 490C | 14.8783 | 69662.1 | 97.1773 | 406506.7 | -16938.1 | -96139.1 | 3.4374 | -223576.7 | -2.6269 |
| 500C | 14.8793 | 71150.0 | 97.4775 | 416239.5 | -15450.2 | -96495.8 | 3.3527 | -223704.1 | -2.8264 |
| 510C | 14.8803 | 72637.9 | 97.7726 | 426002.1 | -13962.3 | -96852.5 | 3.2714 | -223841.5 | -3.0182 |
| 520C | 14.8812 | 74126.0 | 98.0615 | 435793.9 | -12474.2 | -97209.2 | 3.1929 | -223989.3 | -3.2027 |
| 530C | 14.8821 | 75614.2 | 98.3450 | 445614.2 | -10986.0 | -97565.9 | 3.1173 | -224147.8 | -3.3803 |
| 540C | 14.8829 | 77102.4 | 98.6232 | 455462.7 | -9497.8 | -97922.6 | 3.0442 | -224317.1 | -3.5516 |
| 550C | 14.8837 | 78590.8 | 98.8966 | 465338.7 | -8009.4 | -98279.3 | 2.9738 | -224497.4 | -3.7167 |
| 560C | 14.8844 | 80079.2 | 99.1644 | 475241.8 | -6521.0 | -98636.0 | 2.9057 | -224688.9 | -3.8761 |
| 570C | 14.8851 | 81567.6 | 99.4275 | 485171.4 | -5032.6 | -98992.7 | 2.8399 | -224891.7 | -4.0300 |
| 580C | 14.8857 | 83056.2 | 99.6866 | 495127.2 | -3544.0 | -99349.4 | 2.7763 | -225105.8 | -4.1787 |
| 590C | 14.8864 | 84544.8 | 99.9413 | 505108.6 | -2055.4 | -99706.1 | 2.7146 | -225331.4 | -4.3225 |
| 600C | 14.8870 | 86033.4 | 100.1915 | 515115.3 | -566.7 | -100062.8 | 2.6549 | -225568.3 | -4.4617 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Be, 1560° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(45) BeCl (gas); molecular weight, 44.470

| T, °K | C _p ^o , cal/mole °K | H _f ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _f ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| C | ----- | 0 | ----- | 0 | -9117.9 | -7552.4 | ----- | -112988.3 | ----- |
| 100 | 6.9597 | 694.9 | 44.124C | 3717.5 | -8422.9 | -7215.3 | 20.4490 | -113287.0 | 243.8725 |
| 200 | 7.1399 | 1396.8 | 48.9822 | 8399.7 | -7721.1 | -7015.7 | 12.6674 | -113581.0 | 119.9592 |
| 298.15 | 7.5655 | 2117.9 | 51.9099 | 13359.1 | -7000.0 | -7000.0 | 10.1502 | -113850.6 | 79.0600 |
| 300 | 7.5736 | 2131.9 | 51.9567 | 13455.1 | -6986.0 | -7000.6 | 10.1185 | -113855.5 | 78.5453 |
| 400 | 7.9659 | 2909.8 | 54.1919 | 18767.0 | -6208.1 | -7075.9 | 8.8382 | -114104.7 | 57.7895 |
| 500 | 8.2468 | 3721.3 | 56.0015 | 24279.5 | -5396.6 | -7193.3 | 8.0594 | -114330.9 | 45.3097 |
| 600 | 8.4408 | 4556.2 | 57.5233 | 29957.7 | -4561.6 | -7335.1 | 7.5307 | -114537.2 | 36.9139 |
| 700 | 8.5773 | 5467.5 | 58.8353 | 35777.2 | -3710.4 | -7495.1 | 7.1452 | -114726.3 | 31.0095 |
| 800 | 8.6764 | 6270.4 | 59.9874 | 41719.5 | -2847.4 | -7670.5 | 6.8495 | -114900.9 | 26.5290 |
| 900 | 8.7508 | 7142.0 | 61.0138 | 47770.5 | -1975.9 | -7861.7 | 6.6139 | -115063.3 | 23.0390 |
| 1000 | 8.8086 | 8020.1 | 61.9389 | 53918.9 | -1697.8 | -8070.1 | 6.4207 | -115215.3 | 20.2433 |
| 1100 | 8.8549 | 8903.3 | 62.7807 | 60155.5 | -214.6 | -8296.8 | 6.2582 | -115358.5 | 17.9529 |
| 1200 | 8.8929 | 9790.8 | 63.5529 | 66472.7 | 672.9 | -8542.5 | 6.1189 | -115494.2 | 16.0419 |
| 1300 | 8.9249 | 10681.7 | 64.266C | 72864.1 | 1563.8 | -8807.7 | 5.9974 | -115623.6 | 14.4230 |
| 1400 | 8.9525 | 11575.6 | 64.9284 | 79324.2 | 2457.7 | -9092.9 | 5.8899 | -115747.3 | 13.0339 |
| 1500 | 8.9767 | 12472.1 | 65.5469 | 85848.3 | 3354.2 | -9398.2 | 5.7937 | -115866.2 | 11.8288 |
| 1600 | 8.9983 | 13370.8 | 66.127C | 92432.3 | 4253.0 | -13221.3 | 5.6944 | -115980.9 | 10.7732 |
| 1700 | 9.0178 | 14271.7 | 66.6731 | 99072.6 | 5153.8 | -13495.8 | 5.5872 | -116091.6 | 9.8409 |
| 1800 | 9.0358 | 15174.3 | 67.1891 | 105765.9 | 6056.5 | -13769.3 | 5.4898 | -116199.0 | 9.0115 |
| 1900 | 9.0524 | 16078.8 | 67.678C | 112509.5 | 6960.9 | -14041.8 | 5.4010 | -116303.3 | 8.2686 |
| 2000 | 9.0680 | 16984.8 | 68.1428 | 119300.7 | 7866.9 | -14313.5 | 5.3196 | -116404.8 | 7.5995 |
| 2100 | 9.0827 | 17892.3 | 68.5856 | 126137.3 | 8774.5 | -14584.4 | 5.2442 | -116503.7 | 6.9935 |
| 2200 | 9.0968 | 18801.3 | 69.0084 | 133017.2 | 9683.4 | -14854.6 | 5.1746 | -116600.3 | 6.4422 |
| 2300 | 9.1102 | 19711.7 | 69.4131 | 139938.4 | 10593.8 | -15124.2 | 5.1099 | -116694.7 | 5.9384 |
| 2400 | 9.1232 | 20623.3 | 69.8011 | 146899.3 | 11505.5 | -15393.2 | 5.0496 | -116787.3 | 5.4762 |
| 2500 | 9.1357 | 21536.3 | 70.1738 | 153898.1 | 12418.4 | -15661.5 | 4.9930 | -116878.2 | 5.0507 |
| 2600 | 9.1479 | 22450.5 | 70.5323 | 160933.5 | 13332.6 | -15929.3 | 4.9400 | -116967.6 | 4.6576 |
| 2700 | 9.1599 | 23365.9 | 70.8778 | 168004.1 | 14248.0 | -16196.6 | 4.8899 | -117055.7 | 4.2933 |
| 2800 | 9.1716 | 24282.4 | 71.2111 | 175108.7 | 15164.6 | -16463.4 | 4.8427 | -117142.9 | 3.9548 |
| 2900 | 9.1832 | 25200.2 | 71.5332 | 182246.0 | 16082.3 | -16729.7 | 4.7980 | -117229.4 | 3.6394 |
| 3000 | 9.1947 | 26119.1 | 71.8447 | 189415.0 | 17001.2 | -16995.4 | 4.7556 | -117315.5 | 3.3448 |
| 3100 | 9.2061 | 27039.1 | 72.1464 | 196614.6 | 17921.2 | -17260.7 | 4.7154 | -117401.6 | 3.0691 |
| 3200 | 9.2176 | 27960.3 | 72.4388 | 203843.9 | 18842.4 | -17525.5 | 4.6772 | -117487.9 | 2.8103 |
| 3300 | 9.2291 | 28882.6 | 72.7226 | 211102.1 | 19764.8 | -17789.8 | 4.6406 | -117575.0 | 2.5671 |
| 3400 | 9.2407 | 29806.1 | 72.9983 | 218388.2 | 20688.2 | -18053.6 | 4.6057 | -117663.3 | 2.3380 |
| 3500 | 9.2525 | 30730.8 | 73.2664 | 225701.5 | 21612.9 | -18316.8 | 4.5722 | -117753.1 | 2.1218 |
| 3600 | 9.2645 | 31656.6 | 73.5272 | 233041.2 | 22538.8 | -18579.5 | 4.5404 | -117844.9 | 1.9175 |
| 3700 | 9.2768 | 32583.7 | 73.7812 | 240406.7 | 23465.8 | -18841.6 | 4.5095 | -117939.3 | 1.7241 |
| 3800 | 9.2894 | 33512.0 | 74.0287 | 247797.2 | 24394.1 | -19103.1 | 4.4800 | -118036.6 | 1.5407 |
| 3900 | 9.3024 | 34441.6 | 74.2702 | 255212.2 | 25323.7 | -19364.0 | 4.4517 | -118137.4 | 1.3666 |
| 4000 | 9.3158 | 35372.5 | 74.5059 | 262651.1 | 26254.6 | -19624.2 | 4.4244 | -118242.2 | 1.2010 |
| 4100 | 9.3296 | 36304.7 | 74.7361 | 270113.2 | 27186.9 | -19883.7 | 4.3981 | -118351.4 | 1.0434 |
| 4200 | 9.3440 | 37238.4 | 74.9611 | 277598.1 | 28120.6 | -20142.3 | 4.3728 | -118465.6 | 0.8931 |
| 4300 | 9.3589 | 38173.6 | 75.1811 | 285105.3 | 29055.7 | -20400.2 | 4.3481 | -118585.2 | 0.7497 |
| 4400 | 9.3745 | 39110.2 | 75.3965 | 292634.2 | 29992.4 | -20657.1 | 4.3245 | -118710.6 | 0.6126 |
| 4500 | 9.3906 | 40048.5 | 75.6073 | 300184.4 | 30930.6 | -20913.1 | 4.3016 | -118842.3 | 0.4815 |
| 4600 | 9.4074 | 40988.4 | 75.8139 | 307755.5 | 31870.5 | -21168.1 | 4.2794 | -118980.7 | 0.3560 |
| 4700 | 9.4249 | 41930.0 | 76.0164 | 315347.1 | 32812.1 | -21422.0 | 4.2578 | -119126.2 | 0.2356 |
| 4800 | 9.4431 | 42873.4 | 76.215C | 322958.7 | 33755.5 | -21674.7 | 4.2369 | -119279.0 | 0.1222 |
| 4900 | 9.4620 | 43818.6 | 76.4099 | 330590.0 | 34700.8 | -21926.2 | 4.2167 | -119439.7 | 0.0093 |
| 5000 | 9.4817 | 44765.8 | 76.6013 | 338240.5 | 35647.9 | -22176.4 | 4.1969 | -119608.3 | -0.0973 |
| 5100 | 9.5021 | 45715.0 | 76.7892 | 345910.1 | 36597.1 | -22425.2 | 4.1779 | -119785.2 | -0.1999 |
| 5200 | 9.5233 | 46666.3 | 76.974C | 353598.3 | 37548.4 | -22672.5 | 4.1593 | -119970.6 | -0.2987 |
| 5300 | 9.5452 | 47619.7 | 77.1556 | 361304.8 | 38501.8 | -22918.3 | 4.1413 | -120164.6 | -0.3939 |
| 5400 | 9.5679 | 48575.3 | 77.3342 | 369029.3 | 39457.5 | -23162.5 | 4.1236 | -120367.4 | -0.4857 |
| 5500 | 9.5914 | 49533.3 | 77.510C | 376771.5 | 40415.4 | -23405.1 | 4.1065 | -120579.1 | -0.5744 |
| 5600 | 9.6156 | 50493.6 | 77.683C | 384531.2 | 41375.8 | -23645.8 | 4.0897 | -120799.7 | -0.6660 |
| 5700 | 9.6405 | 51456.4 | 77.8534 | 392308.0 | 42338.6 | -23884.7 | 4.0736 | -121029.3 | -0.7428 |
| 5800 | 9.6661 | 52421.7 | 78.0213 | 400101.8 | 43303.9 | -24121.8 | 4.0577 | -121267.9 | -0.8229 |
| 5900 | 9.6924 | 53389.7 | 78.1868 | 407912.2 | 44271.8 | -24356.8 | 4.0423 | -121515.4 | -0.9004 |
| 6000 | 9.7194 | 54360.3 | 78.3499 | 415739.1 | 45242.4 | -24589.8 | 4.0272 | -121771.7 | -0.9755 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Be, 1560° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (44) Be (crystal, liquid); molecular weight, 9.013

| T , °K | C_p^o , cal/mole °K | $H_T^o - H_O^o,^a$ cal/mole | S_T^o , cal/mole °K | $-(F_T^o - H_O^o),^a$ cal/mole | H_T^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|--------------------------|--------------------------------|--------------------------|-----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^o)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^o , cal/mole | $\log_{10} K$ |
| C | ----- | 0 | 0 | 0 | -468.7 | 0 | ----- | -76887.4 | ----- |
| 100 | 0.427 | 9.8 | 0.130 | 3.2 | -458.9 | 0 | 0 | -77374.5 | 163.1957 |
| 200 | 2.400 | 149.3 | 1.018 | 54.3 | -319.4 | 0 | 0 | -77731.8 | 78.4808 |
| 258.15 | 3.932 | 468.7 | 2.297 | 216.2 | 0 | 0 | 0 | -77900.0 | 50.4891 |
| 300 | 3.950 | 475.8 | 2.321 | 220.5 | 7.1 | 0 | 0 | -77902.1 | 50.1370 |
| 400 | 4.765 | 914.3 | 3.577 | 516.5 | 445.6 | 0 | 0 | -77960.4 | 35.9438 |
| 500 | 5.249 | 1416.3 | 4.655 | 931.2 | 947.6 | 0 | 0 | -77955.2 | 27.4249 |
| 600 | 5.585 | 1958.6 | 5.683 | 1451.2 | 1489.9 | 0 | 0 | -77909.7 | 21.7475 |
| 700 | 5.848 | 2530.6 | 6.564 | 2064.2 | 2061.9 | 0 | 0 | -77834.5 | 17.6953 |
| 800 | 6.066 | 3126.3 | 7.359 | 2760.9 | 2657.6 | 0 | 0 | -77735.7 | 14.6596 |
| 900 | 6.264 | 3743.8 | 8.086 | 3533.6 | 3275.1 | 0 | 0 | -77615.0 | 12.3018 |
| 1000 | 6.502 | 4383.1 | 8.759 | 4375.9 | 3914.4 | 0 | 0 | -77472.5 | 10.4187 |
| 1100 | 6.720 | 5044.2 | 9.389 | 5283.7 | 4575.5 | 0 | 0 | -77308.2 | 8.8811 |
| 1200 | 6.938 | 5727.1 | 9.983 | 6252.5 | 5258.4 | 0 | 0 | -77122.1 | 7.6026 |
| 1300 | 7.156 | 6431.8 | 10.547 | 7279.3 | 5963.1 | 0 | 0 | -76914.2 | 6.5236 |
| 1400 | 7.374 | 7158.3 | 11.086 | 8362.1 | 6685.6 | 0 | 0 | -76684.6 | 5.6015 |
| 1500 | 7.592 | 7906.6 | 11.602 | 9496.4 | 7437.9 | 0 | 0 | -76433.1 | 4.8047 |
| 1560 | 7.723 | 8366.0 | 11.902 | 10201.5 | 7857.3 | 0 | 0 | -76250.3 | 4.3765 |
| 1560 | 7.2 | 11886.0 | 14.159 | 10201.5 | 11417.3 | 0 | 0 | -72748.0 | 4.3765 |
| 1600 | 7.2 | 12174.0 | 14.341 | 10771.6 | 11705.3 | 0 | 0 | -72662.5 | 4.1222 |
| 1700 | 7.2 | 12894.0 | 14.777 | 12226.9 | 12425.3 | 0 | 0 | -72439.3 | 3.5392 |
| 1800 | 7.2 | 13614.0 | 15.189 | 13726.2 | 13145.3 | 0 | 0 | -72216.1 | 3.0227 |
| 1900 | 7.2 | 14334.0 | 15.578 | 15264.2 | 13865.3 | 0 | 0 | -71993.0 | 2.5619 |
| 2000 | 7.2 | 15054.0 | 15.947 | 16840.0 | 14585.3 | 0 | 0 | -71769.8 | 2.1484 |
| 2100 | 7.2 | 15774.0 | 16.299 | 18453.9 | 15305.3 | 0 | 0 | -71546.7 | 1.7757 |
| 2200 | 7.2 | 16494.0 | 16.634 | 20100.8 | 16025.3 | 0 | 0 | -71323.7 | 1.4378 |
| 2300 | 7.2 | 17214.0 | 16.954 | 21780.2 | 16745.3 | 0 | 0 | -71100.8 | 1.1302 |
| 2400 | 7.2 | 17934.0 | 17.260 | 23490.0 | 17465.3 | 0 | 0 | -70878.1 | 0.8491 |
| 2500 | 7.2 | 18654.0 | 17.554 | 25231.0 | 18185.3 | 0 | 0 | -70655.6 | 0.5913 |
| 2600 | 7.2 | 19374.0 | 17.836 | 26999.6 | 18905.3 | 0 | 0 | -70433.6 | 0.3541 |
| 2700 | 7.2 | 20094.0 | 18.108 | 28797.6 | 19625.3 | 0 | 0 | -70212.1 | 0.1352 |
| 2800 | 7.2 | 20814.0 | 18.370 | 30622.0 | 20345.3 | 0 | 0 | -69991.3 | -0.0674 |
| 2900 | 7.2 | 21534.0 | 18.623 | 32472.7 | 21065.3 | 0 | 0 | -69771.5 | -0.2554 |
| 3000 | 7.2 | 22254.0 | 18.867 | 34347.0 | 21785.3 | 0 | 0 | -69552.8 | -0.4304 |
| 3100 | 7.2 | 22974.0 | 19.103 | 36245.3 | 22505.3 | 0 | 0 | -69335.7 | -0.5936 |
| 3200 | 7.2 | 23694.0 | 19.331 | 38165.2 | 23225.3 | 0 | 0 | -69120.4 | -0.7463 |
| 3300 | 7.2 | 24414.0 | 19.553 | 40110.9 | 23945.3 | 0 | 0 | -68907.3 | -0.8890 |
| 3400 | 7.2 | 25134.0 | 19.768 | 42077.2 | 24665.3 | 0 | 0 | -68696.8 | -1.0230 |
| 3500 | 7.2 | 25854.0 | 19.977 | 44065.5 | 25385.3 | 0 | 0 | -68489.3 | -1.1489 |
| 3600 | 7.2 | 26574.0 | 20.179 | 46070.4 | 26105.3 | 0 | 0 | -68285.2 | -1.2677 |
| 3700 | 7.2 | 27294.0 | 20.377 | 48100.9 | 26825.3 | 0 | 0 | -68085.2 | -1.3794 |
| 3800 | 7.2 | 28014.0 | 20.569 | 50148.2 | 27545.3 | 0 | 0 | -67889.6 | -1.4851 |
| 3900 | 7.2 | 28734.0 | 20.756 | 52214.4 | 28265.3 | 0 | 0 | -67699.0 | -1.5851 |
| 4000 | 7.2 | 29454.0 | 20.938 | 54298.0 | 28985.3 | 0 | 0 | -67513.8 | -1.6799 |
| 4100 | 7.2 | 30174.0 | 21.116 | 56401.6 | 29705.3 | 0 | 0 | -67334.7 | -1.7697 |
| 4200 | 7.2 | 30894.0 | 21.289 | 58519.8 | 30425.3 | 0 | 0 | -67162.1 | -1.8551 |
| 4300 | 7.2 | 31614.0 | 21.459 | 60659.7 | 31145.3 | 0 | 0 | -66996.5 | -1.9362 |
| 4400 | 7.2 | 32334.0 | 21.624 | 62811.6 | 31865.3 | 0 | 0 | -66838.4 | -2.0136 |
| 4500 | 7.2 | 33054.0 | 21.786 | 64983.0 | 32585.3 | 0 | 0 | -66688.3 | -2.0872 |
| 4600 | 7.2 | 33774.0 | 21.944 | 67168.4 | 33305.3 | 0 | 0 | -66546.7 | -2.1576 |
| 4700 | 7.2 | 34494.0 | 22.099 | 69371.3 | 34025.3 | 0 | 0 | -66414.0 | -2.2248 |
| 4800 | 7.2 | 35214.0 | 22.251 | 71590.8 | 34745.3 | 0 | 0 | -66290.6 | -2.2889 |
| 4900 | 7.2 | 35934.0 | 22.399 | 73821.1 | 35465.3 | 0 | 0 | -66177.0 | -2.3506 |
| 5000 | 7.2 | 36654.0 | 22.545 | 76071.0 | 36185.3 | 0 | 0 | -66073.3 | -2.4095 |
| 5100 | 7.2 | 37374.0 | 22.687 | 78329.7 | 36905.3 | 0 | 0 | -65980.1 | -2.4662 |
| 5200 | 7.2 | 38094.0 | 22.827 | 80606.4 | 37625.3 | 0 | 0 | -65897.4 | -2.5205 |
| 5300 | 7.2 | 38814.0 | 22.964 | 82895.2 | 38345.3 | 0 | 0 | -65825.7 | -2.5727 |
| 5400 | 7.2 | 39534.0 | 23.099 | 85200.6 | 39065.3 | 0 | 0 | -65765.1 | -2.6229 |
| 5500 | 7.2 | 40254.0 | 23.231 | 87516.5 | 39785.3 | 0 | 0 | -65715.7 | -2.6713 |
| 5600 | 7.2 | 40974.0 | 23.361 | 89847.6 | 40505.3 | 0 | 0 | -65677.8 | -2.7178 |
| 5700 | 7.2 | 41694.0 | 23.488 | 92187.6 | 41225.3 | 0 | 0 | -65651.3 | -2.7629 |
| 5800 | 7.2 | 42414.0 | 23.613 | 94541.4 | 41945.3 | 0 | 0 | -65636.4 | -2.8063 |
| 5900 | 7.2 | 43134.0 | 23.736 | 96908.4 | 42665.3 | 0 | 0 | -65633.1 | -2.8482 |
| 6000 | 7.2 | 43854.0 | 23.857 | 99288.0 | 43385.3 | 0 | 0 | -65641.3 | -2.8888 |

^a H_O^o refers to crystal state.^bMelting point.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(45) Be (gas); molecular weight, 9.013

| T, °K | C_p^0 , cal/mole °K | $H_T^0 - H_0^0$, cal/mole | S_T^0 , cal/mole °K | $-(F_T^0 - H_0^0)$, cal/mole | H_T^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_T^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_T^0 , cal/mole | $\log_{10} K$ |
| C | ----- | C | ----- | 0 | 76418.7 | 76887.4 | ----- | 0 | ----- |
| 1CC | 4.9681 | 456.8 | 27.117E | 2215.0 | 76915.6 | 77374.5 | -163.1957 | 0 | 0 |
| 2CC | 4.9681 | 953.6 | 30.5614 | 5118.7 | 77412.4 | 77731.8 | -78.4808 | 0 | 0 |
| 258.15 | 4.9681 | 1481.3 | 32.5451 | 8222.1 | 77500.0 | 77900.0 | -50.4891 | 0 | 0 |
| 3CC | 4.9681 | 1450.4 | 32.5759 | 8282.3 | 77909.2 | 77902.1 | -50.1370 | 0 | 0 |
| 4CC | 4.9681 | 1967.3 | 34.0051 | 11614.8 | 78406.0 | 77960.4 | -35.9438 | 0 | 0 |
| 5CC | 4.9681 | 2484.1 | 35.1137 | 15072.8 | 78902.8 | 77955.2 | -27.4249 | 0 | 0 |
| 6CC | 4.9681 | 2980.9 | 36.0195 | 18630.8 | 79399.6 | 77909.7 | -21.7475 | 0 | 0 |
| 7CC | 4.9681 | 3477.7 | 36.7854 | 22272.0 | 79896.4 | 77834.5 | -17.6953 | 0 | 0 |
| 8CC | 4.9681 | 3974.5 | 37.4488 | 25984.5 | 80393.3 | 77735.7 | -14.6596 | 0 | 0 |
| 9CC | 4.9681 | 4471.3 | 38.0335 | 29759.2 | 80890.1 | 77615.0 | -12.3018 | 0 | 0 |
| 10CC | 4.9681 | 4968.1 | 38.5574 | 33589.2 | 81386.9 | 77472.5 | -10.4187 | 0 | 0 |
| 11CC | 4.9681 | 5465.0 | 39.0309 | 37469.0 | 81883.7 | 77308.2 | -8.8811 | 0 | 0 |
| 12CC | 4.9681 | 5961.8 | 39.4632 | 41394.0 | 82380.5 | 77122.1 | -7.6026 | 0 | 0 |
| 13CC | 4.9682 | 6458.6 | 39.8606 | 45360.5 | 82877.3 | 76914.2 | -6.5236 | 0 | 0 |
| 14CC | 4.9682 | 6955.4 | 40.2290 | 49365.2 | 83374.2 | 76684.6 | -5.6015 | 0 | 0 |
| 15CC | 4.9682 | 7452.2 | 40.5718 | 53405.5 | 83871.0 | 76433.1 | -4.8047 | 0 | 0 |
| 16CC | 4.9682 | 7949.0 | 40.8924 | 57478.8 | 84367.8 | 72662.5 | -4.1222 | 0 | 0 |
| 17CC | 4.9682 | 8445.9 | 41.1936 | 61583.3 | 84864.6 | 72439.3 | -3.5392 | 0 | 0 |
| 18CC | 4.9683 | 8942.7 | 41.4776 | 65717.0 | 85361.4 | 72216.1 | -3.0227 | 0 | 0 |
| 19CC | 4.9684 | 9439.5 | 41.7462 | 69878.3 | 85858.3 | 71993.0 | -2.5619 | 0 | 0 |
| 20CC | 4.9688 | 9936.4 | 42.0011 | 74065.8 | 86355.1 | 71769.8 | -2.1484 | 0 | 0 |
| 21CC | 4.9693 | 10433.3 | 42.2435 | 78278.1 | 86852.0 | 71546.7 | -1.7757 | 0 | 0 |
| 22CC | 4.9703 | 10930.3 | 42.4747 | 82514.1 | 87349.0 | 71323.7 | -1.4378 | 0 | 0 |
| 23CC | 4.9718 | 11427.3 | 42.6957 | 86772.7 | 87846.1 | 71100.8 | -1.1302 | 0 | 0 |
| 24CC | 4.9740 | 11924.6 | 42.9073 | 91052.9 | 88343.4 | 70878.1 | -0.8491 | 0 | 0 |
| 25CC | 4.9773 | 12422.2 | 43.1104 | 95353.9 | 88840.9 | 70655.6 | -0.5933 | 0 | 0 |
| 26CC | 4.9820 | 12920.1 | 43.3057 | 99674.7 | 89338.9 | 70433.6 | -0.3541 | 0 | 0 |
| 27CC | 4.9882 | 13418.6 | 43.4935 | 104014.8 | 89837.4 | 70212.1 | -0.1352 | 0 | 0 |
| 28CC | 4.9965 | 13917.9 | 43.6754 | 108373.3 | 90336.6 | 69991.3 | 0.0674 | 0 | 0 |
| 29CC | 5.0072 | 14418.0 | 43.8505 | 112749.7 | 90836.8 | 69771.5 | 0.2554 | 0 | 0 |
| 30CC | 5.0206 | 14919.4 | 44.0205 | 117143.3 | 91338.1 | 69552.8 | 0.4304 | 0 | 0 |
| 31CC | 5.0372 | 15422.2 | 44.1856 | 121553.7 | 91841.0 | 69335.7 | 0.5936 | 0 | 0 |
| 32CC | 5.0572 | 15926.9 | 44.3466 | 125980.3 | 92345.7 | 69120.4 | 0.7463 | 0 | 0 |
| 33CC | 5.0811 | 16433.8 | 44.5020 | 130422.7 | 92852.6 | 68907.3 | 0.8890 | 0 | 0 |
| 34CC | 5.1092 | 16943.3 | 44.6541 | 134880.6 | 93362.1 | 68696.8 | 1.0230 | 0 | 0 |
| 35CC | 5.1417 | 17455.8 | 44.8026 | 139353.4 | 93874.6 | 68489.3 | 1.1489 | 0 | 0 |
| 36CC | 5.1789 | 17971.8 | 44.9480 | 143841.0 | 94390.5 | 68285.2 | 1.2677 | 0 | 0 |
| 37CC | 5.2210 | 18451.8 | 45.0905 | 148342.9 | 94910.5 | 68085.2 | 1.3794 | 0 | 0 |
| 38CC | 5.2680 | 19016.2 | 45.2303 | 152859.0 | 95434.9 | 67889.6 | 1.4851 | 0 | 0 |
| 39CC | 5.3203 | 19545.5 | 45.3678 | 157388.9 | 95964.3 | 67699.0 | 1.5851 | 0 | 0 |
| 40CC | 5.3777 | 20080.4 | 45.5032 | 161932.5 | 96499.1 | 67513.8 | 1.6799 | 0 | 0 |
| 41CC | 5.4403 | 20621.2 | 45.6366 | 166489.5 | 97040.0 | 67334.7 | 1.7697 | 0 | 0 |
| 42CC | 5.5080 | 21168.6 | 45.7687 | 171059.8 | 97587.4 | 67162.1 | 1.8551 | 0 | 0 |
| 43CC | 5.5808 | 21723.0 | 45.8991 | 175643.2 | 98141.8 | 66996.5 | 1.9362 | 0 | 0 |
| 44CC | 5.6585 | 22284.9 | 46.0283 | 180239.6 | 98703.7 | 66838.4 | 2.0136 | 0 | 0 |
| 45CC | 5.7409 | 22854.9 | 46.1564 | 184848.8 | 99273.6 | 66688.3 | 2.0872 | 0 | 0 |
| 46CC | 5.8278 | 23433.3 | 46.2835 | 189470.8 | 99852.0 | 66546.7 | 2.1576 | 0 | 0 |
| 47CC | 5.9190 | 24020.6 | 46.4098 | 194105.5 | 100439.3 | 66414.0 | 2.2248 | 0 | 0 |
| 48CC | 6.0141 | 24617.2 | 46.5354 | 198752.7 | 101035.9 | 66290.6 | 2.2889 | 0 | 0 |
| 49CC | 6.1129 | 25223.5 | 46.6604 | 203412.5 | 101642.3 | 66177.0 | 2.3506 | 0 | 0 |
| 50CC | 6.2150 | 25839.9 | 46.7845 | 208084.8 | 102258.6 | 66073.3 | 2.4095 | 0 | 0 |
| 51CC | 6.3202 | 26466.6 | 46.9090 | 212769.5 | 102885.4 | 65980.1 | 2.4662 | 0 | 0 |
| 52CC | 6.4279 | 27104.0 | 47.0328 | 217466.6 | 103522.7 | 65897.4 | 2.5205 | 0 | 0 |
| 53CC | 6.5379 | 27752.3 | 47.1563 | 222176.1 | 104171.0 | 65825.7 | 2.5727 | 0 | 0 |
| 54CC | 6.6498 | 28411.6 | 47.2795 | 226897.9 | 104830.4 | 65765.1 | 2.6229 | 0 | 0 |
| 55CC | 6.7632 | 29082.3 | 47.4026 | 231632.0 | 105501.0 | 65715.7 | 2.6713 | 0 | 0 |
| 56CC | 6.8777 | 29764.3 | 47.5255 | 236378.4 | 106183.1 | 65677.8 | 2.7178 | 0 | 0 |
| 57CC | 6.9931 | 30457.9 | 47.6482 | 241137.1 | 106876.6 | 65651.3 | 2.7629 | 0 | 0 |
| 58CC | 7.1089 | 31162.9 | 47.7705 | 245908.0 | 107581.7 | 65636.4 | 2.8063 | 0 | 0 |
| 59CC | 7.2247 | 31879.6 | 47.8934 | 250691.2 | 108298.4 | 65633.1 | 2.8482 | 0 | 0 |
| 60CC | 7.3404 | 32607.9 | 48.0158 | 255486.7 | 109026.6 | 65641.3 | 2.8888 | 0 | 0 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Be, 1560° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (42) BS (gas); molecular weight, 42.886

| T, °K | C_p^0 , cal/mole °K | $H_T^0 - H_0^0$, cal/mole | S_T^0 , cal/mole °K | $-(F_T^0 - H_0^0)$, cal/mole | H_T^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| C | ----- | 0 | ----- | 0 | 80238.8 | 81684.2 | ----- | -118000.0 | ----- |
| 100 | 6.9567 | 694.8 | 43.998E | 3705.0 | 81033.6 | 82208.2 | -170.7251 | -118329.2 | 253.9325 |
| 200 | 6.9884 | 1391.3 | 4E.8252 | E373.8 | 81730.0 | 82432.1 | -80.7781 | -118668.1 | 124.4956 |
| 298.15 | 7.1E25 | 2085.2 | 51.6457 | 13312.9 | 82424.0 | 82424.0 | -51.1211 | -119016.8 | 81.7544 |
| 300 | 7.1E77 | 2098.5 | 51.6901 | 13408.5 | 82437.3 | 82422.4 | -50.7488 | -119023.2 | 81.2164 |
| 400 | 7.4593 | 2832.6 | 53.7997 | 18687.3 | 83171.3 | 81731.6 | -35.7619 | -119347.2 | 59.5131 |
| 500 | 7.7593 | 3597.9 | 55.5062 | 24155.2 | 83536.6 | 81150.0 | -26.8589 | -119628.2 | 46.4575 |
| 600 | 8.0441 | 4350.5 | 56.9507 | 29779.9 | 84729.3 | 80624.9 | -20.9656 | -119871.0 | 37.7345 |
| 700 | 8.2337 | 5204.9 | 58.2056 | 35539.1 | 85543.6 | 80139.3 | -16.7823 | -120083.7 | 31.4918 |
| 800 | 8.3791 | 6035.8 | 59.3150 | 41416.2 | 86374.6 | 79669.0 | -13.6639 | -120273.3 | 26.8020 |
| 900 | 8.4515 | 6879.6 | 60.3087 | 47398.2 | 87218.3 | 79182.3 | -11.2527 | -120445.3 | 23.1488 |
| 1000 | 8.5755 | 7733.3 | 61.2081 | 53474.8 | 88072.1 | 78679.6 | -9.3358 | -120603.6 | 20.2223 |
| 1100 | 8.6496 | 8594.9 | 62.0292 | 59637.2 | 88933.6 | 78159.8 | -7.7776 | -120751.2 | 17.8248 |
| 1200 | 8.7064 | 9462.8 | 62.7843 | 65878.4 | 89801.5 | 77622.7 | -6.4879 | -120890.4 | 15.8245 |
| 1300 | 8.7533 | 10335.8 | 63.4831 | 72192.2 | 90674.6 | 77071.1 | -5.4042 | -121022.7 | 14.1300 |
| 1400 | 8.7925 | 11213.2 | 64.1333 | 78573.4 | 91551.9 | 76507.6 | -4.4821 | -121149.6 | 12.6761 |
| 1500 | 8.8260 | 12094.2 | 64.7411 | 85017.4 | 92432.9 | 75935.1 | -3.6888 | -121272.1 | 11.4147 |
| 1600 | 8.8552 | 12978.2 | 65.3116 | 91520.4 | 93317.0 | 75355.0 | -2.9999 | -121391.1 | 10.3099 |
| 1700 | 8.8812 | 13865.1 | 65.8492 | 98078.7 | 94203.8 | 74768.4 | -2.3968 | -121507.3 | 9.3341 |
| 1800 | 8.9049 | 14754.4 | 66.3576 | 104689.2 | 95093.2 | 74176.1 | -1.8649 | -121621.3 | 8.4659 |
| 1900 | 8.9274 | 15646.0 | 66.8397 | 111349.3 | 95984.8 | 73578.9 | -1.3928 | -121733.7 | 7.6884 |
| 2000 | 8.9493 | 16539.9 | 67.2981 | 118056.4 | 96878.6 | 72977.5 | -0.9713 | -121844.7 | 6.9880 |
| 2100 | 8.9716 | 17435.9 | 67.7353 | 124808.2 | 97774.7 | 72372.6 | -0.5931 | -121954.6 | 6.3537 |
| 2200 | 8.9948 | 18334.2 | 68.1532 | 131602.8 | 98673.0 | 71765.0 | -0.2523 | -122063.5 | 5.7766 |
| 2300 | 9.0197 | 19234.9 | 68.5536 | 138438.3 | 99573.7 | 71155.3 | 0.0565 | -122171.6 | 5.2492 |
| 2400 | 9.0469 | 20138.2 | 68.9380 | 145313.0 | 100477.0 | 70549.1 | 0.3185 | -122278.7 | 4.7653 |
| 2500 | 9.0770 | 21044.4 | 69.3075 | 152225.4 | 101383.2 | 64580.8 | 0.5549 | -122384.6 | 4.3197 |
| 2600 | 9.1104 | 21953.7 | 69.6646 | 159174.1 | 102292.5 | | | -122489.3 | 3.9080 |
| 2700 | 9.1474 | 22866.6 | 70.0091 | 166157.9 | 103205.3 | | | -122592.3 | 3.5266 |
| 2800 | 9.1886 | 23783.4 | 70.3425 | 173175.6 | 104122.1 | | | -122693.4 | 3.1720 |
| 2900 | 9.2339 | 24704.4 | 70.6657 | 180226.1 | 105043.2 | | | -122792.1 | 2.8417 |
| 3000 | 9.2837 | 25630.3 | 70.9796 | 187308.4 | 105969.0 | | | -122888.0 | 2.5331 |
| 3100 | 9.3379 | 26561.3 | 71.2848 | 194421.7 | 106900.1 | | | -122980.6 | 2.2442 |
| 3200 | 9.3965 | 27498.0 | 71.5822 | 201565.1 | 107836.8 | | | -123069.5 | 1.9732 |
| 3300 | 9.4595 | 28440.8 | 71.8723 | 208737.9 | 108779.5 | | | -123154.2 | 1.7184 |
| 3400 | 9.5266 | 29390.0 | 72.1557 | 215939.4 | 109728.8 | | | -123234.2 | 1.4785 |
| 3500 | 9.5978 | 30346.2 | 72.4325 | 223168.8 | 110685.0 | | | -123309.1 | 1.2521 |
| 3600 | 9.6726 | 31309.7 | 72.7043 | 230425.7 | 111648.5 | | | -123378.4 | 1.0382 |
| 3700 | 9.7509 | 32280.5 | 72.9704 | 237709.5 | 112619.6 | | | -123441.7 | 0.8357 |
| 3800 | 9.8323 | 33260.0 | 73.2315 | 245019.6 | 113598.8 | | | -123498.7 | 0.6438 |
| 3900 | 9.9163 | 34247.4 | 73.4880 | 252355.7 | 114586.2 | | | -123549.1 | 0.4616 |
| 4000 | 10.0028 | 35243.4 | 73.7401 | 259717.1 | 115582.1 | | | -123592.4 | 0.2885 |
| 4100 | 10.0912 | 36248.0 | 73.9882 | 267103.5 | 116586.8 | | | -123628.5 | 0.1238 |
| 4200 | 10.1811 | 37261.6 | 74.2324 | 274514.6 | 117600.4 | | | -123657.1 | -0.0331 |
| 4300 | 10.2723 | 38284.3 | 74.4731 | 281949.9 | 118623.1 | | | -123678.2 | -0.1828 |
| 4400 | 10.3642 | 39316.1 | 74.7103 | 289409.1 | 119654.9 | | | -123691.5 | -0.3256 |
| 4500 | 10.4566 | 40357.2 | 74.9442 | 296891.8 | 120695.9 | | | -123696.9 | -0.4622 |
| 4600 | 10.5490 | 41407.4 | 75.1751 | 304397.8 | 121746.2 | | | -123694.5 | -0.5928 |
| 4700 | 10.6411 | 42466.9 | 75.4025 | 311926.8 | 122805.7 | | | -123684.3 | -0.7178 |
| 4800 | 10.7325 | 43535.6 | 75.6275 | 319478.3 | 123874.4 | | | -123666.3 | -0.8376 |
| 4900 | 10.8231 | 44613.4 | 75.8501 | 327052.3 | 124952.2 | | | -123640.5 | -0.9525 |
| 5000 | 10.9124 | 45700.2 | 76.0697 | 334648.3 | 126039.0 | | | -123607.1 | -1.0628 |
| 5100 | 11.0002 | 46795.8 | 76.2867 | 342266.1 | 127134.6 | | | -123566.3 | -1.1687 |
| 5200 | 11.0863 | 47900.2 | 76.5011 | 349905.5 | 128238.9 | | | -123518.2 | -1.2705 |
| 5300 | 11.1705 | 49013.0 | 76.7131 | 357566.2 | 129351.8 | | | -123463.0 | -1.3684 |
| 5400 | 11.2526 | 50134.2 | 76.9226 | 365248.1 | 130473.0 | | | -123401.0 | -1.4627 |
| 5500 | 11.3324 | 51263.5 | 77.1299 | 372950.7 | 131602.2 | | | -123332.4 | -1.5534 |
| 5600 | 11.4097 | 52400.6 | 77.3347 | 380673.9 | 132739.4 | | | -123257.6 | -1.6409 |
| 5700 | 11.4845 | 53545.3 | 77.5374 | 388417.6 | 133884.1 | | | -123176.7 | -1.7253 |
| 5800 | 11.5566 | 54697.4 | 77.7377 | 396181.3 | 135036.2 | | | -123090.1 | -1.8067 |
| 5900 | 11.6260 | 55856.6 | 77.9359 | 403965.0 | 136195.3 | | | -122998.2 | -1.8852 |
| 6000 | 11.6926 | 57022.5 | 78.131E | 411768.4 | 137361.3 | | | -122901.2 | -1.9612 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K and of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (38) BOCI (gas); molecular weight, 62.277

| T_r °K | C_p° cal/mole °K | $H_f^\circ - H_0^\circ$ cal/mole | S_f° cal/mole °K | $-(F_f^\circ - H_0^\circ)$ cal/mole | H_f° cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|----------------------------|-------------------------------------|----------------------------|----------------------------------------|-------------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$ cal/mole | $\log_{10} K_f$ | ΔH_f° cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -90510.1 | -88084.3 | ----- | -309400.0 | ----- |
| 100 | 7.2239 | 699.6 | 46.8935 | 3989.7 | -89810.5 | -88085.6 | 193.2749 | -310249.5 | 666.9288 |
| 200 | 9.0902 | 1511.0 | 52.4412 | 8977.3 | -88999.2 | -88064.8 | 97.0290 | -310992.7 | 327.5880 |
| 298.15 | 10.5555 | 2481.1 | 56.3680 | 14325.1 | -88029.1 | -88029.1 | 65.3580 | -311536.4 | 215.6310 |
| 300 | 10.5765 | 2500.6 | 56.4334 | 14429.4 | -88009.5 | -88028.4 | 64.9599 | -311545.3 | 214.2228 |
| 400 | 11.4695 | 3606.4 | 59.6083 | 20237.0 | -86903.8 | -88018.8 | 48.9292 | -311984.8 | 157.4479 |
| 500 | 12.0709 | 4785.0 | 62.2359 | 26332.9 | -85725.1 | -88041.7 | 39.3103 | -312354.6 | 123.3382 |
| 600 | 12.5280 | 6015.8 | 64.4787 | 32671.4 | -84494.3 | -88083.9 | 32.8955 | -312671.4 | 100.5732 |
| 700 | 12.8952 | 7287.6 | 66.4384 | 39219.3 | -83222.5 | -88140.4 | 28.3111 | -312943.9 | 84.2970 |
| 800 | 13.1954 | 8592.7 | 68.1806 | 45951.8 | -81917.5 | -88207.9 | 24.8699 | -313178.6 | 72.0799 |
| 900 | 13.4417 | 9924.9 | 69.7495 | 52849.6 | -80585.2 | -88288.9 | 22.1915 | -313381.3 | 62.5711 |
| 1000 | 13.6444 | 11279.5 | 71.1766 | 59897.0 | -79230.6 | -88382.3 | 20.0466 | -313557.0 | 54.9594 |
| 1100 | 13.8117 | 12652.6 | 72.4851 | 67081.0 | -77857.5 | -88489.5 | 18.2897 | -313710.1 | 48.7284 |
| 1200 | 13.9505 | 14040.9 | 73.6930 | 74390.7 | -76469.2 | -88611.2 | 16.8237 | -313844.1 | 43.5335 |
| 1300 | 14.0662 | 15441.9 | 74.8143 | 81816.7 | -75068.2 | -88745.3 | 15.5816 | -313962.2 | 39.1360 |
| 1400 | 14.1633 | 16853.6 | 75.8604 | 89351.0 | -73656.6 | -88889.6 | 14.5150 | -314066.8 | 35.3655 |
| 1500 | 14.2454 | 18274.1 | 76.8405 | 96986.6 | -72236.0 | -89042.1 | 13.5892 | -314160.0 | 32.0966 |
| 1600 | 14.3151 | 19702.2 | 77.7621 | 104717.2 | -70807.9 | -89201.7 | 12.7777 | -314243.4 | 29.2355 |
| 1700 | 14.3748 | 21136.8 | 78.6318 | 112537.3 | -69373.3 | -89367.9 | 12.0604 | -314318.4 | 26.7104 |
| 1800 | 14.4262 | 22576.9 | 79.4550 | 120442.0 | -67933.2 | -89540.5 | 11.4215 | -314386.3 | 24.4654 |
| 1900 | 14.4707 | 24021.8 | 80.2362 | 128426.9 | -66488.3 | -89719.2 | 10.8488 | -314447.9 | 22.4563 |
| 2000 | 14.5094 | 25470.9 | 80.9794 | 136488.0 | -65039.3 | -89903.7 | 10.3324 | -314504.1 | 20.6477 |
| 2100 | 14.5433 | 26923.5 | 81.6882 | 144621.6 | -63586.6 | -90093.8 | 9.8641 | -314555.6 | 19.0111 |
| 2200 | 14.5732 | 28379.4 | 82.3654 | 152824.6 | -62130.7 | -90289.2 | 9.4373 | -314603.0 | 17.5231 |
| 2300 | 14.5995 | 29838.1 | 83.0138 | 161093.7 | -60672.1 | -90489.7 | 9.0479 | -314646.8 | 16.1642 |
| 2400 | 14.6229 | 31299.2 | 83.6357 | 169426.4 | -59210.9 | -90645.4 | 8.6699 | -314687.5 | 14.9184 |
| 2500 | 14.6438 | 32762.6 | 84.2331 | 177820.1 | -57747.6 | -90817.1 | 8.3197 | -314725.4 | 13.7722 |
| 2600 | 14.6624 | 34227.9 | 84.8078 | 186272.3 | -56282.3 | -90970.1 | 7.9958 | -314761.0 | 12.7139 |
| 2700 | 14.6792 | 35695.0 | 85.3614 | 194780.9 | -54815.2 | -90884.6 | 7.6951 | -314794.6 | 11.7340 |
| 2800 | 14.6943 | 37163.7 | 85.8956 | 203343.9 | -53346.5 | -90900.7 | 7.4153 | -314826.5 | 10.8240 |
| 2900 | 14.7079 | 38633.8 | 86.4115 | 211959.4 | -51876.3 | -90918.5 | 7.1542 | -314857.0 | 9.9766 |
| 3000 | 14.7203 | 40105.2 | 86.9103 | 220625.6 | -50404.9 | -90938.1 | 6.9098 | -314886.2 | 9.1857 |
| 3100 | 14.7316 | 41577.8 | 87.3932 | 229340.9 | -48932.3 | -90959.5 | 6.6811 | -314914.5 | 8.4457 |
| 3200 | 14.7419 | 43051.5 | 87.8610 | 238103.8 | -47458.6 | -90982.8 | 6.4657 | -314942.0 | 7.7519 |
| 3300 | 14.7512 | 44526.2 | 88.3148 | 246912.7 | -45984.0 | -90997.9 | 6.2633 | -314969.0 | 7.1001 |
| 3400 | 14.7599 | 46001.7 | 88.7553 | 255766.3 | -44508.4 | -90983.9 | 6.0721 | -314995.6 | 6.4866 |
| 3500 | 14.7678 | 47478.1 | 89.1833 | 264663.3 | -43032.0 | -90963.7 | 5.8914 | -315022.0 | 5.9081 |
| 3600 | 14.7750 | 48955.3 | 89.5994 | 273602.6 | -41554.9 | -90944.4 | 5.7205 | -315048.4 | 5.3617 |
| 3700 | 14.7818 | 50433.1 | 90.0043 | 282582.8 | -40077.0 | -90926.9 | 5.5585 | -315075.0 | 4.8448 |
| 3800 | 14.7880 | 51911.6 | 90.3986 | 291603.1 | -38598.5 | -90916.2 | 5.4045 | -315101.8 | 4.3550 |
| 3900 | 14.7937 | 53390.7 | 90.7828 | 300662.2 | -37119.5 | -90939.2 | 5.2581 | -315129.1 | 3.8903 |
| 4000 | 14.7991 | 54870.3 | 91.1574 | 309759.3 | -35639.8 | -90935.0 | 5.1187 | -315156.9 | 3.4489 |
| 4100 | 14.8041 | 56350.5 | 91.5229 | 318893.4 | -34159.7 | -90974.6 | 4.9858 | -315185.4 | 3.0289 |
| 4200 | 14.8087 | 57831.1 | 91.8797 | 328063.6 | -32679.0 | -100115.7 | 4.8588 | -315214.8 | 2.6289 |
| 4300 | 14.8130 | 59312.2 | 92.2282 | 337269.0 | -31197.9 | -100358.6 | 4.7374 | -315245.0 | 2.2474 |
| 4400 | 14.8170 | 60793.7 | 92.5688 | 346509.0 | -29716.4 | -100603.0 | 4.6214 | -315276.4 | 1.8833 |
| 4500 | 14.8208 | 62275.6 | 92.9018 | 355782.6 | -28234.5 | -100849.1 | 4.5104 | -315308.8 | 1.5353 |
| 4600 | 14.8243 | 63757.9 | 93.2276 | 365089.1 | -26752.3 | -101096.7 | 4.4037 | -315342.6 | 1.2024 |
| 4700 | 14.8277 | 65240.5 | 93.5465 | 374427.8 | -25269.7 | -101345.8 | 4.3013 | -315377.0 | 0.8836 |
| 4800 | 14.8308 | 66723.4 | 93.8587 | 383798.2 | -23786.7 | -101596.5 | 4.2030 | -315414.2 | 0.5781 |
| 4900 | 14.8337 | 68206.6 | 94.1645 | 393199.4 | -22303.5 | -101848.6 | 4.1086 | -315452.3 | 0.2850 |
| 5000 | 14.8365 | 69690.1 | 94.4642 | 402630.8 | -20820.0 | -102102.2 | 4.0175 | -315492.1 | 0.0036 |
| 5100 | 14.8391 | 71173.9 | 94.7580 | 412092.0 | -19336.2 | -102357.2 | 3.9300 | -315533.7 | -0.2668 |
| 5200 | 14.8415 | 72657.9 | 95.0462 | 421582.3 | -17852.2 | -102613.7 | 3.8455 | -315577.0 | -0.5269 |
| 5300 | 14.8439 | 74142.2 | 95.3289 | 431101.1 | -16367.9 | -102871.5 | 3.7640 | -315622.3 | -0.7771 |
| 5400 | 14.8461 | 75626.7 | 95.6064 | 440647.9 | -14883.4 | -103130.7 | 3.6854 | -315669.6 | -1.0181 |
| 5500 | 14.8481 | 77111.4 | 95.8788 | 450222.2 | -13398.7 | -103391.3 | 3.6093 | -315719.0 | -1.2504 |
| 5600 | 14.8501 | 78596.3 | 96.1464 | 459823.5 | -11913.8 | -103653.2 | 3.5359 | -315770.6 | -1.4745 |
| 5700 | 14.8520 | 80081.4 | 96.4093 | 469451.3 | -10428.7 | -103916.5 | 3.4650 | -315824.4 | -1.6907 |
| 5800 | 14.8537 | 81566.7 | 96.6676 | 479105.2 | -8943.4 | -104181.0 | 3.3961 | -315880.5 | -1.8995 |
| 5900 | 14.8554 | 83052.2 | 96.9215 | 488784.7 | -7458.0 | -104446.9 | 3.3295 | -315939.1 | -2.1012 |
| 6000 | 14.8570 | 84537.8 | 97.1712 | 498489.3 | -5972.3 | -104714.0 | 3.2650 | -316000.1 | -2.2963 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(35) B₂O₃ (gas); molecular weight, 69.64

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -205343.4 | -201647.9 | ----- | -646169.0 | ----- |
| 100 | 9.0459 | 819.0 | 53.7820 | 4559.2 | -204524.4 | -201881.4 | 439.3382 | -647982.1 | 1392.9223 |
| 200 | 12.9699 | 1918.5 | 61.2435 | 10330.2 | -203425.0 | -201985.5 | 218.6848 | -649551.0 | 684.1704 |
| 298.15 | 15.8476 | 3343.4 | 67.0021 | 16633.2 | -202000.0 | -202000.0 | 146.0273 | -650669.9 | 450.3343 |
| 300 | 15.8903 | 3372.8 | 67.1003 | 16757.3 | -201970.6 | -201999.9 | 145.1140 | -650688.0 | 447.3932 |
| 400 | 17.7836 | 5062.4 | 71.9480 | 23716.8 | -200281.0 | -202028.3 | 108.3235 | -651546.2 | 328.8184 |
| 500 | 19.1571 | 6912.5 | 76.0707 | 31122.8 | -198430.9 | -202093.0 | 86.2445 | -652221.5 | 257.5886 |
| 600 | 20.2369 | 8884.2 | 79.6625 | 38913.3 | -196459.2 | -202176.1 | 71.5201 | -652762.7 | 210.0574 |
| 700 | 21.1118 | 10953.1 | 82.8500 | 47041.9 | -194390.3 | -202274.2 | 60.9983 | -653199.0 | 176.0809 |
| 800 | 21.8262 | 13101.2 | 85.7173 | 55472.7 | -192242.2 | -202384.6 | 53.1020 | -653551.1 | 150.5831 |
| 900 | 22.4106 | 15314.0 | 88.3230 | 64176.7 | -190029.4 | -202514.8 | 46.9574 | -653835.1 | 130.7418 |
| 1000 | 22.8896 | 17579.8 | 90.7098 | 73130.0 | -187763.6 | -202664.5 | 42.0383 | -654063.7 | 114.8625 |
| 1100 | 23.2839 | 19889.1 | 92.9105 | 82312.4 | -185454.3 | -202837.6 | 38.0103 | -654246.9 | 101.8662 |
| 1200 | 23.6101 | 22234.3 | 94.9509 | 91706.7 | -183109.1 | -203036.3 | 34.6506 | -654392.9 | 91.0333 |
| 1300 | 23.8815 | 24609.3 | 96.8518 | 101297.9 | -180734.1 | -203256.9 | 31.8049 | -654508.1 | 81.8651 |
| 1400 | 24.1090 | 27009.2 | 98.6301 | 111073.0 | -178334.2 | -203495.9 | 29.3627 | -654597.5 | 74.0055 |
| 1500 | 24.3009 | 29429.9 | 100.3002 | 121020.4 | -175913.5 | -203749.4 | 27.2437 | -654665.4 | 67.1929 |
| 1600 | 24.4638 | 31868.4 | 101.8739 | 131129.8 | -173475.0 | -204015.9 | 25.3874 | -654715.0 | 61.2314 |
| 1700 | 24.6031 | 34321.9 | 103.3613 | 141392.3 | -171021.5 | -204294.7 | 23.7470 | -654749.1 | 55.9710 |
| 1800 | 24.7229 | 36788.4 | 104.7710 | 151799.5 | -168555.1 | -204585.7 | 22.2870 | -654770.0 | 51.2948 |
| 1900 | 24.8266 | 39266.0 | 106.1106 | 162344.1 | -166077.5 | -204888.7 | 20.9787 | -654779.5 | 47.1108 |
| 2000 | 24.9168 | 41753.2 | 107.3864 | 173019.5 | -163590.2 | -205203.0 | 19.7997 | -654779.3 | 43.3451 |
| 2100 | 24.9958 | 44249.0 | 108.6040 | 183819.5 | -161094.5 | -205528.7 | 18.7310 | -654770.5 | 39.9381 |
| 2200 | 25.0652 | 46752.1 | 109.7685 | 194738.5 | -158591.4 | -205865.2 | 17.7579 | -654754.6 | 36.8409 |
| 2300 | 25.1265 | 49261.7 | 110.8840 | 205771.5 | -156081.7 | -206212.5 | 16.8682 | -654732.3 | 34.0131 |
| 2400 | 25.1809 | 51777.1 | 111.9546 | 216913.8 | -153566.3 | -212720.5 | 16.0141 | -654704.7 | 31.4210 |
| 2500 | 25.2293 | 54297.7 | 112.9835 | 228161.1 | -151045.7 | -217641.1 | 15.2221 | -654672.5 | 29.0364 |
| 2600 | 25.2727 | 56822.8 | 113.9739 | 239509.2 | -148520.6 | -218014.9 | 14.4898 | -654636.5 | 26.8354 |
| 2700 | 25.3117 | 59352.1 | 114.9284 | 250954.6 | -145991.3 | -218392.5 | 13.8106 | -654597.3 | 24.7975 |
| 2800 | 25.3467 | 61885.0 | 115.8496 | 262493.8 | -143458.4 | -218773.9 | 13.1786 | -654555.6 | 22.9053 |
| 2900 | 25.3784 | 64421.3 | 116.7396 | 274123.5 | -140922.1 | -219159.5 | 12.5894 | -654512.0 | 21.1437 |
| 3000 | 25.4072 | 66960.6 | 117.6005 | 285840.8 | -138382.8 | -219549.2 | 12.0380 | -654466.9 | 19.4996 |
| 3100 | 25.4334 | 69502.7 | 118.4340 | 297642.7 | -135840.7 | -219943.3 | 11.5221 | -654420.8 | 17.9618 |
| 3200 | 25.4572 | 72047.2 | 119.2419 | 309526.7 | -133296.2 | -220341.6 | 11.0367 | -654374.3 | 16.5201 |
| 3300 | 25.4790 | 74594.1 | 120.0256 | 321490.3 | -130749.4 | -220744.3 | 10.5806 | -654327.8 | 15.1659 |
| 3400 | 25.4990 | 77143.0 | 120.7865 | 333531.1 | -128200.5 | -221151.2 | 10.1503 | -654281.6 | 13.8915 |
| 3500 | 25.5173 | 79693.8 | 121.5259 | 345646.8 | -125649.6 | -221562.3 | 9.7435 | -654236.2 | 12.6900 |
| 3600 | 25.5343 | 82246.4 | 122.2450 | 357835.6 | -123097.0 | -221977.5 | 9.3590 | -654191.9 | 11.5553 |
| 3700 | 25.5499 | 84800.6 | 122.9448 | 370095.2 | -120542.8 | -222396.7 | 8.9946 | -654149.0 | 10.4820 |
| 3800 | 25.5643 | 87356.3 | 123.6264 | 382423.9 | -117987.1 | -222819.9 | 8.6486 | -654108.0 | 9.4653 |
| 3900 | 25.5776 | 89913.4 | 124.2906 | 394819.9 | -115430.0 | -223246.9 | 8.3197 | -654069.1 | 8.5007 |
| 4000 | 25.5900 | 92471.8 | 124.9383 | 407281.5 | -112871.6 | -223677.6 | 8.0066 | -654032.6 | 7.5845 |
| 4100 | 25.6016 | 95031.4 | 125.5704 | 419807.1 | -110312.0 | -224111.8 | 7.7083 | -653998.8 | 6.7130 |
| 4200 | 25.6123 | 97592.1 | 126.1874 | 432395.1 | -107751.3 | -224549.6 | 7.4235 | -653968.0 | 5.8830 |
| 4300 | 25.6223 | 100153.8 | 126.7902 | 445044.1 | -105189.6 | -224990.7 | 7.1513 | -653940.3 | 5.0916 |
| 4400 | 25.6317 | 102716.6 | 127.3794 | 457752.6 | -102626.9 | -225435.0 | 6.8913 | -653916.1 | 4.3363 |
| 4500 | 25.6404 | 105280.2 | 127.9555 | 470519.5 | -100063.3 | -225882.5 | 6.6425 | -653895.5 | 3.6146 |
| 4600 | 25.6486 | 107844.6 | 128.5191 | 483343.3 | -97498.8 | -226333.1 | 6.4037 | -653878.8 | 2.9242 |
| 4700 | 25.6563 | 110409.9 | 129.0708 | 496222.9 | -94933.6 | -226786.6 | 6.1744 | -653866.2 | 2.2633 |
| 4800 | 25.6636 | 112975.9 | 129.6110 | 509157.1 | -92367.6 | -227242.9 | 5.9545 | -653857.8 | 1.6299 |
| 4900 | 25.6704 | 115542.6 | 130.1403 | 522144.8 | -89800.9 | -227702.1 | 5.7434 | -653853.9 | 1.0224 |
| 5000 | 25.6768 | 118109.9 | 130.6589 | 535184.8 | -87233.5 | -228163.9 | 5.5399 | -653854.7 | 0.4391 |
| 5100 | 25.6828 | 120677.9 | 131.1675 | 548276.2 | -84665.5 | -228628.4 | 5.3444 | -653860.3 | -0.1212 |
| 5200 | 25.6885 | 123246.5 | 131.6662 | 561418.0 | -82096.9 | -229095.4 | 5.1556 | -653870.8 | -0.6601 |
| 5300 | 25.6939 | 125815.6 | 132.1556 | 574609.1 | -79527.8 | -229564.9 | 4.9737 | -653886.5 | -1.1786 |
| 5400 | 25.6990 | 128385.3 | 132.6359 | 587848.8 | -76958.2 | -230036.8 | 4.7983 | -653907.4 | -1.6779 |
| 5500 | 25.7038 | 130955.4 | 133.1075 | 601136.0 | -74388.0 | -230511.0 | 4.6287 | -653933.8 | -2.1590 |
| 5600 | 25.7084 | 133526.0 | 133.5707 | 614470.0 | -71817.4 | -230987.6 | 4.4650 | -653965.7 | -2.6230 |
| 5700 | 25.7127 | 136097.1 | 134.0258 | 627849.9 | -69246.4 | -231466.4 | 4.3071 | -654003.4 | -3.0708 |
| 5800 | 25.7168 | 138668.5 | 134.4730 | 641274.9 | -66674.9 | -231947.5 | 4.1536 | -654046.9 | -3.5031 |
| 5900 | 25.7207 | 141240.4 | 134.9127 | 654744.3 | -64103.0 | -232430.7 | 4.0055 | -654096.3 | -3.9208 |
| 6000 | 25.7245 | 143812.7 | 135.3450 | 668257.2 | -61530.7 | -232916.0 | 3.8618 | -654151.9 | -4.3247 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(32) BO (gas); molecular weight, 26.82

| T, °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| C | ----- | C | ----- | 0 | 3670.9 | 5000.C | ----- | -187767.3 | ----- |
| 1CC | 6.9566 | 653.9 | 41.0015 | 3406.3 | 4364.8 | 5341.C | -7.2529 | -188125.7 | 406.1732 |
| 2CC | 6.9582 | 1389.6 | 45.8238 | 7775.2 | 5060.5 | 5608.9 | -1.2935 | -188485.5 | 200.4546 |
| 298.15 | 6.9782 | 2073.2 | 48.6044 | 12418.2 | 5744.1 | 5744.1 | 0.7500 | -188812.5 | 132.6024 |
| 300 | 6.9791 | 2086.1 | 48.6476 | 12508.2 | 5757.0 | 5745.6 | 0.7759 | -188818.5 | 131.7490 |
| 4CC | 7.0683 | 2787.8 | 50.6656 | 17478.4 | 6458.7 | 5765.8 | 1.8248 | -189131.8 | 97.3360 |
| 5CC | 7.2299 | 3502.2 | 52.2591 | 22627.3 | 7173.1 | 5705.7 | 2.4521 | -189424.8 | 76.6546 |
| 6CC | 7.4273 | 4234.9 | 53.5945 | 27921.8 | 7905.9 | 5599.8 | 2.8644 | -189695.3 | 62.8463 |
| 7CC | 7.6267 | 4987.7 | 54.7545 | 33340.4 | 8658.7 | 5463.6 | 3.1527 | -189943.2 | 52.9697 |
| 8CC | 7.8100 | 5759.7 | 55.7851 | 38868.4 | 9430.7 | 5305.8 | 3.3628 | -190170.2 | 45.5528 |
| 9CC | 7.9708 | 6549.C | 56.7145 | 44494.1 | 10219.9 | 5127.0 | 3.5214 | -190378.9 | 39.7776 |
| 10CC | 8.1086 | 7353.1 | 57.5617 | 50208.5 | 11024.1 | 4930.3 | 3.6436 | -190571.8 | 35.1525 |
| 11CC | 8.2256 | 8170.C | 58.3401 | 56004.1 | 11840.9 | 4715.7 | 3.7396 | -190751.4 | 31.3646 |
| 12CC | 8.3248 | 8957.7 | 59.0602 | 61874.6 | 12668.6 | 4483.6 | 3.8158 | -190919.7 | 28.2052 |
| 13CC | 8.4090 | 9834.5 | 59.7300 | 67814.5 | 13505.4 | 4236.7 | 3.8770 | -191078.6 | 25.5295 |
| 14CC | 8.4808 | 10679.0 | 60.3559 | 73819.1 | 14350.0 | 3977.9 | 3.9263 | -191229.4 | 23.2342 |
| 15CC | 8.5424 | 11530.3 | 60.9431 | 79884.4 | 15201.2 | 3709.7 | 3.9663 | -191373.3 | 21.2434 |
| 16CC | 8.5957 | 12387.3 | 61.4962 | 86006.6 | 16058.2 | 3433.4 | 3.9989 | -191511.3 | 19.5002 |
| 17CC | 8.6420 | 13249.2 | 62.0187 | 92182.6 | 16920.1 | 3149.9 | 4.0254 | -191644.2 | 17.9609 |
| 18CC | 8.6825 | 14115.5 | 62.5138 | 98409.5 | 17786.4 | 2859.6 | 4.0469 | -191772.6 | 16.5918 |
| 19CC | 8.7183 | 14985.5 | 62.9843 | 104684.6 | 18656.5 | 2563.0 | 4.0642 | -191897.2 | 15.3660 |
| 20CC | 8.7501 | 15859.C | 63.4323 | 111005.6 | 19529.9 | 2260.6 | 4.0782 | -192018.3 | 14.2620 |
| 21CC | 8.7785 | 16735.4 | 63.8595 | 117370.3 | 20406.4 | 1952.8 | 4.0891 | -192136.5 | 13.2626 |
| 22CC | 8.8042 | 17614.6 | 64.2685 | 123776.9 | 21285.5 | 1639.9 | 4.0975 | -192252.0 | 12.5259 |
| 23CC | 8.8275 | 18496.2 | 64.6608 | 130223.5 | 22167.1 | 1322.2 | 4.1040 | -192365.1 | 11.5523 |
| 24CC | 8.8489 | 19380.C | 65.0365 | 136708.5 | 23051.0 | -4350.2 | 4.0901 | -192476.2 | 10.7611 |
| 25CC | 8.8687 | 20265.9 | 65.3985 | 143230.4 | 23936.9 | -4678.0 | 4.0737 | -192585.3 | 10.0598 |
| 26CC | 8.8872 | 21153.7 | 65.7467 | 149787.8 | 24824.7 | -5006.5 | 4.0575 | -192692.8 | 9.4121 |
| 27CC | 8.9048 | 22043.3 | 66.0825 | 156379.4 | 25714.3 | -5335.8 | 4.0414 | -192798.9 | 8.8121 |
| 28CC | 8.9217 | 22934.7 | 66.4066 | 163003.9 | 26605.6 | -5666.C | 4.0255 | -192903.6 | 8.2546 |
| 29CC | 8.9381 | 23827.7 | 66.7200 | 169660.3 | 27498.6 | -5996.9 | 4.0098 | -193007.1 | 7.7353 |
| 30CC | 8.9544 | 24722.3 | 67.0233 | 176347.6 | 28393.2 | -6328.6 | 3.9942 | -193109.5 | 7.2504 |
| 31CC | 8.9707 | 25618.5 | 67.3172 | 183064.7 | 29285.5 | -6661.1 | 3.9791 | -193210.9 | 6.7965 |
| 32CC | 8.9873 | 26516.4 | 67.6022 | 189810.7 | 30187.4 | -6994.2 | 3.9639 | -193311.3 | 6.3707 |
| 33CC | 9.0043 | 27416.C | 67.8791 | 196584.9 | 31086.9 | -7327.8 | 3.9492 | -193410.8 | 5.9705 |
| 34CC | 9.0221 | 28317.3 | 68.1481 | 203386.3 | 31988.3 | -7661.7 | 3.9346 | -193509.4 | 5.5937 |
| 35CC | 9.0407 | 29220.5 | 68.4099 | 210214.2 | 32891.4 | -7995.9 | 3.9201 | -193607.2 | 5.2383 |
| 36CC | 9.0604 | 30125.5 | 68.6645 | 217068.0 | 33796.4 | -8330.1 | 3.9060 | -193704.0 | 4.9024 |
| 37CC | 9.0813 | 31032.6 | 68.9134 | 223947.0 | 34703.5 | -8664.2 | 3.8922 | -193799.9 | 4.5845 |
| 38CC | 9.1036 | 31941.8 | 69.1595 | 230850.5 | 35612.7 | -8997.9 | 3.8785 | -193894.7 | 4.2832 |
| 39CC | 9.1274 | 32853.3 | 69.3926 | 237778.0 | 36524.3 | -9331.1 | 3.8649 | -193988.5 | 3.9972 |
| 40CC | 9.1528 | 33767.3 | 69.6240 | 244728.9 | 37438.3 | -9663.5 | 3.8516 | -194081.2 | 3.7254 |
| 41CC | 9.1799 | 34684.C | 69.8504 | 251702.6 | 38354.9 | -9994.8 | 3.8385 | -194172.6 | 3.4667 |
| 42CC | 9.2088 | 35603.4 | 70.0719 | 258698.8 | 39274.3 | -10324.8 | 3.8256 | -194262.7 | 3.2202 |
| 43CC | 9.2396 | 36525.8 | 70.2890 | 265716.9 | 40196.7 | -10653.4 | 3.8128 | -194351.3 | 2.9851 |
| 44CC | 9.2723 | 37451.4 | 70.5018 | 272756.4 | 41122.3 | -10980.2 | 3.8004 | -194438.4 | 2.7606 |
| 45CC | 9.3070 | 38380.3 | 70.7105 | 279817.1 | 42051.2 | -11304.9 | 3.7882 | -194523.8 | 2.5459 |
| 46CC | 9.3437 | 39312.8 | 70.9155 | 286898.4 | 42983.8 | -11627.4 | 3.7761 | -194607.3 | 2.3405 |
| 47CC | 9.3824 | 40249.1 | 71.1168 | 294000.1 | 43920.1 | -11947.4 | 3.7640 | -194689.0 | 2.1437 |
| 48CC | 9.4230 | 41189.4 | 71.3148 | 301121.7 | 44860.3 | -12264.6 | 3.7523 | -194768.6 | 1.9551 |
| 49CC | 9.4656 | 42133.8 | 71.5095 | 308262.9 | 45804.7 | -12578.8 | 3.7409 | -194846.0 | 1.7741 |
| 50CC | 9.5101 | 43082.6 | 71.7012 | 315423.5 | 46753.5 | -12889.7 | 3.7294 | -194921.0 | 1.6003 |
| 51CC | 9.5565 | 44035.9 | 71.8900 | 322603.1 | 47706.8 | -13197.2 | 3.7183 | -194993.7 | 1.4332 |
| 52CC | 9.6047 | 44993.9 | 72.0760 | 329801.4 | 48664.9 | -13501.0 | 3.7072 | -195063.8 | 1.2725 |
| 53CC | 9.6547 | 45956.9 | 72.2594 | 337018.2 | 49627.8 | -13800.9 | 3.6964 | -195131.2 | 1.1178 |
| 54CC | 9.7064 | 46924.9 | 72.4404 | 344253.2 | 50595.9 | -14096.7 | 3.6858 | -195195.9 | 0.9687 |
| 55CC | 9.7597 | 47898.2 | 72.6190 | 351506.2 | 51569.2 | -14388.2 | 3.6752 | -195257.7 | 0.8251 |
| 56CC | 9.8146 | 48876.9 | 72.7953 | 358776.9 | 52547.9 | -14675.3 | 3.6649 | -195316.5 | 0.6865 |
| 57CC | 9.8708 | 49861.2 | 72.9695 | 366065.2 | 53532.1 | -14957.6 | 3.6550 | -195372.3 | 0.5528 |
| 58CC | 9.9284 | 50851.1 | 73.1417 | 373370.7 | 54522.1 | -15235.2 | 3.6449 | -195425.0 | 0.4236 |
| 59CC | 9.9873 | 51846.9 | 73.3119 | 380693.4 | 55517.8 | -15507.8 | 3.6351 | -195474.5 | 0.2988 |
| 60CC | 10.0472 | 52848.6 | 73.4803 | 388033.1 | 56519.6 | -15775.3 | 3.6254 | -195520.7 | 0.1781 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(31) EN (crystal); molecular weight, 24.828

| T, °K | C_p^o , cal/mole °K | $H_f^o - H_o^o$, cal/mole | S_f^o , cal/mole °K | $-(F_f^o - H_o^o)$, cal/mole | H_f^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^o)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^o , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | 0 | 0 | -60931.0 | -59603.1 | ----- | -305963.4 | ----- |
| 100 | 1.280 | 48.3 | 0.747 | 26.4 | -60882.7 | -59907.8 | 126.8967 | -306936.8 | 657.3044 |
| 200 | 2.994 | 259.4 | 2.143 | 169.2 | -60671.6 | -60124.4 | 61.3398 | -307720.5 | 321.5699 |
| 298.15 | 4.783 | 641.0 | 3.673 | 454.1 | -60290.0 | -60290.0 | 39.6863 | -308314.6 | 210.7815 |
| 300 | 4.815 | 649.8 | 3.702 | 460.8 | -60281.2 | -60292.5 | 39.4136 | -308324.2 | 209.3878 |
| 400 | 6.28 | 1204 | 5.288 | 911.2 | -59727 | -60413.4 | 28.4225 | -308763.8 | 153.1990 |
| 500 | 7.50 | 1896 | 6.826 | 1517.0 | -59035 | -60481.7 | 21.8167 | -309065.6 | 119.4439 |
| 600 | 8.42 | 2695 | 8.279 | 2272.4 | -58236 | -60500.2 | 17.4097 | -309260.3 | 96.9220 |
| 700 | 9.09 | 3571 | 9.628 | 3168.6 | -57360 | -60487.8 | 14.2621 | -309377.9 | 80.8270 |
| 800 | 9.66 | 4509 | 10.880 | 4195.0 | -56422 | -60452.4 | 11.9020 | -309433.6 | 68.7525 |
| 900 | 10.2 | 5502 | 12.050 | 5343.0 | -55429 | -60400.0 | 10.0681 | -309434.3 | 59.3604 |
| 1000 | 10.6 | 6542 | 13.145 | 6603.0 | -54389 | -60334.2 | 8.6022 | -309387.9 | 51.8470 |
| 1100 | 10.9 | 7620 | 14.172 | 7969.2 | -53311 | -60262.3 | 7.4042 | -309303.6 | 45.7011 |
| 1200 | 11.2 | 8728 | 15.136 | 9435.2 | -52203 | -60190.1 | 6.4071 | -309189.2 | 40.5812 |
| 1300 | 11.4 | 9858 | 16.040 | 10994.0 | -51073 | -60120.9 | 5.5644 | -309052.9 | 36.2506 |
| 1400 | 11.6 | 11008 | 16.892 | 12640.8 | -49923 | -60052.6 | 4.8427 | -308896.5 | 32.5404 |
| 1500 | 11.7 | 12176 | 17.698 | 14371.0 | -48755 | -59983.2 | 4.2182 | -308722.2 | 29.3268 |
| 1600 | 11.7 | 13346 | 18.453 | 16178.8 | -47585 | -59926.1 | 3.6723 | -308545.8 | 26.5164 |
| 1700 | 11.7 | 14516 | 19.162 | 18059.4 | -46415 | -59881.3 | 3.1909 | -308369.5 | 24.0380 |
| 1800 | 11.7 | 15686 | 19.831 | 20009.8 | -45245 | -59847.6 | 2.7634 | -308193.1 | 21.8363 |
| 1900 | 11.7 | 16856 | 20.464 | 22025.6 | -44075 | -59823.6 | 2.3812 | -308016.8 | 19.8676 |
| 2000 | 11.7 | 18026 | 21.064 | 24102.0 | -42905 | -59808.1 | 2.0372 | -307840.5 | 18.0967 |
| 2100 | 11.7 | 19196 | 21.635 | 26237.5 | -41735 | -59800.3 | 1.7260 | -307664.3 | 16.4954 |
| 2200 | 11.7 | 20366 | 22.179 | 28427.8 | -40565 | -59799.2 | 1.4430 | -307488.1 | 15.0404 |
| 2300 | 11.7 | 21536 | 22.699 | 30671.7 | -39395 | -59804.2 | 1.1848 | -307312.1 | 13.7127 |
| 2400 | 11.7 | 22706 | 23.197 | 32966.8 | -38225 | -65164.9 | 0.9295 | -307136.3 | 12.4964 |
| 2500 | 11.7 | 23876 | 23.675 | 35311.5 | -37055 | -65181.6 | 0.6922 | -306960.7 | 11.3781 |
| 2600 | 11.7 | 25046 | 24.134 | 37702.4 | -35885 | -65199.5 | 0.4731 | -306785.5 | 10.3464 |
| 2700 | 11.7 | 26216 | 24.575 | 40136.5 | -34715 | -65218.5 | 0.2700 | -306610.7 | 9.3915 |
| 2800 | 11.7 | 27386 | 25.001 | 42616.8 | -33545 | -65238.5 | 0.0815 | -306436.6 | 8.5055 |
| 2900 | 11.7 | 28556 | 25.411 | 45135.9 | -32375 | -65259.4 | -0.0942 | -306263.1 | 7.6809 |
| 3000 | 11.7 | 29726 | 25.808 | 47698.0 | -31205 | -65281.1 | -0.2582 | -306090.6 | 6.9118 |
| 3100 | 11.7 | 30896 | 26.191 | 50296.1 | -30035 | -65303.7 | -0.4116 | -305919.1 | 6.1926 |
| 3200 | 11.7 | 32066 | 26.563 | 52935.6 | -28865 | -65326.9 | -0.5556 | -305748.8 | 5.5190 |
| 3300 | 11.7 | 33236 | 26.923 | 55609.9 | -27695 | -65350.9 | -0.6906 | -305580.0 | 4.8864 |
| 3400 | 11.7 | 34406 | 27.272 | 58318.8 | -26525 | -65375.4 | -0.8180 | -305412.9 | 4.2913 |
| 3500 | 11.7 | 35576 | 27.611 | 61062.5 | -25355 | -65400.6 | -0.9383 | -305247.6 | 3.7305 |
| 3600 | 11.7 | 36746 | 27.941 | 63841.6 | -24185 | -65426.4 | -1.0516 | -305084.5 | 3.2013 |
| 3700 | 11.7 | 37916 | 28.262 | 66653.4 | -23015 | -65452.7 | -1.1587 | -304923.7 | 2.7010 |
| 3800 | 11.7 | 39086 | 28.574 | 69495.2 | -21845 | -65479.4 | -1.2605 | -304765.6 | 2.2272 |
| 3900 | 11.7 | 40256 | 28.877 | 72364.3 | -20675 | -65506.7 | -1.3573 | -304610.3 | 1.7777 |
| 4000 | 11.7 | 41426 | 29.174 | 75270.0 | -19505 | -65534.5 | -1.4489 | -304458.1 | 1.3512 |
| 4100 | 11.7 | 42596 | 29.463 | 78202.3 | -18335 | -65562.7 | -1.5362 | -304309.2 | 0.9456 |
| 4200 | 11.7 | 43766 | 29.745 | 81163.0 | -17165 | -65591.3 | -1.6195 | -304164.0 | 0.5595 |
| 4300 | 11.7 | 44936 | 30.020 | 84150.0 | -15995 | -65620.3 | -1.6991 | -304022.6 | 0.1915 |
| 4400 | 11.7 | 46106 | 30.289 | 87165.6 | -14825 | -65649.7 | -1.7748 | -303885.3 | -0.1596 |
| 4500 | 11.7 | 47276 | 30.552 | 90208.0 | -13655 | -65679.5 | -1.8471 | -303752.3 | -0.4949 |
| 4600 | 11.7 | 48446 | 30.809 | 93275.4 | -12485 | -65709.6 | -1.9165 | -303623.9 | -0.8156 |
| 4700 | 11.7 | 49616 | 31.061 | 96370.7 | -11315 | -65740.2 | -1.9830 | -303500.2 | -1.1223 |
| 4800 | 11.7 | 50786 | 31.307 | 99487.6 | -10145 | -65771.0 | -2.0468 | -303381.5 | -1.4163 |
| 4900 | 11.7 | 51956 | 31.548 | 102629.2 | -8975 | -65802.2 | -2.1079 | -303268.0 | -1.6982 |
| 5000 | 11.7 | 53126 | 31.784 | 105794.0 | -7805 | -65833.8 | -2.1668 | -303159.9 | -1.9688 |
| 5100 | 11.7 | 54296 | 32.016 | 108985.6 | -6635 | -65865.6 | -2.2230 | -303057.3 | -2.2285 |
| 5200 | 11.7 | 55466 | 32.243 | 112197.6 | -5465 | -65897.8 | -2.2774 | -302960.5 | -2.4782 |
| 5300 | 11.7 | 56636 | 32.466 | 115433.8 | -4295 | -65930.3 | -2.3297 | -302869.5 | -2.7184 |
| 5400 | 11.7 | 57806 | 32.685 | 118693.0 | -3125 | -65963.2 | -2.3800 | -302784.6 | -2.9496 |
| 5500 | 11.7 | 58976 | 32.900 | 121974.0 | -1955 | -65996.3 | -2.4285 | -302705.8 | -3.1723 |
| 5600 | 11.7 | 60146 | 33.110 | 125270.0 | -785 | -66029.8 | -2.4755 | -302633.3 | -3.3872 |
| 5700 | 11.7 | 61316 | 33.317 | 128590.9 | 385 | -66063.6 | -2.5206 | -302567.2 | -3.5944 |
| 5800 | 11.7 | 62486 | 33.521 | 131935.8 | 1555 | -66097.8 | -2.5643 | -302507.6 | -3.7943 |
| 5900 | 11.7 | 63656 | 33.721 | 135297.9 | 2725 | -66132.2 | -2.6064 | -302454.6 | -3.9874 |
| 6000 | 11.7 | 64826 | 33.918 | 138682.0 | 3895 | -66167.1 | -2.6472 | -302408.2 | -4.1741 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
(49) BeFCl (gas); molecular weight, 63.470

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -136393.6 | -133773.3 | ----- | -257564.2 | ----- |
| 100 | 7.0714 | 697.1 | 47.3665 | 4039.6 | -135696.5 | -133781.4 | 293.3076 | -258359.2 | 554.6026 |
| 200 | 8.5637 | 1468.8 | 52.6556 | 9624.4 | -134924.8 | -133862.1 | 147.0983 | -259109.2 | 271.9682 |
| 298.15 | 10.2088 | 2353.6 | 56.3559 | 14420.9 | -134000.0 | -134000.0 | 98.9259 | -259708.8 | 178.6658 |
| 300 | 10.2353 | 2412.5 | 56.4591 | 14525.3 | -133981.1 | -134002.6 | 98.3202 | -259718.8 | 177.4918 |
| 400 | 11.4286 | 3459.8 | 59.5788 | 20331.7 | -132893.8 | -134153.6 | 73.9036 | -260198.8 | 130.1516 |
| 500 | 12.2757 | 4688.1 | 62.2271 | 26425.4 | -131705.4 | -134296.8 | 59.2374 | -260580.2 | 101.6997 |
| 600 | 12.8740 | 5947.5 | 64.5215 | 32765.4 | -130446.0 | -134429.9 | 49.4497 | -260886.9 | 82.7065 |
| 700 | 13.3008 | 7257.4 | 66.5395 | 39320.5 | -129136.2 | -134556.4 | 42.4518 | -261136.8 | 69.1253 |
| 800 | 13.6132 | 8603.9 | 68.3374 | 46066.0 | -127789.7 | -134680.4 | 37.1985 | -261342.8 | 58.9305 |
| 900 | 13.8465 | 9977.4 | 69.9549 | 52982.0 | -126416.1 | -134807.0 | 33.1087 | -261515.0 | 50.9955 |
| 1000 | 14.0242 | 11371.3 | 71.4234 | 60052.1 | -125022.2 | -134941.1 | 29.8339 | -261660.5 | 44.6436 |
| 1100 | 14.1620 | 12780.5 | 72.7666 | 67262.5 | -123612.6 | -135086.4 | 27.1516 | -261784.7 | 39.4439 |
| 1200 | 14.2706 | 14202.7 | 74.0035 | 74601.9 | -122190.8 | -135245.5 | 24.9138 | -261892.0 | 35.1089 |
| 1300 | 14.3576 | 15634.3 | 75.1497 | 82060.3 | -120759.2 | -135420.3 | 23.0180 | -261985.3 | 31.4394 |
| 1400 | 14.4281 | 17073.7 | 76.2163 | 89629.2 | -119319.8 | -135612.3 | 21.3507 | -262067.2 | 28.2931 |
| 1500 | 14.4861 | 18519.5 | 77.2138 | 97301.2 | -117874.0 | -135822.6 | 19.9784 | -262139.6 | 25.5655 |
| 1600 | 14.5343 | 19970.6 | 78.1503 | 105069.9 | -116422.9 | -139549.3 | 18.7283 | -262204.0 | 23.1782 |
| 1700 | 14.5747 | 21426.1 | 79.0327 | 112929.5 | -114967.4 | -139726.8 | 17.6065 | -262261.7 | 21.0713 |
| 1800 | 14.6089 | 22885.3 | 79.8668 | 120874.8 | -113508.2 | -139902.9 | 16.6079 | -262313.6 | 19.1981 |
| 1900 | 14.6381 | 24347.7 | 80.6574 | 128901.4 | -112045.8 | -140078.0 | 15.7134 | -262360.6 | 17.5218 |
| 2000 | 14.6633 | 25812.8 | 81.4085 | 137005.0 | -110580.7 | -140252.5 | 14.9074 | -262403.3 | 16.0128 |
| 2100 | 14.6850 | 27280.3 | 82.1245 | 145182.0 | -109113.3 | -140426.7 | 14.1770 | -262442.3 | 14.6473 |
| 2200 | 14.7040 | 28749.7 | 82.8085 | 153428.9 | -107643.8 | -140600.9 | 13.5123 | -262478.1 | 13.4058 |
| 2300 | 14.7206 | 30221.0 | 83.4625 | 161742.7 | -106172.6 | -140775.3 | 12.9047 | -262511.2 | 12.2721 |
| 2400 | 14.7353 | 31653.8 | 84.0893 | 170120.5 | -104695.7 | -140949.9 | 12.3472 | -262541.9 | 11.2327 |
| 2500 | 14.7483 | 33168.0 | 84.6911 | 178559.7 | -103225.5 | -141125.0 | 11.8334 | -262570.6 | 10.2764 |
| 2600 | 14.7598 | 34643.4 | 85.2696 | 187058.0 | -101750.1 | -141300.7 | 11.3587 | -262597.7 | 9.3936 |
| 2700 | 14.7702 | 36119.9 | 85.8270 | 195613.0 | -100273.6 | -141477.1 | 10.9185 | -262623.5 | 8.5761 |
| 2800 | 14.7794 | 37597.4 | 86.3643 | 204222.7 | -98796.1 | -141654.3 | 10.5093 | -262648.4 | 7.8168 |
| 2900 | 14.7878 | 39075.8 | 86.8831 | 212885.2 | -97317.8 | -141832.4 | 10.1277 | -262672.8 | 7.1099 |
| 3000 | 14.7953 | 40554.9 | 87.3846 | 221598.7 | -95838.6 | -142011.3 | 9.7712 | -262697.0 | 6.4501 |
| 3100 | 14.8021 | 42034.8 | 87.8698 | 230361.6 | -94358.7 | -142191.3 | 9.4373 | -262721.6 | 5.8327 |
| 3200 | 14.8084 | 43515.3 | 88.3395 | 239172.2 | -92878.2 | -142372.3 | 9.1240 | -262746.8 | 5.2539 |
| 3300 | 14.8140 | 44956.5 | 88.7956 | 248029.1 | -91397.1 | -142554.4 | 8.8291 | -262773.3 | 4.7102 |
| 3400 | 14.8192 | 46478.1 | 89.2375 | 256930.9 | -89915.4 | -142737.7 | 8.5512 | -262801.4 | 4.1983 |
| 3500 | 14.8240 | 47960.3 | 89.6676 | 265876.2 | -88433.3 | -142922.1 | 8.2889 | -262831.7 | 3.7157 |
| 3600 | 14.8283 | 49442.9 | 90.0853 | 274864.0 | -86950.6 | -143107.7 | 8.0410 | -262864.7 | 3.2598 |
| 3700 | 14.8323 | 50925.9 | 90.4916 | 283892.9 | -85467.6 | -143294.5 | 7.8059 | -262900.9 | 2.8285 |
| 3800 | 14.8360 | 52409.4 | 90.8872 | 292961.9 | -83984.2 | -143482.6 | 7.5830 | -262941.0 | 2.4198 |
| 3900 | 14.8395 | 53893.1 | 91.2726 | 302070.0 | -82500.4 | -143672.0 | 7.3713 | -262985.3 | 2.0320 |
| 4000 | 14.8427 | 55377.3 | 91.6484 | 311216.1 | -81016.3 | -143862.6 | 7.1700 | -263034.6 | 1.6636 |
| 4100 | 14.8456 | 56861.7 | 92.0145 | 320399.4 | -79531.9 | -144054.6 | 6.9781 | -263089.4 | 1.3130 |
| 4200 | 14.8484 | 58346.4 | 92.3727 | 329618.8 | -78047.2 | -144247.9 | 6.7953 | -263150.2 | 0.9791 |
| 4300 | 14.8509 | 59831.3 | 92.7221 | 338873.6 | -76562.2 | -144442.6 | 6.6205 | -263217.5 | 0.6606 |
| 4400 | 14.8533 | 61316.6 | 93.0635 | 348163.0 | -75077.0 | -144638.7 | 6.4536 | -263292.0 | 0.3565 |
| 4500 | 14.8555 | 62802.0 | 93.3974 | 357486.1 | -73591.5 | -144836.1 | 6.2938 | -263374.0 | 0.0659 |
| 4600 | 14.8576 | 64287.7 | 93.7235 | 366842.2 | -72105.9 | -145034.9 | 6.1409 | -263464.2 | -0.2122 |
| 4700 | 14.8596 | 65773.5 | 94.0434 | 376230.6 | -70620.0 | -145235.1 | 5.9942 | -263562.8 | -0.4786 |
| 4800 | 14.8614 | 67259.6 | 94.3562 | 385650.7 | -69134.0 | -145436.8 | 5.8533 | -263670.5 | -0.7339 |
| 4900 | 14.8632 | 68745.8 | 94.6626 | 395101.7 | -67647.7 | -145639.8 | 5.7181 | -263787.6 | -0.9790 |
| 5000 | 14.8648 | 70232.2 | 94.9630 | 404583.0 | -66161.3 | -145844.3 | 5.5880 | -263914.4 | -1.2143 |
| 5100 | 14.8663 | 71718.8 | 95.2574 | 414094.1 | -64674.8 | -146050.2 | 5.4631 | -264051.3 | -1.4406 |
| 5200 | 14.8678 | 73205.5 | 95.5461 | 423634.3 | -63188.1 | -146257.6 | 5.3426 | -264198.6 | -1.6582 |
| 5300 | 14.8691 | 74692.3 | 95.8292 | 433203.1 | -61701.2 | -146466.4 | 5.2266 | -264356.5 | -1.8678 |
| 5400 | 14.8704 | 76179.3 | 96.1073 | 442800.0 | -60214.3 | -146676.7 | 5.1146 | -264525.3 | -2.0697 |
| 5500 | 14.8716 | 77666.4 | 96.3801 | 452424.4 | -58727.2 | -146888.4 | 5.0066 | -264705.2 | -2.2644 |
| 5600 | 14.8728 | 79153.6 | 96.6481 | 462075.9 | -57239.9 | -147101.6 | 4.9022 | -264896.2 | -2.4523 |
| 5700 | 14.8739 | 80641.0 | 96.9114 | 471753.9 | -55752.6 | -147316.3 | 4.8015 | -265098.5 | -2.6337 |
| 5800 | 14.8749 | 82128.4 | 97.1701 | 481458.0 | -54265.2 | -147532.5 | 4.7041 | -265312.2 | -2.8090 |
| 5900 | 14.8759 | 83615.9 | 97.4244 | 491187.7 | -52777.6 | -147750.1 | 4.6099 | -265537.3 | -2.9785 |
| 6000 | 14.8769 | 85103.6 | 97.6744 | 500942.7 | -51290.0 | -147969.2 | 4.5186 | -265773.8 | -3.1425 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Be, 1560° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(50) BeH (gas); molecular weight, 10.021

| T_f , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|---------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| C | ----- | 0 | ----- | 0 | 76035.2 | 77515.8 | ----- | -51000.0 | ----- |
| 1CC | 6.9617 | 686.0 | 34.6252 | 2776.5 | 76721.3 | 77812.6 | -165.1774 | -51307.6 | 108.9677 |
| 2CC | 6.9664 | 1382.4 | 39.4519 | 6508.0 | 77417.6 | 78068.1 | -80.0219 | -51604.9 | 52.7786 |
| 298.15 | 6.9841 | 2066.8 | 42.2358 | 10525.8 | 78102.0 | 78102.0 | -51.9295 | -51895.7 | 34.1702 |
| 3CC | 6.9848 | 2079.7 | 42.2790 | 10604.0 | 78114.9 | 78101.5 | -51.5766 | -51901.2 | 33.9357 |
| 4CC | 7.0592 | 2781.3 | 44.2968 | 14937.4 | 78816.5 | 78017.3 | -37.3590 | -52193.2 | 24.4595 |
| 5CC | 7.2042 | 3493.9 | 45.8865 | 19449.3 | 79529.2 | 77878.6 | -28.8407 | -52474.2 | 18.7420 |
| 6CC | 7.3529 | 4223.6 | 47.2162 | 24106.2 | 80258.8 | 77716.0 | -23.1730 | -52738.2 | 14.9103 |
| 7CC | 7.5523 | 4972.9 | 48.3709 | 28886.7 | 81008.1 | 77542.2 | -19.1334 | -52982.5 | 12.1600 |
| 8CC | 7.7852 | 5742.0 | 49.3976 | 33776.1 | 81777.2 | 77362.8 | -16.1107 | -53207.1 | 10.0881 |
| 9CC | 7.9552 | 6529.3 | 50.3248 | 38762.9 | 82564.6 | 77177.1 | -13.7651 | -53413.3 | 8.4701 |
| 10CC | 8.1129 | 7333.1 | 51.1715 | 43838.4 | 83368.4 | 76982.5 | -11.8931 | -53603.2 | 7.1709 |
| 11CC | 8.2470 | 8151.3 | 51.9512 | 48995.0 | 84186.5 | 76776.3 | -10.3658 | -53778.7 | 6.1042 |
| 12CC | 8.3635 | 8981.9 | 52.6735 | 54226.7 | 85017.2 | 76556.3 | -9.0964 | -53941.6 | 5.2125 |
| 13CC | 8.4650 | 9823.5 | 53.3474 | 59528.1 | 85858.7 | 76320.2 | -8.0254 | -54093.7 | 4.4558 |
| 14CC | 8.5537 | 10674.5 | 53.9780 | 64894.8 | 86705.7 | 76066.7 | -7.1109 | -54236.3 | 3.8054 |
| 15CC | 8.6217 | 11533.9 | 54.5705 | 70322.5 | 87569.1 | 75794.2 | -6.3205 | -54370.6 | 3.2403 |
| 16CC | 8.7009 | 12400.5 | 55.1302 | 75807.8 | 88435.8 | 72004.8 | -5.6438 | -54497.5 | 2.7447 |
| 17CC | 8.7625 | 13273.8 | 55.6596 | 81347.5 | 89309.0 | 71764.4 | -5.0661 | -54617.9 | 2.3063 |
| 18CC | 8.8179 | 14152.8 | 56.1620 | 86938.8 | 90188.1 | 71525.5 | -4.5545 | -54732.5 | 1.9158 |
| 19CC | 8.8681 | 15037.2 | 56.6402 | 92579.1 | 91072.4 | 71286.7 | -4.0981 | -54841.8 | 1.5658 |
| 20CC | 8.9138 | 15926.3 | 57.0962 | 98266.1 | 91961.6 | 71048.2 | -3.6889 | -54946.4 | 1.2501 |
| 21CC | 8.9558 | 16819.8 | 57.5322 | 103997.7 | 92855.1 | 70809.9 | -3.3199 | -55046.6 | 0.9639 |
| 22CC | 8.9946 | 17717.4 | 57.9457 | 109772.0 | 93752.6 | 70571.7 | -2.9856 | -55142.8 | 0.7033 |
| 23CC | 9.0307 | 18618.7 | 58.3503 | 115587.1 | 94653.9 | 70333.3 | -2.6811 | -55235.4 | 0.4649 |
| 24CC | 9.0645 | 19523.4 | 58.7354 | 121441.5 | 95558.7 | 70094.9 | -2.4032 | -55324.8 | 0.2461 |
| 25CC | 9.0962 | 20431.5 | 59.1061 | 127333.7 | 96466.7 | 69856.3 | -2.1483 | -55411.1 | 0.0444 |
| 26CC | 9.1262 | 21342.6 | 59.4634 | 133262.3 | 97377.9 | 69617.5 | -1.9138 | -55494.7 | -0.1420 |
| 27CC | 9.1546 | 22256.7 | 59.8084 | 139226.0 | 98291.9 | 69378.7 | -1.6974 | -55576.0 | -0.3149 |
| 28CC | 9.1817 | 23173.5 | 60.1418 | 145223.6 | 99208.7 | 69139.5 | -1.4973 | -55655.2 | -0.4757 |
| 29CC | 9.2077 | 24093.0 | 60.4645 | 151254.0 | 100128.2 | 68900.2 | -1.3116 | -55732.7 | -0.6256 |
| 30CC | 9.2326 | 25015.0 | 60.7770 | 157316.1 | 101050.2 | 68660.6 | -1.1387 | -55808.8 | -0.7657 |
| 31CC | 9.2566 | 25939.5 | 61.0802 | 163409.1 | 101974.7 | 68420.6 | -0.9777 | -55884.1 | -0.8969 |
| 32CC | 9.2799 | 26866.3 | 61.3744 | 169531.9 | 102901.5 | 68180.2 | -0.8271 | -55958.7 | -1.0201 |
| 33CC | 9.3024 | 27795.4 | 61.6603 | 175683.7 | 103830.7 | 67940.0 | -0.6863 | -56033.3 | -1.1360 |
| 34CC | 9.3242 | 28726.7 | 61.9384 | 181863.7 | 104762.0 | 67698.9 | -0.5542 | -56108.3 | -1.2452 |
| 35CC | 9.3455 | 29660.2 | 62.2090 | 188071.1 | 105695.5 | 67457.2 | -0.4302 | -56184.1 | -1.3483 |
| 36CC | 9.3663 | 30595.8 | 62.4725 | 194305.2 | 106631.1 | 67215.8 | -0.3131 | -56261.3 | -1.4458 |
| 37CC | 9.3867 | 31533.5 | 62.7294 | 200565.4 | 107568.7 | 66974.2 | -0.2033 | -56340.4 | -1.5382 |
| 38CC | 9.4066 | 32473.2 | 62.9800 | 206850.9 | 108508.4 | 66731.4 | -0.0994 | -56422.0 | -1.6258 |
| 39CC | 9.4261 | 33414.8 | 63.2246 | 213161.2 | 109450.0 | 66489.5 | -0.0013 | -56506.5 | -1.7091 |
| 40CC | 9.4453 | 34358.4 | 63.4635 | 219495.6 | 110393.6 | 66246.7 | 0.0919 | -56594.6 | -1.7883 |
| 41CC | 9.4642 | 35303.8 | 63.6970 | 225853.7 | 111335.1 | 66004.3 | 0.1798 | -56686.8 | -1.8638 |
| 42CC | 9.4828 | 36251.2 | 63.9252 | 232234.8 | 112286.4 | 65761.1 | 0.2638 | -56783.7 | -1.9358 |
| 43CC | 9.5012 | 37200.4 | 64.1486 | 238638.6 | 113235.6 | 65517.9 | 0.3431 | -56885.7 | -2.0046 |
| 44CC | 9.5193 | 38151.4 | 64.3672 | 245064.4 | 114186.7 | 65274.0 | 0.4187 | -56993.4 | -2.0703 |
| 45CC | 9.5372 | 39104.2 | 64.5814 | 251511.9 | 115135.5 | 65030.6 | 0.4905 | -57107.3 | -2.1333 |
| 46CC | 9.5549 | 40058.6 | 64.7912 | 257980.5 | 116094.1 | 64786.6 | 0.5591 | -57227.9 | -2.1936 |
| 47CC | 9.5724 | 41015.2 | 64.9968 | 264470.0 | 117050.5 | 64542.4 | 0.6244 | -57355.7 | -2.2516 |
| 48CC | 9.5898 | 41973.3 | 65.1986 | 270979.8 | 118008.6 | 64297.5 | 0.6868 | -57491.0 | -2.3072 |
| 49CC | 9.6070 | 42933.2 | 65.3965 | 277509.5 | 118968.4 | 64052.5 | 0.7464 | -57634.3 | -2.3607 |
| 50CC | 9.6241 | 43894.7 | 65.5907 | 284058.9 | 119930.0 | 63807.9 | 0.8033 | -57785.9 | -2.4121 |
| 51CC | 9.6410 | 44858.0 | 65.7815 | 290627.6 | 120893.2 | 63562.7 | 0.8581 | -57946.2 | -2.4617 |
| 52CC | 9.6578 | 45822.9 | 65.9689 | 297215.1 | 121858.2 | 63317.6 | 0.9103 | -58115.5 | -2.5096 |
| 53CC | 9.6745 | 46789.5 | 66.1530 | 303821.2 | 122824.8 | 63071.9 | 0.9603 | -58293.9 | -2.5557 |
| 54CC | 9.6911 | 47757.8 | 66.3340 | 310445.6 | 123793.1 | 62826.4 | 1.0084 | -58481.8 | -2.6003 |
| 55CC | 9.7076 | 48727.7 | 66.5119 | 317087.9 | 124763.0 | 62580.4 | 1.0545 | -58679.4 | -2.6434 |
| 56CC | 9.7240 | 49699.3 | 66.6870 | 323747.9 | 125734.6 | 62334.6 | 1.0988 | -58886.6 | -2.6851 |
| 57CC | 9.7403 | 50672.5 | 66.8593 | 330425.2 | 126707.8 | 62089.0 | 1.1415 | -59103.8 | -2.7255 |
| 58CC | 9.7566 | 51647.4 | 67.0288 | 337119.7 | 127682.6 | 61843.1 | 1.1824 | -59330.8 | -2.7646 |
| 59CC | 9.7728 | 52623.9 | 67.1957 | 343830.9 | 128659.1 | 61596.8 | 1.2219 | -59567.8 | -2.8026 |
| 60CC | 9.7889 | 53601.5 | 67.3601 | 350558.7 | 129637.2 | 61350.9 | 1.2597 | -59814.8 | -2.8394 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Be, 1560° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(51) BeO (gas); molecular weight, 25.013

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| C | ----- | 0 | ----- | 0 | 28367.9 | 29874.0 | ----- | -106000.0 | ----- |
| 1CC | 6.5571 | 654.1 | 39.5933 | 3265.3 | 29062.0 | 30211.5 | -61.9230 | -106330.2 | 228.0046 |
| 2CC | 6.9647 | 1390.0 | 44.4167 | 7453.4 | 29757.9 | 30420.0 | -28.8059 | -106688.5 | 111.6644 |
| 298.15 | 7.0465 | 2076.6 | 47.2086 | 11998.7 | 30444.5 | 30444.5 | -17.8553 | -107012.2 | 73.2360 |
| 3CC | 7.0452 | 2089.6 | 47.2524 | 12086.1 | 30457.5 | 30443.9 | -17.7177 | -107018.0 | 72.7522 |
| 4CC | 7.2537 | 2804.0 | 49.3061 | 16918.5 | 31171.9 | 30364.7 | -12.1789 | -107318.4 | 53.2373 |
| 5CC | 7.5103 | 3542.1 | 50.9520 | 21933.9 | 31909.9 | 30235.2 | -8.8672 | -107587.6 | 41.4968 |
| 6CC | 7.7571 | 4305.7 | 52.3435 | 27100.5 | 32673.5 | 30078.9 | -6.6699 | -107827.2 | 33.6511 |
| 7CC | 7.9698 | 5052.3 | 53.5557 | 32396.7 | 33460.2 | 29904.5 | -5.1090 | -108041.2 | 28.0351 |
| 8CC | 8.1451 | 5898.4 | 54.6318 | 37807.1 | 34266.2 | 29716.1 | -3.9454 | -108234.2 | 23.8151 |
| 9CC | 8.2878 | 6720.2 | 55.5997 | 43319.5 | 35088.1 | 29513.4 | -3.0464 | -108410.1 | 20.5273 |
| 10CC | 8.4046 | 7555.1 | 56.4791 | 48924.1 | 35923.0 | 29295.1 | -2.3322 | -108572.3 | 17.8930 |
| 11CC | 8.5020 | 8400.5 | 57.2849 | 54612.8 | 36768.4 | 29060.0 | -1.7524 | -108723.3 | 15.7345 |
| 12CC | 8.5859 | 9255.0 | 58.0283 | 60379.0 | 37622.9 | 28807.4 | -1.2733 | -108864.8 | 13.9333 |
| 13CC | 8.6616 | 10117.4 | 58.7186 | 66216.7 | 38485.3 | 28536.7 | -0.8716 | -108998.0 | 12.4073 |
| 14CC | 8.7236 | 10987.2 | 59.3631 | 72121.2 | 39355.1 | 28248.0 | -0.5307 | -109123.6 | 11.0977 |
| 15CC | 8.8055 | 11864.1 | 59.9681 | 78088.0 | 40232.0 | 27941.3 | -0.2383 | -109241.8 | 9.9615 |
| 016CC | 8.8601 | 12748.4 | 60.5388 | 84113.7 | 41116.3 | 24119.7 | 0.0024 | -109352.5 | 8.9663 |
| 17CC | 8.9596 | 13640.3 | 61.0795 | 90194.8 | 42008.2 | 23850.2 | 0.1953 | -109455.4 | 8.0873 |
| 18CC | 9.0451 | 14540.5 | 61.5940 | 96328.7 | 42908.4 | 23586.0 | 0.3646 | -109550.0 | 7.3052 |
| 19CC | 9.1374 | 15449.6 | 62.0855 | 102512.8 | 43817.5 | 23327.9 | 0.5145 | -109635.5 | 6.6049 |
| 20CC | 9.2365 | 16368.2 | 62.5567 | 108745.1 | 44736.1 | 23076.5 | 0.6481 | -109711.5 | 5.9742 |
| 21CC | 9.3421 | 17297.1 | 63.0096 | 115023.6 | 45665.0 | 22832.6 | 0.7674 | -109777.4 | 5.4032 |
| 22CC | 9.4534 | 18236.8 | 63.4470 | 121346.5 | 46604.7 | 22596.8 | 0.8748 | -109832.4 | 4.8838 |
| 23CC | 9.5693 | 19187.9 | 63.8697 | 127712.5 | 47555.8 | 22369.6 | 0.9719 | -109876.3 | 4.4093 |
| 24CC | 9.6888 | 20150.8 | 64.2795 | 134120.0 | 48518.7 | 22151.5 | 1.0601 | -109908.8 | 3.9742 |
| 25CC | 9.8105 | 21125.8 | 64.6775 | 140568.0 | 49493.7 | 21942.7 | 1.1404 | -109929.6 | 3.5739 |
| 26CC | 9.9333 | 22113.0 | 65.0647 | 147055.2 | 50480.9 | 21743.6 | 1.2140 | -109938.9 | 3.2042 |
| 27CC | 10.0559 | 23112.4 | 65.4419 | 153580.6 | 51480.3 | 21554.1 | 1.2813 | -109936.7 | 2.8620 |
| 28CC | 10.1772 | 24124.1 | 65.8096 | 160143.2 | 52492.0 | 21374.3 | 1.3433 | -109923.5 | 2.5442 |
| 2900 | 10.2960 | 25147.8 | 66.1690 | 166742.3 | 53515.7 | 21204.1 | 1.4005 | -109899.6 | 2.2484 |
| 3000 | 10.4116 | 26183.2 | 66.5200 | 173376.8 | 54551.1 | 21043.1 | 1.4536 | -109865.7 | 1.9724 |
| 31CC | 10.5230 | 27230.0 | 66.8632 | 180046.0 | 55597.9 | 20891.2 | 1.5029 | -109822.5 | 1.7142 |
| 32CC | 10.6297 | 28287.6 | 67.1990 | 186749.2 | 56655.5 | 20747.5 | 1.5489 | -109770.9 | 1.4724 |
| 33CC | 10.7310 | 29355.7 | 67.5277 | 193485.6 | 57723.6 | 20612.8 | 1.5916 | -109711.8 | 1.2452 |
| 34CC | 10.8267 | 30433.7 | 67.8494 | 200254.5 | 58801.5 | 20485.5 | 1.6316 | -109646.2 | 1.0316 |
| 35CC | 10.9163 | 31520.9 | 68.1661 | 207055.2 | 59888.7 | 20365.4 | 1.6691 | -109575.2 | 0.8303 |
| 36CC | 10.9999 | 32616.7 | 68.4732 | 213887.2 | 60984.6 | 20252.0 | 1.7045 | -109499.9 | 0.6403 |
| 37CC | 11.0772 | 33720.6 | 68.7758 | 220749.7 | 62088.5 | 20144.7 | 1.7374 | -109421.5 | 0.4607 |
| 38CC | 11.1483 | 34831.9 | 69.0721 | 227642.1 | 63199.8 | 20043.1 | 1.7687 | -109341.1 | 0.2907 |
| 39CC | 11.2133 | 35950.1 | 69.3626 | 234563.9 | 64318.0 | 19946.5 | 1.7982 | -109259.8 | 0.1295 |
| 40CC | 11.2723 | 37074.4 | 69.6472 | 241514.4 | 65442.3 | 19854.5 | 1.8261 | -109179.0 | -0.0235 |
| 41CC | 11.3256 | 38204.3 | 69.9262 | 248493.2 | 66572.2 | 19766.5 | 1.8525 | -109099.6 | -0.1689 |
| 42CC | 11.3733 | 39339.3 | 70.1997 | 255499.5 | 67707.2 | 19682.0 | 1.8776 | -109022.8 | -0.3073 |
| 43CC | 11.4157 | 40478.8 | 70.4675 | 262532.9 | 68846.7 | 19600.5 | 1.9012 | -108949.7 | -0.4392 |
| 44CC | 11.4532 | 41622.3 | 70.7307 | 269592.9 | 69990.2 | 19521.7 | 1.9239 | -108881.3 | -0.5650 |
| 45CC | 11.4859 | 42769.3 | 70.9885 | 276678.9 | 71137.2 | 19445.0 | 1.9454 | -108818.6 | -0.6851 |
| 46CC | 11.5143 | 43919.4 | 71.2413 | 283790.4 | 72287.3 | 19370.0 | 1.9660 | -108762.5 | -0.8000 |
| 47CC | 11.5386 | 45072.0 | 71.4892 | 290927.0 | 73439.9 | 19296.4 | 1.9855 | -108713.9 | -0.9099 |
| 48CC | 11.5591 | 46227.0 | 71.7323 | 298088.1 | 74594.8 | 19223.9 | 2.0040 | -108673.6 | -1.0152 |
| 49CC | 11.5761 | 47383.7 | 71.9708 | 305273.3 | 75751.6 | 19152.1 | 2.0220 | -108642.3 | -1.1162 |
| 50CC | 11.5900 | 48542.1 | 72.2048 | 312482.1 | 76910.0 | 19080.7 | 2.0389 | -108620.8 | -1.2130 |
| 51CC | 11.6009 | 49701.6 | 72.4345 | 319714.1 | 78069.5 | 19009.4 | 2.0553 | -108609.6 | -1.3061 |
| 52CC | 11.6092 | 50862.2 | 72.6598 | 326968.9 | 79230.1 | 18938.1 | 2.0709 | -108609.3 | -1.3956 |
| 53CC | 11.6151 | 52023.4 | 72.8810 | 334245.9 | 80391.3 | 18866.5 | 2.0860 | -108620.3 | -1.4818 |
| 54CC | 11.6188 | 53185.1 | 73.0982 | 341544.9 | 81553.0 | 18794.3 | 2.1002 | -108643.2 | -1.5647 |
| 55CC | 11.6206 | 54347.1 | 73.3114 | 348865.4 | 82715.0 | 18721.5 | 2.1141 | -108678.2 | -1.6447 |
| 56CC | 11.6207 | 55509.2 | 73.5208 | 356207.1 | 83877.1 | 18647.9 | 2.1273 | -108725.6 | -1.7218 |
| 57CC | 11.6193 | 56671.2 | 73.7264 | 363569.5 | 85039.1 | 18573.2 | 2.1401 | -108785.7 | -1.7962 |
| 58CC | 11.6164 | 57833.0 | 73.9285 | 370952.2 | 86200.9 | 18497.5 | 2.1524 | -108858.7 | -1.8682 |
| 59CC | 11.6124 | 58994.5 | 74.1270 | 378355.1 | 87362.3 | 18420.6 | 2.1642 | -108944.7 | -1.9377 |
| 60CC | 11.6074 | 60155.4 | 74.3222 | 385777.5 | 88523.3 | 18342.4 | 2.1756 | -109043.8 | -2.0050 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Be, 1560° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (52) BeO (crystal, liquid); molecular weight, 25.013

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H _O ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H _O ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | 0 | 0 | -143790.8 | -142284.7 | ----- | -278158.7 | ----- |
| 1CC | 0.672 | 17.9 | 0.242E | 6.3 | -143772.8 | -142623.3 | 307.1894 | -279165.0 | 597.1170 |
| 2CC | 3.416 | 222.8 | 1.5534 | 87.9 | -143568.0 | -142905.9 | 151.2194 | -280014.4 | 291.6897 |
| 298.15 | 6.090 | 650.8 | 3.492E | 350.6 | -143100.0 | -143100.0 | 99.7964 | -280556.7 | 190.8877 |
| 3CC | 6.110 | 702.0 | 3.5304 | 357.1 | -143088.7 | -143102.3 | 99.1495 | -280564.3 | 189.6195 |
| 4CC | 7.920 | 1405.4 | 5.5412 | 811.1 | -142385.4 | -143192.6 | 73.0795 | -280875.7 | 138.4957 |
| 5CC | 9.236 | 2265.9 | 7.4560 | 1462.1 | -141524.9 | -143199.6 | 57.4319 | -281022.5 | 107.7959 |
| 6CC | 10.100 | 3235.2 | 9.2210 | 2297.4 | -140555.6 | -143150.2 | 47.0017 | -281056.3 | 87.3227 |
| 7CC | 10.717 | 4277.5 | 10.8266 | 3301.1 | -139513.3 | -143068.9 | 39.5551 | -281014.7 | 72.6992 |
| 8CC | 11.100 | 5369.5 | 12.2841 | 4457.8 | -138421.3 | -142971.5 | 33.9737 | -280921.7 | 61.7343 |
| 9CC | 11.350 | 6492.3 | 13.6064 | 5753.4 | -137298.5 | -142873.2 | 29.6356 | -280796.7 | 53.2093 |
| 10CC | 11.560 | 7637.8 | 14.8131 | 7175.2 | -136153.0 | -142780.8 | 26.1675 | -280648.3 | 46.3926 |
| 11CC | 11.770 | 8804.3 | 15.9247 | 8712.8 | -134586.5 | -142694.5 | 23.3317 | -280478.2 | 40.8185 |
| 12CC | 11.979 | 9991.8 | 16.9578 | 10357.6 | -133759.0 | -142614.5 | 20.9699 | -280286.7 | 36.1765 |
| 13CC | 12.188 | 11200.1 | 17.9245 | 12102.2 | -132590.7 | -142539.2 | 18.9725 | -280074.0 | 32.2514 |
| 14CC | 12.357 | 12429.4 | 18.8357 | 13940.7 | -131361.4 | -142468.5 | 17.2612 | -279840.1 | 28.8897 |
| 15CC | 12.606 | 13679.5 | 19.6982 | 15867.7 | -130111.3 | -142402.0 | 15.7790 | -279585.1 | 25.9788 |
| b 16CC | 12.815 | 14950.6 | 20.5184 | 17878.9 | -128840.2 | -145836.8 | 14.4703 | -279309.0 | 23.4341 |
| 17CC | 13.024 | 16242.5 | 21.3016 | 19970.2 | -127548.3 | -145706.3 | 13.2992 | -279011.9 | 21.1912 |
| 18CC | 13.223 | 17555.4 | 22.0519 | 22138.1 | -126235.4 | -145557.8 | 12.2590 | -278693.8 | 19.1996 |
| 19CC | 13.442 | 18889.1 | 22.7730 | 24379.6 | -124901.7 | -145391.2 | 11.3294 | -278354.7 | 17.4198 |
| 20CC | 13.651 | 20243.8 | 23.4678 | 26691.8 | -123547.0 | -145206.6 | 10.4938 | -277994.7 | 15.8200 |
| 21CC | 13.860 | 21619.3 | 24.1389 | 29072.4 | -122171.5 | -145003.8 | 9.7387 | -277613.8 | 14.3745 |
| 22CC | 14.069 | 23015.8 | 24.7885 | 31518.9 | -120775.0 | -144782.9 | 9.0532 | -277212.2 | 13.0622 |
| 2300 | 14.278 | 24433.1 | 25.4185 | 34029.4 | -119357.7 | -144543.9 | 8.4284 | -276789.8 | 11.8658 |
| 24CC | 14.487 | 25871.4 | 26.0306 | 36602.0 | -117919.4 | -144286.7 | 7.8568 | -276346.9 | 10.7709 |
| 25CC | 14.696 | 27330.5 | 26.6262 | 39235.0 | -116460.3 | -144011.2 | 7.3317 | -275883.6 | 9.7651 |
| 26CC | 14.905 | 28810.6 | 27.2067 | 41926.7 | -114980.2 | -143717.5 | 6.8481 | -275400.0 | 8.8384 |
| 27CC | 15.114 | 30311.5 | 27.7731 | 44675.9 | -113475.3 | -143405.5 | 6.4011 | -274896.3 | 7.9818 |
| 28CC | 15.323 | 31833.4 | 28.3265 | 47480.9 | -111957.4 | -143075.1 | 5.9870 | -274372.9 | 7.1879 |
| c 2843 | 15.413 | 32494.2 | 28.8608 | 48704.0 | -111296.6 | -142925.8 | 5.8179 | -274138.8 | 6.8639 |
| 2E43 | 15.0 | 49552.2 | 34.5608 | 48704.0 | -94238.6 | -125868.1 | 5.8179 | -257081.2 | 6.8639 |
| 29CC | 15.0 | 50407.2 | 34.8585 | 50682.5 | -93383.6 | -125655.2 | 5.6281 | -256798.9 | 6.4759 |
| 30CC | 15.0 | 51907.2 | 35.3670 | 54193.9 | -91883.6 | -125391.6 | 5.3127 | -256300.4 | 5.8315 |
| 31CC | 15.0 | 53407.2 | 35.8585 | 57755.4 | -90383.6 | -125090.3 | 5.0184 | -255804.0 | 5.2298 |
| 32CC | 15.0 | 54907.2 | 36.3351 | 61365.2 | -88883.6 | -124791.2 | 4.7433 | -255310.0 | 4.6668 |
| 33CC | 15.0 | 56407.2 | 36.7567 | 65021.9 | -87383.6 | -124494.4 | 4.4853 | -254819.0 | 4.1389 |
| 3400 | 15.0 | 57907.2 | 37.2445 | 68724.1 | -85883.6 | -124199.7 | 4.2430 | -254331.3 | 3.6431 |
| 35CC | 15.0 | 59407.2 | 37.6793 | 72470.4 | -84383.6 | -123907.0 | 4.0152 | -253847.5 | 3.1764 |
| 36CC | 15.0 | 60907.2 | 38.1015 | 76259.5 | -82883.6 | -123616.2 | 3.8007 | -253368.1 | 2.7366 |
| 37CC | 15.0 | 62407.2 | 38.5128 | 80090.3 | -81383.6 | -123327.4 | 3.5979 | -252893.6 | 2.3212 |
| 38CC | 15.0 | 63907.2 | 38.9125 | 83961.7 | -79883.6 | -123040.4 | 3.4065 | -252424.5 | 1.9285 |
| 39CC | 15.0 | 65407.2 | 39.3025 | 87872.6 | -78383.6 | -122755.1 | 3.2252 | -251961.4 | 1.5566 |
| 4000 | 15.0 | 66907.2 | 39.6822 | 91821.9 | -76883.6 | -122471.4 | 3.0535 | -251504.9 | 1.2040 |
| 41CC | 15.0 | 68407.2 | 40.0527 | 95808.7 | -75383.6 | -122189.4 | 2.8905 | -251055.4 | 0.8691 |
| 42CC | 15.0 | 69907.2 | 40.4141 | 99832.1 | -73883.6 | -121908.8 | 2.7357 | -250613.6 | 0.5508 |
| 4300 | 15.0 | 71407.2 | 40.7671 | 103891.2 | -72383.6 | -121629.8 | 2.5882 | -250180.0 | 0.2478 |
| 4400 | 15.0 | 72907.2 | 41.1119 | 107985.3 | -70883.6 | -121352.1 | 2.4480 | -249755.1 | -0.0409 |
| 45CC | 15.0 | 74407.2 | 41.4490 | 112113.4 | -69383.6 | -121075.9 | 2.3142 | -249339.4 | -0.3164 |
| 46CC | 15.0 | 75907.2 | 41.7787 | 116274.8 | -67883.6 | -120800.5 | 2.1865 | -248933.4 | -0.5794 |
| 47CC | 15.0 | 77407.2 | 42.1012 | 120468.9 | -66383.6 | -120527.1 | 2.0645 | -248537.4 | -0.8308 |
| 48CC | 15.0 | 78907.2 | 42.4171 | 124694.9 | -64883.6 | -120254.6 | 1.9478 | -248152.1 | -1.0714 |
| 49CC | 15.0 | 80407.2 | 42.7264 | 128952.1 | -63383.6 | -119983.2 | 1.8363 | -247777.6 | -1.3018 |
| 5000 | 15.0 | 81907.2 | 43.0294 | 133239.9 | -61883.6 | -119712.9 | 1.7293 | -247414.4 | -1.5227 |
| 51CC | 15.0 | 83407.2 | 43.3265 | 137557.8 | -60383.6 | -119443.7 | 1.6269 | -247062.7 | -1.7345 |
| 52CC | 15.0 | 84907.2 | 43.6177 | 141905.0 | -58883.6 | -119175.6 | 1.5286 | -246722.9 | -1.9380 |
| 5300 | 15.0 | 86407.2 | 43.9035 | 146281.1 | -57383.6 | -118908.4 | 1.4342 | -246395.2 | -2.1335 |
| 5400 | 15.0 | 87907.2 | 44.1838 | 150685.5 | -55883.6 | -118642.3 | 1.3434 | -246079.8 | -2.3215 |
| 55CC | 15.0 | 89407.2 | 44.4591 | 155117.7 | -54383.6 | -118377.1 | 1.2562 | -245776.8 | -2.5025 |
| 5600 | 15.0 | 90907.2 | 44.7294 | 159577.2 | -52883.6 | -118112.8 | 1.1723 | -245486.3 | -2.6768 |
| 57CC | 15.0 | 92407.2 | 44.9948 | 164063.4 | -51383.6 | -117849.5 | 1.0916 | -245208.4 | -2.8448 |
| 5800 | 15.0 | 93907.2 | 45.2557 | 168576.0 | -49883.6 | -117587.0 | 1.0138 | -244943.2 | -3.0068 |
| 5900 | 15.0 | 95407.2 | 45.5121 | 173114.4 | -48383.6 | -117325.3 | 0.9388 | -244690.6 | -3.1631 |
| 6000 | 15.0 | 96907.2 | 45.7642 | 177678.3 | -46883.6 | -117064.5 | 0.8665 | -244450.7 | -3.3141 |

^aH_T^o refers to crystal state.

^bA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Be, 1560° K.

^cMelting point.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(55) (BeO)₄ (gas); molecular weight, 100.052

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| C | ----- | 0 | ----- | 0 | -384184.4 | -378160.1 | ----- | -921656.0 | ----- |
| 100 | 9.1757 | 820.6 | 55.6727 | 4746.7 | -383363.9 | -378765.8 | 821.7118 | -924932.6 | 1981.4224 |
| 200 | 14.9556 | 2004.5 | 63.6474 | 10725.0 | -382179.9 | -379531.5 | 407.5309 | -927965.6 | 969.4120 |
| 298.15 | 21.1897 | 3784.4 | 70.8054 | 17326.2 | -380400.0 | -380400.0 | 270.8732 | -930226.6 | 635.2383 |
| 300 | 21.2587 | 3823.7 | 70.9366 | 17457.3 | -380360.7 | -380415.1 | 269.1535 | -930262.8 | 631.0335 |
| 400 | 26.5570 | 6227.1 | 77.8146 | 24898.7 | -377957.3 | -381186.0 | 199.8077 | -931918.4 | 461.4728 |
| 500 | 30.5578 | 9052.8 | 84.1926 | 33003.5 | -375091.6 | -381790.6 | 158.1238 | -933082.0 | 359.5797 |
| 600 | 33.4514 | 12303.0 | 90.0374 | 41719.4 | -371881.4 | -382260.1 | 130.2948 | -933884.5 | 291.5787 |
| 700 | 35.6306 | 15744.7 | 95.3694 | 50993.9 | -368419.7 | -382642.4 | 110.3950 | -934425.4 | 242.9714 |
| 800 | 37.2060 | 19410.4 | 100.2352 | 60777.8 | -364774.0 | -382974.7 | 95.4563 | -934775.6 | 206.4985 |
| 900 | 38.3850 | 23192.7 | 104.6888 | 71027.2 | -360991.7 | -383290.5 | 83.8274 | -934984.7 | 178.1222 |
| 1000 | 39.2632 | 27078.1 | 108.7816 | 81703.5 | -357106.3 | -383617.7 | 74.5168 | -935087.5 | 155.4174 |
| 1100 | 39.9796 | 31042.7 | 112.5597 | 92773.0 | -353141.7 | -383975.3 | 66.8920 | -935108.7 | 136.8395 |
| 1200 | 40.5284 | 35069.1 | 116.0628 | 104206.3 | -349115.3 | -384377.4 | 60.5317 | -935066.2 | 121.3581 |
| 1300 | 40.9675 | 39144.7 | 119.3246 | 115977.5 | -345039.7 | -384834.0 | 55.1439 | -934973.1 | 108.2594 |
| 1400 | 41.3235 | 43259.9 | 122.3743 | 128064.2 | -340924.5 | -385352.9 | 50.5194 | -934839.4 | 97.0333 |
| 1500 | 41.6159 | 47407.3 | 125.2356 | 140446.1 | -336777.1 | -385940.0 | 46.5064 | -934672.5 | 87.3056 |
| ^a 1600 | 41.8587 | 51581.4 | 127.9294 | 153105.7 | -332603.0 | -400589.4 | 42.9401 | -934478.3 | 78.7955 |
| 1700 | 42.0623 | 55777.7 | 130.4734 | 166027.0 | -328406.7 | -401038.8 | 39.7202 | -934261.2 | 71.2882 |
| 1800 | 42.2346 | 59992.8 | 132.8826 | 179195.9 | -324191.6 | -401481.2 | 36.8541 | -934025.0 | 64.6167 |
| 1900 | 42.3817 | 64223.8 | 135.1702 | 192599.5 | -319960.6 | -401918.9 | 34.2875 | -933772.7 | 58.6490 |
| 2000 | 42.5082 | 68468.5 | 137.3474 | 206226.3 | -315715.9 | -402354.3 | 31.9751 | -933506.6 | 53.2796 |
| 2100 | 42.6177 | 72724.9 | 139.4241 | 220065.6 | -311459.5 | -402789.0 | 29.8797 | -933228.9 | 48.4230 |
| 2200 | 42.7131 | 76951.5 | 141.4089 | 234108.0 | -307192.9 | -403224.6 | 27.9734 | -932941.5 | 44.0092 |
| 2300 | 42.7967 | 81267.1 | 143.3094 | 248344.6 | -302917.3 | -403662.2 | 26.2310 | -932646.0 | 39.9805 |
| 2400 | 42.8704 | 85550.6 | 145.1324 | 262767.3 | -298633.9 | -404102.8 | 24.6324 | -932343.8 | 36.2887 |
| 2500 | 42.9257 | 89840.9 | 146.8835 | 277368.7 | -294343.5 | -404547.2 | 23.1596 | -932036.7 | 32.8934 |
| 2600 | 42.9938 | 94137.5 | 148.5690 | 292141.9 | -290047.0 | -404996.1 | 21.7991 | -931725.9 | 29.7602 |
| 2700 | 43.0457 | 98439.5 | 150.1926 | 307080.4 | -285744.9 | -405449.8 | 20.5374 | -931413.1 | 26.8602 |
| 2800 | 43.0922 | 102746.4 | 151.7589 | 322178.5 | -281438.0 | -405908.7 | 19.3645 | -931099.8 | 24.1681 |
| 2900 | 43.1341 | 107057.8 | 153.2718 | 337430.4 | -277126.6 | -406373.1 | 18.2712 | -930787.7 | 21.6626 |
| 3000 | 43.1720 | 111373.1 | 154.7348 | 352831.2 | -272811.3 | -406843.2 | 17.2499 | -930478.4 | 19.3249 |
| 3100 | 43.2063 | 115692.0 | 156.1505 | 368375.8 | -268492.4 | -407319.1 | 16.2934 | -930173.8 | 17.1388 |
| 3200 | 43.2375 | 120014.3 | 157.5232 | 384059.9 | -264170.2 | -407800.7 | 15.3960 | -929875.9 | 15.0899 |
| 3300 | 43.2659 | 124339.5 | 158.8541 | 399879.1 | -259845.0 | -408288.1 | 14.5512 | -929586.6 | 13.1658 |
| 3400 | 43.2920 | 128667.4 | 160.1461 | 415829.4 | -255517.0 | -408781.3 | 13.7554 | -929300.0 | 11.3555 |
| 3500 | 43.3158 | 132997.8 | 161.4014 | 431907.1 | -251186.6 | -409280.2 | 13.0040 | -929042.4 | 9.6491 |
| 3600 | 43.3377 | 137330.5 | 162.6219 | 448108.5 | -246853.9 | -409784.6 | 12.2944 | -928792.0 | 8.0379 |
| 3700 | 43.3575 | 141665.3 | 163.8096 | 464430.4 | -242519.2 | -410294.4 | 11.6210 | -928559.9 | 6.5143 |
| 3800 | 43.3765 | 146002.0 | 164.9662 | 480869.4 | -238182.4 | -410809.5 | 10.9829 | -928346.0 | 5.0711 |
| 3900 | 43.3938 | 150340.5 | 166.0931 | 497422.6 | -233843.9 | -411329.7 | 10.3768 | -928155.1 | 3.7023 |
| 4000 | 43.4097 | 154680.7 | 167.1920 | 514087.1 | -229503.7 | -411855.0 | 9.8004 | -927988.8 | 2.4022 |
| 4100 | 43.4246 | 159022.4 | 168.2640 | 530860.1 | -225162.0 | -412385.1 | 9.2511 | -927849.3 | 1.1657 |
| 4200 | 43.4383 | 163365.6 | 169.3106 | 547739.1 | -220818.8 | -412919.8 | 8.7278 | -927739.0 | -0.0118 |
| 4300 | 43.4512 | 167710.1 | 170.3329 | 564721.4 | -216474.3 | -413459.1 | 8.2273 | -927660.0 | -1.1344 |
| 4400 | 43.4632 | 172055.8 | 171.3320 | 581804.9 | -212128.6 | -414002.8 | 7.7499 | -927614.7 | -2.2058 |
| 4500 | 43.4744 | 176402.7 | 172.3088 | 598987.1 | -207781.7 | -414550.7 | 7.2925 | -927604.9 | -3.2297 |
| 4600 | 43.4849 | 180750.7 | 173.2645 | 616265.9 | -203433.8 | -415102.8 | 6.8547 | -927632.8 | -4.2090 |
| 4700 | 43.4947 | 185099.6 | 174.1998 | 633639.3 | -199084.8 | -415658.8 | 6.4347 | -927700.1 | -5.1467 |
| 4800 | 43.5039 | 189449.6 | 175.1156 | 651105.2 | -194734.8 | -416218.7 | 6.0315 | -927808.6 | -6.0454 |
| 4900 | 43.5126 | 193800.4 | 176.0127 | 668661.8 | -190384.0 | -416782.3 | 5.6449 | -927959.9 | -6.9076 |
| 5000 | 43.5208 | 198152.1 | 176.8919 | 686307.2 | -186032.3 | -417349.5 | 5.2724 | -928155.4 | -7.7354 |
| 5100 | 43.5285 | 202504.6 | 177.7538 | 704039.6 | -181679.9 | -417920.3 | 4.9150 | -928396.4 | -8.5309 |
| 5200 | 43.5357 | 206857.8 | 178.5991 | 721857.4 | -177326.6 | -418494.5 | 4.5702 | -928684.0 | -9.2961 |
| 5300 | 43.5426 | 211211.7 | 179.4284 | 739758.9 | -172972.7 | -419072.1 | 4.2382 | -929019.2 | -10.0326 |
| 5400 | 43.5490 | 215566.3 | 180.2424 | 757742.6 | -168618.1 | -419652.9 | 3.9176 | -929402.9 | -10.7422 |
| 5500 | 43.5552 | 219921.5 | 181.0415 | 775806.9 | -164262.9 | -420236.9 | 3.6087 | -929835.5 | -11.4262 |
| 5600 | 43.5610 | 224277.3 | 181.8264 | 793950.4 | -159907.1 | -420824.0 | 3.3101 | -930317.8 | -12.0861 |
| 5700 | 43.5665 | 228633.7 | 182.5974 | 812171.7 | -155550.7 | -421414.2 | 3.0222 | -930805.0 | -12.7232 |
| 5800 | 43.5717 | 232990.6 | 183.3552 | 830469.4 | -151193.8 | -422007.3 | 2.7436 | -931432.3 | -13.3388 |
| 5900 | 43.5766 | 237348.0 | 184.1000 | 848842.3 | -146836.4 | -422603.3 | 2.4740 | -932064.6 | -13.9338 |
| 6000 | 43.5813 | 241705.9 | 184.8325 | 867289.0 | -142478.5 | -423202.1 | 2.2129 | -932747.1 | -14.5094 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Be, 1560° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (56) Be(OH)₂ (gas); molecular weight, 43.029

| T, °K | C _p ^o , cal/mole °K | H _f ^o -H ₀ ^o , cal/mole | S _f ^o , cal/mole °K | -(F _f ^o -H ₀ ^o), cal/mole | H _f ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| C | ----- | C | ----- | 0 | -159072.1 | -154504.8 | ----- | -452622.1 | ----- |
| 1CC | 7.0213 | 696.3 | 44.3331 | 3737.0 | -158375.8 | -155270.8 | 334.6115 | -454471.2 | 973.1699 |
| 2CC | 8.4005 | 1454.9 | 49.5364 | 8452.4 | -157617.2 | -155950.3 | 164.6758 | -456317.9 | 475.7748 |
| 298.15 | 10.2E49 | 2372.1 | 53.2425 | 13502.2 | -156700.0 | -156700.0 | 108.4622 | -457908.8 | 311.3768 |
| 3CC | 10.3200 | 2351.1 | 53.3062 | 13600.7 | -156680.9 | -156713.8 | 107.7535 | -457936.7 | 309.3070 |
| 4CC | 12.1947 | 3517.4 | 56.5332 | 19095.9 | -155554.7 | -157430.8 | 79.1528 | -459336.8 | 225.7909 |
| 5CC | 13.9E07 | 4826.5 | 59.4471 | 24897.1 | -154245.6 | -158053.4 | 61.9182 | -460539.1 | 175.5368 |
| 6CC | 15.5238 | 6302.6 | 62.1341 | 30577.8 | -152765.5 | -158574.8 | 50.3861 | -461566.1 | 141.9521 |
| 7CC | 16.8597 | 7923.6 | 64.6303 | 37317.5 | -151148.4 | -159006.0 | 42.1239 | -462443.2 | 117.9131 |
| 8CC | 17.9526 | 9667.8 | 66.9576 | 43898.3 | -149404.3 | -159366.7 | 35.9119 | -463193.9 | 99.8519 |
| 9CC | 18.5581 | 11516.6 | 69.1340 | 50704.0 | -147555.5 | -159654.6 | 31.0707 | -463837.6 | 85.7831 |
| 10CC | 19.7E77 | 13454.9 | 71.1755 | 57720.6 | -145617.2 | -159901.4 | 27.1913 | -464390.2 | 74.5135 |
| 11CC | 20.5060 | 15470.4 | 73.0959 | 64935.1 | -143601.7 | -160112.3 | 24.0122 | -464864.3 | 65.2827 |
| 12CC | 21.1316 | 17553.0 | 74.9076 | 72336.1 | -141519.1 | -160296.7 | 21.3599 | -465270.5 | 57.5830 |
| 1300 | 21.6789 | 19654.2 | 76.6212 | 79513.3 | -139377.9 | -160462.8 | 19.1133 | -465617.5 | 51.0626 |
| 14CC | 22.1595 | 21886.6 | 78.2457 | 87657.4 | -137185.5 | -160616.9 | 17.1850 | -465912.6 | 45.4699 |
| 15CC | 22.5E26 | 24124.1 | 79.7893 | 95559.8 | -134948.0 | -160765.5 | 15.5129 | -466162.1 | 40.6200 |
| ^a 16CC | 22.9562 | 26401.5 | 81.2589 | 103612.8 | -132670.6 | -164409.9 | 14.0363 | -466371.6 | 36.3742 |
| 17CC | 23.2E71 | 28714.0 | 82.6607 | 111809.3 | -130358.1 | -164487.5 | 12.7151 | -466545.5 | 32.6265 |
| 18CC | 23.5E08 | 31057.6 | 84.0003 | 120142.9 | -128014.5 | -164548.6 | 11.5401 | -466688.1 | 29.2940 |
| 19CC | 23.8422 | 33429.0 | 85.2824 | 128607.4 | -125643.1 | -164597.8 | 10.4886 | -466802.8 | 26.3114 |
| 20CC | 24.0755 | 35825.1 | 86.5112 | 137197.6 | -123247.0 | -164636.9 | 9.5417 | -466892.8 | 23.6266 |
| 21CC | 24.2E43 | 38243.3 | 87.6911 | 145908.1 | -120828.8 | -164668.0 | 8.6849 | -466960.7 | 21.1970 |
| 22CC | 24.4716 | 40681.3 | 88.8252 | 154734.3 | -118390.8 | -164692.6 | 7.9058 | -467009.0 | 18.9880 |
| 23CC | 24.6402 | 43137.0 | 89.9168 | 163671.7 | -115935.1 | -164712.8 | 7.1548 | -467039.8 | 16.9710 |
| 24CC | 24.7522 | 45608.8 | 90.9688 | 172716.3 | -113463.3 | -164729.5 | 6.5424 | -467055.1 | 15.1219 |
| 25CC | 24.9297 | 48055.0 | 91.9837 | 181864.2 | -110977.1 | -164743.9 | 5.9425 | -467056.5 | 13.4207 |
| 26CC | 25.0544 | 50594.3 | 92.9639 | 191111.9 | -108477.8 | -164757.1 | 5.3885 | -467045.8 | 11.8504 |
| 27CC | 25.1677 | 53105.5 | 93.9116 | 200455.9 | -105966.6 | -164769.5 | 4.8757 | -467024.3 | 10.3965 |
| 2800 | 25.2708 | 55627.5 | 94.8288 | 209893.2 | -103444.6 | -164782.5 | 4.3992 | -466993.6 | 9.0465 |
| 29CC | 25.3651 | 58159.3 | 95.7173 | 219420.7 | -100912.7 | -164796.0 | 3.9556 | -466954.8 | 7.7897 |
| 30CC | 25.4513 | 60700.2 | 96.5787 | 229035.7 | -98371.9 | -164811.2 | 3.5419 | -466909.2 | 6.6168 |
| 31CC | 25.5303 | 63249.4 | 97.4145 | 238735.6 | -95822.7 | -164828.4 | 3.1545 | -466858.0 | 5.5197 |
| 3200 | 25.6030 | 65806.1 | 98.2262 | 248517.8 | -93266.0 | -164848.1 | 2.7914 | -466802.4 | 4.4912 |
| 33CC | 25.6699 | 68369.8 | 99.0151 | 258380.1 | -90702.3 | -164869.2 | 2.4502 | -466743.3 | 3.5252 |
| 34CC | 25.7316 | 70939.9 | 99.7824 | 268320.1 | -88132.2 | -164894.5 | 2.1290 | -466682.1 | 2.6162 |
| 3500 | 25.7886 | 73515.9 | 100.5291 | 278335.9 | -85556.2 | -164923.6 | 1.8260 | -466619.5 | 1.7592 |
| 36CC | 25.8414 | 76097.5 | 101.2563 | 288425.3 | -82974.6 | -164954.5 | 1.5404 | -466556.8 | 0.9499 |
| 37CC | 25.8904 | 78684.1 | 101.9650 | 298586.5 | -80388.0 | -164988.7 | 1.2694 | -466494.8 | 0.1845 |
| 38CC | 25.9359 | 81275.4 | 102.6561 | 308817.7 | -77796.6 | -165028.4 | 1.0130 | -466434.5 | -0.5405 |
| 39CC | 25.9783 | 83871.2 | 103.3304 | 319117.2 | -75200.9 | -165069.1 | 0.7692 | -466376.8 | -1.2283 |
| 40CC | 26.0177 | 86471.0 | 103.9886 | 329483.3 | -72601.1 | -165114.7 | 0.5384 | -466322.7 | -1.8816 |
| 41CC | 26.0545 | 89074.6 | 104.6315 | 339914.4 | -69997.5 | -165162.7 | 0.3179 | -466272.9 | -2.5030 |
| 4200 | 26.0889 | 91681.8 | 105.2597 | 350409.1 | -67390.3 | -165215.6 | 0.1089 | -466228.4 | -3.0947 |
| 43CC | 26.1211 | 94292.3 | 105.8740 | 360965.9 | -64779.7 | -165271.7 | -0.0912 | -466189.9 | -3.6589 |
| 4400 | 26.1513 | 96906.0 | 106.4745 | 371583.4 | -62166.1 | -165332.7 | -0.2821 | -466158.2 | -4.1973 |
| 4500 | 26.1796 | 99522.5 | 107.0629 | 382260.4 | -59549.5 | -165395.9 | -0.4648 | -466133.9 | -4.7118 |
| 46CC | 26.2062 | 102141.9 | 107.6386 | 392995.6 | -56930.2 | -165463.9 | -0.6395 | -466117.7 | -5.2039 |
| 4700 | 26.2313 | 104763.7 | 108.2024 | 403787.7 | -54308.3 | -165535.7 | -0.8068 | -466110.3 | -5.6751 |
| 48CC | 26.2548 | 107388.1 | 108.7550 | 414635.7 | -51684.0 | -165612.2 | -0.9671 | -466112.2 | -6.1266 |
| 49CC | 26.2770 | 110014.7 | 109.2965 | 425538.4 | -49057.4 | -165692.5 | -1.1211 | -466124.0 | -6.5597 |
| 50CC | 26.2980 | 112643.4 | 109.8276 | 436494.7 | -46428.7 | -165775.6 | -1.2691 | -466146.1 | -6.9755 |
| 51CC | 26.3178 | 115274.2 | 110.3486 | 447503.6 | -43797.9 | -165863.2 | -1.4109 | -466178.9 | -7.3750 |
| 52CC | 26.3365 | 117907.0 | 110.8598 | 458564.1 | -41165.1 | -165954.4 | -1.5478 | -466222.8 | -7.7592 |
| 53CC | 26.3543 | 120541.5 | 111.3616 | 469675.2 | -38530.6 | -166050.0 | -1.6797 | -466278.2 | -8.1289 |
| 54CC | 26.3711 | 123177.8 | 111.8544 | 480836.1 | -35894.3 | -166149.1 | -1.8062 | -466345.3 | -8.4850 |
| 55CC | 26.3870 | 125815.7 | 112.3385 | 492045.8 | -33256.4 | -166252.7 | -1.9287 | -466424.3 | -8.8281 |
| 56CC | 26.4021 | 128455.2 | 112.8140 | 503303.5 | -30616.9 | -166359.5 | -2.0466 | -466515.5 | -9.1591 |
| 57CC | 26.4165 | 131096.1 | 113.2815 | 514608.3 | -27976.0 | -166469.4 | -2.1605 | -466618.9 | -9.4785 |
| 58CC | 26.4301 | 133738.4 | 113.7410 | 525959.5 | -25333.7 | -166583.7 | -2.2707 | -466734.7 | -9.7870 |
| 59CC | 26.4431 | 136382.1 | 114.1925 | 537356.3 | -22690.0 | -166702.1 | -2.3769 | -466862.9 | -10.0852 |
| 60CC | 26.4555 | 139027.0 | 114.6375 | 548797.9 | -20045.1 | -166823.5 | -2.4802 | -467003.5 | -10.3734 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Be, 1560° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
(57) C (gas); molecular weight, 12.011

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| C | ----- | 0 | ----- | C | 169738.6 | 169589.8 | ----- | 0 | ----- |
| 100 | 5.0847 | 570.2 | 32.2825 | 2658.1 | 170308.8 | 170545.3 | -365.7033 | 0 | 0 |
| 200 | 4.9565 | 1072.8 | 35.7695 | 6081.2 | 170811.4 | 170970.1 | -179.1627 | 0 | 0 |
| 258.15 | 4.9807 | 1562.3 | 37.7612 | 9696.2 | 171300.9 | 171300.9 | -117.6084 | 0 | 0 |
| 300 | 4.9806 | 1571.5 | 37.7921 | 9766.1 | 171310.1 | 171300.4 | -116.8341 | 0 | 0 |
| 400 | 4.9751 | 2069.2 | 39.2241 | 13620.4 | 171807.8 | 171557.1 | -85.6146 | 0 | 0 |
| 500 | 4.9726 | 2566.6 | 40.3340 | 17600.4 | 172305.2 | 171735.5 | -66.8590 | 0 | 0 |
| 600 | 4.9712 | 3063.8 | 41.2404 | 21680.5 | 172802.4 | 171855.5 | -54.3443 | 0 | 0 |
| 700 | 4.9704 | 3560.9 | 42.0067 | 25843.8 | 173299.5 | 171928.5 | -45.4901 | 0 | 0 |
| 800 | 4.9699 | 4057.9 | 42.6702 | 30078.4 | 173796.5 | 171965.5 | -38.6898 | 0 | 0 |
| 900 | 4.9695 | 4554.5 | 43.2557 | 34375.3 | 174292.5 | 171975.7 | -33.4700 | 0 | 0 |
| 1000 | 4.9693 | 5051.8 | 43.7793 | 38727.5 | 174790.4 | 171965.9 | -29.2941 | 0 | 0 |
| 1100 | 4.9694 | 5548.7 | 44.2529 | 43129.5 | 175287.3 | 171940.4 | -25.8779 | 0 | 0 |
| 1200 | 4.9697 | 6045.7 | 44.6852 | 47576.7 | 175784.3 | 171901.5 | -23.0315 | 0 | 0 |
| 1300 | 4.9706 | 6542.7 | 45.0831 | 52065.4 | 176281.3 | 171850.8 | -20.6237 | 0 | 0 |
| 1400 | 4.9722 | 7039.8 | 45.4515 | 56592.3 | 176778.4 | 171789.7 | -18.5605 | 0 | 0 |
| 1500 | 4.9748 | 7537.2 | 45.7947 | 61154.8 | 177275.8 | 171719.6 | -16.7731 | 0 | 0 |
| 1600 | 4.9785 | 8034.8 | 46.1158 | 65750.5 | 177773.4 | 171641.7 | -15.2098 | 0 | 0 |
| 1700 | 4.9835 | 8532.9 | 46.4178 | 70377.4 | 178271.5 | 171557.4 | -13.8311 | 0 | 0 |
| 1800 | 4.9901 | 9031.6 | 46.7028 | 75033.5 | 178770.2 | 171467.3 | -12.6062 | 0 | 0 |
| 1900 | 4.9981 | 9531.0 | 46.9728 | 79717.4 | 179269.6 | 171372.2 | -11.5108 | 0 | 0 |
| 2000 | 5.0078 | 10031.3 | 47.2295 | 84427.6 | 179769.9 | 171272.5 | -10.5255 | 0 | 0 |
| 2100 | 5.0190 | 10532.6 | 47.4740 | 89162.9 | 180271.2 | 171165.0 | -9.6346 | 0 | 0 |
| 2200 | 5.0316 | 11035.1 | 47.7078 | 93922.1 | 180773.7 | 171062.4 | -8.8251 | 0 | 0 |
| 2300 | 5.0456 | 11539.0 | 47.9318 | 98704.2 | 181277.5 | 170953.3 | -8.0866 | 0 | 0 |
| 2400 | 5.0607 | 12044.3 | 48.1468 | 103508.2 | 181782.9 | 170842.0 | -7.4100 | 0 | 0 |
| 2500 | 5.0769 | 12551.1 | 48.3538 | 108333.2 | 182289.7 | 170729.2 | -6.7875 | 0 | 0 |
| 2600 | 5.0940 | 13059.7 | 48.5532 | 113178.7 | 182798.3 | 170615.2 | -6.2141 | 0 | 0 |
| 2700 | 5.1118 | 13570.0 | 48.7458 | 118043.7 | 183308.6 | 170500.2 | -5.6831 | 0 | 0 |
| 2800 | 5.1301 | 14082.1 | 48.9320 | 122927.6 | 183820.7 | 170384.6 | -5.1904 | 0 | 0 |
| 2900 | 5.1488 | 14596.0 | 49.1124 | 127829.9 | 184334.6 | 170268.5 | -4.7320 | 0 | 0 |
| 3000 | 5.1677 | 15111.8 | 49.2872 | 132749.9 | 184850.4 | 170152.0 | -4.3044 | 0 | 0 |
| 3100 | 5.1867 | 15629.5 | 49.4570 | 137687.1 | 185368.1 | 170035.3 | -3.9047 | 0 | 0 |
| 3200 | 5.2057 | 16149.2 | 49.6220 | 142641.1 | 185887.8 | 169918.4 | -3.5303 | 0 | 0 |
| 3300 | 5.2245 | 16670.7 | 49.7824 | 147611.4 | 186409.3 | 169801.5 | -3.1787 | 0 | 0 |
| 3400 | 5.2430 | 17194.0 | 49.9387 | 152595.5 | 186932.6 | 169684.8 | -2.8481 | 0 | 0 |
| 3500 | 5.2612 | 17719.3 | 50.0909 | 157599.0 | 187457.9 | 169568.3 | -2.5366 | 0 | 0 |
| 3600 | 5.2790 | 18246.2 | 50.2394 | 162615.5 | 187984.9 | 169452.0 | -2.2426 | 0 | 0 |
| 3700 | 5.2963 | 18775.0 | 50.3843 | 167646.8 | 188513.6 | 169335.8 | -1.9647 | 0 | 0 |
| 3800 | 5.3131 | 19305.5 | 50.5257 | 172692.3 | 189044.1 | 169219.9 | -1.7016 | 0 | 0 |
| 3900 | 5.3294 | 19837.7 | 50.6640 | 177751.8 | 189576.2 | 169104.1 | -1.4521 | 0 | 0 |
| 4000 | 5.3450 | 20371.4 | 50.7991 | 182825.0 | 190110.0 | 168988.5 | -1.2153 | 0 | 0 |
| 4100 | 5.3601 | 20906.6 | 50.9312 | 187911.5 | 190645.2 | | 0 | 0 | |
| 4200 | 5.3745 | 21443.4 | 51.0606 | 193011.1 | 191182.0 | | 0 | 0 | |
| 4300 | 5.3884 | 21981.5 | 51.1872 | 198123.5 | 191720.1 | | 0 | 0 | |
| 4400 | 5.4016 | 22521.0 | 51.3112 | 203248.5 | 192259.6 | | 0 | 0 | |
| 4500 | 5.4141 | 23061.8 | 51.4328 | 208385.7 | 192800.4 | | 0 | 0 | |
| 4600 | 5.4261 | 23603.8 | 51.5515 | 213535.0 | 193342.4 | | 0 | 0 | |
| 4700 | 5.4375 | 24147.0 | 51.6687 | 218696.0 | 193885.6 | | 0 | 0 | |
| 4800 | 5.4483 | 24691.3 | 51.7833 | 223868.6 | 194429.9 | | 0 | 0 | |
| 4900 | 5.4585 | 25236.7 | 51.8958 | 229052.6 | 194975.3 | | 0 | 0 | |
| 5000 | 5.4682 | 25783.0 | 52.0061 | 234247.7 | 195521.6 | | 0 | 0 | |
| 5100 | 5.4774 | 26330.3 | 52.1145 | 239453.8 | 196068.9 | | 0 | 0 | |
| 5200 | 5.4861 | 26878.5 | 52.2210 | 244670.6 | 196617.1 | | 0 | 0 | |
| 5300 | 5.4943 | 27427.5 | 52.3255 | 249897.9 | 197166.1 | | 0 | 0 | |
| 5400 | 5.5021 | 27977.3 | 52.4283 | 255135.6 | 197715.9 | | 0 | 0 | |
| 5500 | 5.5094 | 28527.9 | 52.5293 | 260383.5 | 198266.5 | | 0 | 0 | |
| 5600 | 5.5164 | 29079.2 | 52.6287 | 265641.4 | 198817.8 | | 0 | 0 | |
| 5700 | 5.5229 | 29631.2 | 52.7264 | 270909.2 | 199369.8 | | 0 | 0 | |
| 5800 | 5.5292 | 30183.8 | 52.8225 | 276186.6 | 199922.4 | | 0 | 0 | |
| 5900 | 5.5351 | 30737.0 | 52.9171 | 281473.6 | 200475.6 | | 0 | 0 | |
| 6000 | 5.5407 | 31290.8 | 53.0101 | 286770.0 | 201029.4 | | 0 | 0 | |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(58) C (graphite); molecular weight, 12.011

| T, °K | C _p ^o , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | 0 | 0 | -251.2 | 0 | ----- | -169989.8 | ----- |
| 100 | 0.3963 | 14.7 | 0.2275 | 8.0 | -236.5 | 0 | 0 | -170545.3 | 365.7033 |
| 200 | 1.180 | 92.5 | 0.7384 | 55.2 | -158.7 | 0 | 0 | -170970.1 | 179.1627 |
| 298.15 | 2.038 | 251.2 | 1.3718 | 157.8 | 0 | 0 | 0 | -171300.9 | 117.6084 |
| 300 | 2.053 | 254.9 | 1.3846 | 160.5 | 3.7 | 0 | 0 | -171306.4 | 116.8341 |
| 400 | 2.860 | 501.9 | 2.0897 | 334.0 | 250.7 | 0 | 0 | -171557.1 | 85.6146 |
| 500 | 3.500 | 820.9 | 2.7988 | 578.5 | 569.7 | 0 | 0 | -171735.5 | 66.8590 |
| 600 | 4.025 | 1198.1 | 3.4850 | 892.9 | 946.9 | 0 | 0 | -171855.5 | 54.3443 |
| 700 | 4.439 | 1622.1 | 4.1379 | 1274.4 | 1370.9 | 0 | 0 | -171928.5 | 45.4001 |
| 800 | 4.748 | 2082.2 | 4.7517 | 1719.2 | 1831.0 | 0 | 0 | -171965.5 | 38.6898 |
| 900 | 4.978 | 2568.9 | 5.3248 | 2223.4 | 2317.7 | 0 | 0 | -171975.7 | 33.4700 |
| 1000 | 5.152 | 3075.7 | 5.8585 | 2782.8 | 2824.5 | 0 | 0 | -171965.9 | 29.2941 |
| 1100 | 5.294 | 3598.1 | 6.3564 | 3393.9 | 3346.9 | 0 | 0 | -171940.4 | 25.8779 |
| 1200 | 5.420 | 4133.9 | 6.8225 | 4053.1 | 3882.7 | 0 | 0 | -171901.5 | 23.0315 |
| 1300 | 5.532 | 4681.6 | 7.2608 | 4757.5 | 4430.4 | 0 | 0 | -171850.8 | 20.6237 |
| 1400 | 5.631 | 5239.9 | 7.6745 | 5504.4 | 4988.7 | 0 | 0 | -171789.7 | 18.5605 |
| 1500 | 5.717 | 5807.4 | 8.0660 | 6291.6 | 5556.2 | 0 | 0 | -171719.6 | 16.7731 |
| 1600 | 5.791 | 6382.9 | 8.4374 | 7116.9 | 6131.7 | 0 | 0 | -171641.7 | 15.2098 |
| 1700 | 5.857 | 6965.3 | 8.7905 | 7978.5 | 6714.1 | 0 | 0 | -171557.4 | 13.8311 |
| 1800 | 5.917 | 7554.1 | 9.1270 | 8874.5 | 7302.9 | 0 | 0 | -171467.3 | 12.6062 |
| 1900 | 5.973 | 8148.6 | 9.4484 | 9803.4 | 7897.4 | 0 | 0 | -171372.2 | 11.5108 |
| 2000 | 6.025 | 8748.5 | 9.7561 | 10763.7 | 8497.3 | 0 | 0 | -171272.5 | 10.5255 |
| 2100 | 6.071 | 9353.4 | 10.0512 | 11754.2 | 9102.2 | 0 | 0 | -171169.0 | 9.6346 |
| 2200 | 6.111 | 9962.5 | 10.3346 | 12773.6 | 9711.3 | 0 | 0 | -171062.4 | 8.8251 |
| 2300 | 6.148 | 10575.5 | 10.6071 | 13820.7 | 10324.3 | 0 | 0 | -170953.3 | 8.0866 |
| 2400 | 6.182 | 11192.0 | 10.8694 | 14894.6 | 10940.8 | 0 | 0 | -170842.0 | 7.4100 |
| 2500 | 6.212 | 11811.7 | 11.1224 | 15994.3 | 11560.5 | 0 | 0 | -170729.2 | 6.7879 |
| 2600 | 6.239 | 12434.3 | 11.3666 | 17118.8 | 12183.1 | 0 | 0 | -170615.2 | 6.2141 |
| 2700 | 6.265 | 13059.5 | 11.6025 | 18267.4 | 12808.3 | 0 | 0 | -170500.2 | 5.6831 |
| 2800 | 6.289 | 13687.2 | 11.8308 | 19439.1 | 13436.0 | 0 | 0 | -170384.6 | 5.1904 |
| 2900 | 6.312 | 14317.3 | 12.0519 | 20633.3 | 14066.1 | 0 | 0 | -170268.5 | 4.7320 |
| 3000 | 6.334 | 14949.6 | 12.2663 | 21849.2 | 14698.4 | 0 | 0 | -170152.0 | 4.3044 |
| 3100 | 6.355 | 15584.1 | 12.4743 | 23086.3 | 15332.9 | 0 | 0 | -170035.3 | 3.9047 |
| 3200 | 6.375 | 16220.6 | 12.6764 | 24343.9 | 15969.4 | 0 | 0 | -169918.4 | 3.5303 |
| 3300 | 6.393 | 16859.0 | 12.8728 | 25621.4 | 16607.8 | 0 | 0 | -169801.5 | 3.1787 |
| 3400 | 6.409 | 17499.1 | 13.0639 | 26918.3 | 17247.9 | 0 | 0 | -169684.8 | 2.8481 |
| 3500 | 6.425 | 18140.8 | 13.2499 | 28234.0 | 17889.6 | 0 | 0 | -169568.3 | 2.5366 |
| 3600 | 6.441 | 18784.1 | 13.4312 | 29568.1 | 18532.9 | 0 | 0 | -169452.0 | 2.2426 |
| 3700 | 6.457 | 19429.0 | 13.6079 | 30920.1 | 19177.8 | 0 | 0 | -169335.8 | 1.9647 |
| 3800 | 6.472 | 20075.5 | 13.7803 | 32289.6 | 19824.3 | 0 | 0 | -169219.9 | 1.7016 |
| 3900 | 6.486 | 20723.4 | 13.9486 | 33676.0 | 20472.2 | 0 | 0 | -169104.1 | 1.4521 |
| 4000 | 6.500 | 21372.7 | 14.1129 | 35079.1 | 21121.5 | 0 | 0 | -168988.5 | 1.2153 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(59) C₂ (gas); molecular weight, 24.022

| T, °K | C _p , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 197497.6 | 198000.0 | ----- | -141979.6 | ----- |
| 100 | 7.1142 | 695.7 | 37.9208 | 3096.4 | 198193.2 | 198666.2 | -425.9761 | -142424.4 | 305.4304 |
| 200 | 9.6701 | 1523.4 | 43.5509 | 7186.8 | 199021.0 | 199338.4 | -208.6216 | -142501.8 | 149.7039 |
| 298.15 | 10.3130 | 2528.3 | 47.6302 | 11672.7 | 200025.8 | 200025.8 | -136.8064 | -142575.9 | 98.4134 |
| 300 | 10.3022 | 2547.3 | 47.6940 | 11760.9 | 200044.9 | 200037.5 | -135.9024 | -142575.3 | 97.7659 |
| 400 | 9.4777 | 3537.5 | 50.5484 | 16681.8 | 201035.1 | 200533.6 | -99.4278 | -142580.6 | 71.8015 |
| 500 | 8.8784 | 4452.1 | 52.5917 | 21843.8 | 201949.6 | 200810.2 | -77.4998 | -142660.8 | 56.2182 |
| 600 | 8.6060 | 5324.2 | 54.1825 | 27185.3 | 202821.8 | 200928.0 | -62.8667 | -142783.0 | 45.8219 |
| 700 | 8.5157 | 6179.3 | 55.5008 | 32671.3 | 203676.8 | 200934.9 | -52.4112 | -142922.1 | 38.3890 |
| 800 | 8.5114 | 7030.2 | 56.6370 | 38279.4 | 204527.7 | 200865.8 | -44.5708 | -143065.2 | 32.8088 |
| 900 | 8.5459 | 7882.8 | 57.6412 | 43994.3 | 205380.4 | 200744.9 | -38.4756 | -143206.5 | 28.4644 |
| 1000 | 8.5977 | 8739.9 | 58.5442 | 49804.3 | 206237.5 | 200588.5 | -33.6029 | -143343.3 | 24.9854 |
| 1100 | 8.6575 | 9602.6 | 59.3664 | 55700.5 | 207100.2 | 200406.3 | -29.6195 | -143474.5 | 22.1363 |
| 1200 | 8.7214 | 10471.5 | 60.1225 | 61675.4 | 207969.1 | 200203.6 | -26.3032 | -143599.5 | 19.7599 |
| 1300 | 8.7876 | 11347.0 | 60.8231 | 67723.1 | 208844.5 | 199983.6 | -23.5000 | -143718.0 | 17.7474 |
| 1400 | 8.8551 | 12229.1 | 61.4768 | 73838.5 | 209726.7 | 199749.2 | -21.1000 | -143830.2 | 16.1020 |
| 1500 | 8.9232 | 13118.0 | 62.0901 | 80017.1 | 210615.6 | 199503.2 | -19.0225 | -143936.0 | 14.5237 |
| 1600 | 8.9912 | 14013.7 | 62.6682 | 86255.3 | 211511.3 | 199247.9 | -17.2070 | -144035.5 | 13.2126 |
| 1700 | 9.0587 | 14916.2 | 63.2153 | 92549.7 | 212413.8 | 198985.6 | -15.6072 | -144129.2 | 12.0550 |
| 1800 | 9.1250 | 15825.4 | 63.7349 | 98897.5 | 213323.0 | 198717.3 | -14.1870 | -144217.3 | 11.0253 |
| 1900 | 9.1896 | 16741.2 | 64.2300 | 105295.9 | 214238.7 | 198444.0 | -12.9181 | -144300.4 | 10.1035 |
| 2000 | 9.2519 | 17663.3 | 64.7030 | 111742.7 | 215160.8 | 198166.2 | -11.7776 | -144378.9 | 9.2734 |
| 2100 | 9.3117 | 18591.5 | 65.1559 | 118235.8 | 216089.1 | 197884.7 | -10.7472 | -144453.3 | 8.5220 |
| 2200 | 9.3685 | 19525.5 | 65.5904 | 124773.3 | 217023.1 | 197600.5 | -9.8118 | -144524.3 | 7.8385 |
| 2300 | 9.4221 | 20465.1 | 66.0080 | 131353.3 | 217962.6 | 197314.1 | -8.9590 | -144592.5 | 7.2141 |
| 2400 | 9.4724 | 21409.8 | 66.4101 | 137974.4 | 218907.4 | 197025.7 | -8.1784 | -144658.3 | 6.6416 |
| 2500 | 9.5193 | 22359.5 | 66.7977 | 144634.9 | 219857.0 | 196735.9 | -7.4613 | -144722.4 | 6.1146 |
| 2600 | 9.5628 | 23313.6 | 67.1719 | 151333.5 | 220811.2 | 196444.9 | -6.8003 | -144785.4 | 5.6279 |
| 2700 | 9.6029 | 24271.9 | 67.5336 | 158068.8 | 221769.5 | 196152.8 | -6.1892 | -144847.7 | 5.1770 |
| 2800 | 9.6396 | 25234.1 | 67.8835 | 164839.8 | 222731.6 | 195859.5 | -5.6226 | -144909.7 | 4.7582 |
| 2900 | 9.6731 | 26199.7 | 68.2224 | 171645.2 | 223697.3 | 195565.1 | -5.0958 | -144971.9 | 4.3682 |
| 3000 | 9.7034 | 27168.6 | 68.5508 | 178483.9 | 224666.1 | 195269.3 | -4.6050 | -145034.7 | 4.0039 |
| 3100 | 9.7309 | 28140.3 | 68.8695 | 185355.0 | 225637.9 | 194972.1 | -4.1464 | -145098.4 | 3.6630 |
| 3200 | 9.7555 | 29114.6 | 69.1788 | 192257.5 | 226612.2 | 194673.5 | -3.7172 | -145163.3 | 3.3433 |
| 3300 | 9.7775 | 30091.3 | 69.4793 | 199190.5 | 227588.9 | 194373.3 | -3.3147 | -145229.7 | 3.0428 |
| 3400 | 9.7971 | 31070.1 | 69.7715 | 206153.1 | 228567.6 | 194071.8 | -2.9364 | -145297.7 | 2.7599 |
| 3500 | 9.8144 | 32050.7 | 70.0558 | 213144.5 | 229548.2 | 193769.0 | -2.5802 | -145367.5 | 2.4930 |
| 3600 | 9.8296 | 33032.9 | 70.3325 | 220164.0 | 230530.4 | 193464.6 | -2.2444 | -145439.3 | 2.2408 |
| 3700 | 9.8428 | 34016.5 | 70.6020 | 227210.8 | 231514.1 | 193158.5 | -1.9272 | -145513.2 | 2.0021 |
| 3800 | 9.8543 | 35001.4 | 70.8646 | 234284.2 | 232498.9 | 192850.4 | -1.6273 | -145589.3 | 1.7759 |
| 3900 | 9.8642 | 35987.3 | 71.1207 | 241383.5 | 233484.9 | 192540.6 | -1.3431 | -145667.6 | 1.5611 |
| 4000 | 9.8726 | 36974.2 | 71.3706 | 248508.1 | 234471.7 | 192228.8 | -1.0736 | -145748.2 | 1.3570 |
| 4100 | 9.8796 | 37961.8 | 71.6144 | 255657.4 | 235459.3 | 191922.1 | ----- | -145831.1 | 1.1627 |
| 4200 | 9.8854 | 38950.0 | 71.8526 | 262830.8 | 236447.6 | 191615.2 | ----- | -145916.4 | 0.9776 |
| 4300 | 9.8902 | 39938.8 | 72.0852 | 270027.7 | 237436.4 | 191308.5 | ----- | -146003.9 | 0.8010 |
| 4400 | 9.8940 | 40928.0 | 72.3127 | 277247.7 | 238425.6 | 191001.8 | ----- | -146093.7 | 0.6323 |
| 4500 | 9.8969 | 41917.6 | 72.5350 | 284490.1 | 239415.2 | 190695.1 | ----- | -146185.7 | 0.4710 |
| 4600 | 9.8990 | 42907.4 | 72.7526 | 291754.5 | 240405.0 | 190388.4 | ----- | -146279.9 | 0.3166 |
| 4700 | 9.9004 | 43897.4 | 72.9655 | 299040.5 | 241394.9 | 190081.7 | ----- | -146376.3 | 0.1687 |
| 4800 | 9.9013 | 44887.5 | 73.1739 | 306347.5 | 242385.0 | 189775.0 | ----- | -146474.8 | 0.0269 |
| 4900 | 9.9016 | 45877.6 | 73.3781 | 313675.1 | 243375.2 | 189468.3 | ----- | -146575.4 | -0.1093 |
| 5000 | 9.9014 | 46867.8 | 73.5781 | 321023.0 | 244365.3 | 189161.6 | ----- | -146677.9 | -0.2401 |
| 5100 | 9.9008 | 47857.9 | 73.7742 | 328390.6 | 245355.4 | 188854.9 | ----- | -146782.4 | -0.3658 |
| 5200 | 9.8999 | 48847.9 | 73.9665 | 335777.7 | 246345.5 | 188548.2 | ----- | -146888.7 | -0.4868 |
| 5300 | 9.8987 | 49837.8 | 74.1550 | 343183.8 | 247335.4 | 188241.5 | ----- | -146996.8 | -0.6033 |
| 5400 | 9.8972 | 50827.6 | 74.3400 | 350608.6 | 248325.2 | 187934.8 | ----- | -147106.7 | -0.7156 |
| 5500 | 9.8955 | 51817.3 | 74.5216 | 358051.7 | 249314.8 | 187628.1 | ----- | -147218.2 | -0.8239 |
| 5600 | 9.8936 | 52806.7 | 74.6999 | 365512.8 | 250304.3 | 187321.4 | ----- | -147331.3 | -0.9284 |
| 5700 | 9.8916 | 53796.0 | 74.8750 | 372991.5 | 251293.5 | 187014.7 | ----- | -147446.0 | -1.0293 |
| 5800 | 9.8895 | 54785.0 | 75.0470 | 380487.7 | 252282.6 | 186708.0 | ----- | -147562.1 | -1.1268 |
| 5900 | 9.8873 | 55773.9 | 75.2161 | 388000.8 | 253271.4 | 186401.3 | ----- | -147679.7 | -1.2211 |
| 6000 | 9.8851 | 56762.5 | 75.3822 | 395530.8 | 254260.1 | 186094.6 | ----- | -147798.7 | -1.3123 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(60) C_3 (gas); molecular weight, 36.035

| T , °K | C_p^0 , cal/mole °K | $H_f^0 - H_0^0$, cal/mole | S_f^0 , cal/mole °K | $-(F_f^0 - H_0^0)$, cal/mole | H_f^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 187346.3 | 188099.9 | ----- | -321869.5 | ----- |
| 100 | 7.0465 | 696.7 | 41.9865 | 3502.0 | 188043.0 | 188752.5 | -403.4720 | -322883.5 | 693.6378 |
| 200 | 8.2075 | 1452.7 | 47.1798 | 7983.2 | 188799.1 | 189275.2 | -196.9939 | -323635.1 | 340.4943 |
| 298.15 | 9.3883 | 2319.0 | 50.6880 | 12793.7 | 189665.3 | 189665.3 | -128.8439 | -324237.4 | 223.9813 |
| 300 | 9.4075 | 2336.4 | 50.7462 | 12887.5 | 189682.7 | 189671.6 | -127.9867 | -324247.6 | 222.5157 |
| 400 | 10.3107 | 3324.2 | 53.5818 | 18108.5 | 19670.5 | 189918.3 | -93.4219 | -324753.0 | 163.4220 |
| 500 | 11.0295 | 4392.4 | 55.9625 | 23586.8 | 191738.8 | 190029.7 | -72.6628 | -325176.9 | 127.9142 |
| 600 | 11.6225 | 5525.9 | 58.0275 | 29290.5 | 192872.3 | 190031.7 | -58.8192 | -325534.9 | 104.2136 |
| 700 | 12.1153 | 6713.6 | 59.8573 | 35186.5 | 194059.9 | 189947.1 | -48.9330 | -325838.5 | 87.2673 |
| 800 | 12.5240 | 7946.2 | 61.5026 | 41255.9 | 195292.5 | 189799.7 | -41.5229 | -326096.9 | 74.5465 |
| 900 | 12.8620 | 9216.1 | 62.9979 | 47482.0 | 196562.4 | 189609.2 | -35.7647 | -326318.0 | 64.6453 |
| 1000 | 13.1415 | 10516.7 | 64.3680 | 53851.3 | 197863.0 | 189389.5 | -31.1631 | -326508.2 | 56.7193 |
| 1100 | 13.3730 | 11842.7 | 65.6317 | 60352.1 | 199189.1 | 189148.3 | -27.4027 | -326672.9 | 50.2309 |
| 1200 | 13.5655 | 13190.0 | 66.8038 | 66974.6 | 200536.3 | 188888.1 | -24.2733 | -326816.5 | 44.8213 |
| 1300 | 13.7266 | 14554.8 | 67.8961 | 73710.2 | 201901.1 | 188609.8 | -21.6290 | -326942.7 | 40.2421 |
| 1400 | 13.8620 | 15934.4 | 68.9185 | 80551.5 | 203280.8 | 188314.6 | -19.3660 | -327054.0 | 36.3156 |
| 1500 | 13.9766 | 17326.5 | 69.8789 | 87491.8 | 204672.8 | 188004.2 | -17.4078 | -327154.5 | 32.9116 |
| 1600 | 14.0741 | 18729.2 | 70.7841 | 94525.4 | 206075.5 | 187680.5 | -15.6973 | -327244.8 | 29.9321 |
| 1700 | 14.1577 | 20140.9 | 71.6399 | 101647.0 | 207487.2 | 187344.8 | -14.1907 | -327327.3 | 27.3026 |
| 1800 | 14.2298 | 21560.3 | 72.4512 | 108851.9 | 208906.7 | 186998.1 | -12.8539 | -327403.8 | 24.9646 |
| 1900 | 14.2922 | 22986.5 | 73.2223 | 116135.9 | 210332.8 | 186640.7 | -11.6601 | -327475.9 | 22.8722 |
| 2000 | 14.3467 | 24418.5 | 73.9568 | 123495.1 | 211764.8 | 186272.8 | -10.5878 | -327544.7 | 20.9887 |
| 2100 | 14.3943 | 25855.6 | 74.6580 | 130926.2 | 213201.9 | 185895.4 | -9.6195 | -327611.6 | 19.2842 |
| 2200 | 14.4363 | 27297.2 | 75.3286 | 138425.7 | 214643.5 | 185509.6 | -8.7411 | -327677.7 | 17.7344 |
| 2300 | 14.4734 | 28742.7 | 75.9712 | 145990.9 | 216089.0 | 185116.2 | -7.9407 | -327743.6 | 16.3190 |
| 2400 | 14.5064 | 30191.7 | 76.5878 | 153619.1 | 217538.1 | 184715.6 | -7.2086 | -327810.5 | 15.0213 |
| 2500 | 14.5358 | 31643.9 | 77.1806 | 161307.7 | 218990.2 | 184308.6 | -6.5365 | -327879.0 | 13.8272 |
| 2600 | 14.5621 | 33098.8 | 77.7513 | 169054.5 | 220445.1 | 183895.8 | -5.9175 | -327949.7 | 12.7247 |
| 2700 | 14.5857 | 34556.2 | 78.3013 | 176857.3 | 221902.5 | 183477.6 | -5.3457 | -328023.1 | 11.7037 |
| 2800 | 14.6070 | 36015.9 | 78.8321 | 184714.1 | 223362.2 | 183054.1 | -4.8159 | -328099.8 | 10.7553 |
| 2900 | 14.6263 | 37477.5 | 79.3451 | 192623.1 | 224823.9 | 182625.6 | -4.3238 | -328179.9 | 9.8722 |
| 3000 | 14.6438 | 38941.1 | 79.8412 | 200582.6 | 226287.4 | 182192.2 | -3.8656 | -328263.9 | 9.0477 |
| 3100 | 14.6597 | 40406.3 | 80.3216 | 208590.8 | 227752.6 | 181754.0 | -3.4380 | -328351.8 | 8.2762 |
| 3200 | 14.6742 | 41873.0 | 80.7873 | 216646.4 | 229219.3 | 181311.2 | -3.0381 | -328444.0 | 7.5528 |
| 3300 | 14.6875 | 43341.1 | 81.2391 | 224747.8 | 230687.4 | 180864.0 | -2.6633 | -328540.4 | 6.8729 |
| 3400 | 14.6997 | 44810.4 | 81.6777 | 232893.8 | 232156.8 | 180413.1 | -2.3114 | -328641.2 | 6.2329 |
| 3500 | 14.7108 | 46281.0 | 82.1040 | 241082.9 | 233627.3 | 179958.5 | -1.9805 | -328746.3 | 5.6293 |
| 3600 | 14.7211 | 47752.6 | 82.5185 | 249314.2 | 235098.9 | 179500.2 | -1.6688 | -328855.7 | 5.0590 |
| 3700 | 14.7307 | 49225.2 | 82.9220 | 257586.3 | 236571.5 | 179038.1 | -1.3747 | -328969.4 | 4.5194 |
| 3800 | 14.7394 | 50698.7 | 83.3150 | 265898.2 | 238045.0 | 178572.2 | -1.0967 | -329087.4 | 4.0079 |
| 3900 | 14.7476 | 52173.0 | 83.6979 | 274248.9 | 239519.4 | 178102.9 | -0.8338 | -329209.4 | 3.5226 |
| 4000 | 14.7552 | 53648.2 | 84.0714 | 282637.5 | 240994.5 | 177630.1 | -0.5846 | -329335.4 | 3.0613 |
| 4100 | 14.7622 | 55124.0 | 84.4358 | 291062.9 | 242470.4 | 177154.0 | ----- | -329465.3 | 2.6224 |
| 4200 | 14.7687 | 56600.6 | 84.7917 | 299524.4 | 243946.9 | 176677.6 | ----- | -329599.0 | 2.2041 |
| 4300 | 14.7749 | 58077.8 | 85.1392 | 308021.0 | 245424.1 | 176200.0 | ----- | -329736.3 | 1.8052 |
| 4400 | 14.7806 | 59555.5 | 85.4790 | 316552.0 | 246901.9 | 175722.2 | ----- | -329877.0 | 1.4243 |
| 4500 | 14.7859 | 61033.9 | 85.8112 | 325116.5 | 248380.2 | 175244.4 | ----- | -330021.0 | 1.0601 |
| 4600 | 14.7909 | 62512.7 | 86.1362 | 333714.0 | 249859.1 | 174766.6 | ----- | -330168.3 | 0.7116 |
| 4700 | 14.7956 | 63992.0 | 86.4544 | 342343.6 | 251338.4 | 174288.8 | ----- | -330318.5 | 0.3778 |
| 4800 | 14.8000 | 65471.8 | 86.7659 | 351004.6 | 252818.2 | 173811.0 | ----- | -330471.6 | 0.0577 |
| 4900 | 14.8042 | 66952.0 | 87.0711 | 359696.5 | 254298.4 | 173333.2 | ----- | -330627.4 | -0.2494 |
| 5000 | 14.8081 | 68432.7 | 87.3703 | 368418.6 | 255779.0 | 172855.4 | ----- | -330785.8 | -0.5444 |
| 5100 | 14.8118 | 69913.7 | 87.6635 | 377170.4 | 257260.0 | 172377.6 | ----- | -330946.7 | -0.8279 |
| 5200 | 14.8153 | 71395.0 | 87.9512 | 385951.2 | 258741.3 | 171899.8 | ----- | -331109.9 | -1.1007 |
| 5300 | 14.8185 | 72876.7 | 88.2334 | 394760.4 | 260223.0 | 171422.0 | ----- | -331275.2 | -1.3633 |
| 5400 | 14.8217 | 74358.7 | 88.5104 | 403597.7 | 261705.0 | 170944.2 | ----- | -331442.7 | -1.6164 |
| 5500 | 14.8246 | 75841.0 | 88.7824 | 412462.4 | 263187.4 | 170466.4 | ----- | -331612.1 | -1.8603 |
| 5600 | 14.8274 | 77323.6 | 89.0496 | 421354.0 | 264670.0 | 170000.0 | ----- | -331783.4 | -2.0957 |
| 5700 | 14.8300 | 78806.5 | 89.3120 | 430272.1 | 266152.8 | 169533.2 | ----- | -331956.4 | -2.3229 |
| 5800 | 14.8326 | 80289.6 | 89.5700 | 439216.3 | 267636.0 | 169066.4 | ----- | -332131.1 | -2.5424 |
| 5900 | 14.8349 | 81773.0 | 89.8236 | 448186.0 | 269119.3 | 168600.0 | ----- | -332307.4 | -2.7545 |
| 6000 | 14.8372 | 83256.6 | 90.0729 | 457180.8 | 270602.9 | 168133.2 | ----- | -332485.1 | -2.9597 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(61) CCl (gas); molecular weight, 47.468

| T , °K | C_p^0 , cal/mole °K | $H_T^0 - H_0^0$, cal/mole | S_T^0 , cal/mole °K | $-(F_T^0 - H_0^0)$, cal/mole | H_T^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 120160.3 | 121508.2 | ----- | -77030.0 | ----- |
| 100 | 7.7764 | 743.7 | 45.3594 | 3792.2 | 120904.0 | 121889.3 | -261.4465 | -77353.3 | 164.4845 |
| 200 | 7.4825 | 1501.5 | 50.6248 | 8623.4 | 121661.8 | 122206.4 | -128.1131 | -77597.1 | 79.8605 |
| 298.15 | 7.7055 | 2244.7 | 53.6451 | 13749.6 | 122405.0 | 122405.0 | -84.1203 | -77846.5 | 51.9088 |
| 300 | 7.7115 | 2259.0 | 53.6928 | 13848.9 | 122419.2 | 122408.0 | -83.5670 | -77851.2 | 51.5569 |
| 400 | 8.0260 | 3046.2 | 55.9552 | 19335.9 | 123206.4 | 122533.5 | -61.2632 | -78092.0 | 37.3589 |
| 500 | 8.2747 | 3861.9 | 57.7744 | 25025.3 | 124022.1 | 122603.3 | -47.8701 | -78314.6 | 28.8144 |
| 600 | 8.4535 | 4698.8 | 59.2997 | 30881.1 | 124859.0 | 122628.6 | -38.9377 | -78519.3 | 23.1023 |
| 700 | 8.5818 | 5550.9 | 60.6130 | 36878.2 | 125711.1 | 122617.4 | -32.5571 | -78707.9 | 19.0120 |
| 800 | 8.6760 | 6414.0 | 61.7654 | 42998.3 | 126574.3 | 122577.8 | -27.7727 | -78882.5 | 15.9371 |
| 900 | 8.7471 | 7285.3 | 62.7916 | 49227.1 | 127445.6 | 122517.1 | -24.0529 | -79045.2 | 13.5404 |
| 1000 | 8.8024 | 8162.9 | 63.7162 | 55553.3 | 128323.2 | 122440.7 | -21.3788 | -79197.8 | 11.6192 |
| 1100 | 8.8467 | 9045.4 | 64.5573 | 61967.6 | 129205.7 | 122352.0 | -18.6471 | -79341.9 | 10.0444 |
| 1200 | 8.8831 | 9932.0 | 65.3286 | 68462.4 | 130092.2 | 122252.5 | -16.6222 | -79478.7 | 8.7297 |
| 1300 | 8.9136 | 10821.9 | 66.0409 | 75031.3 | 130982.1 | 122143.2 | -14.9103 | -79609.2 | 7.6154 |
| 1400 | 8.9399 | 11714.6 | 66.7025 | 81668.9 | 131874.8 | 122025.1 | -13.4444 | -79734.5 | 6.6587 |
| 1500 | 8.9628 | 12609.7 | 67.3200 | 88370.3 | 132770.0 | 121899.3 | -12.1751 | -79855.3 | 5.8283 |
| 1600 | 8.9832 | 13507.0 | 67.8992 | 95131.6 | 133667.3 | 121766.7 | -11.0657 | -79972.2 | 5.1007 |
| 1700 | 9.0016 | 14406.3 | 68.4443 | 101949.1 | 134566.5 | 121628.1 | -10.0879 | -80085.8 | 4.4577 |
| 1800 | 9.0184 | 15307.3 | 68.9593 | 108819.5 | 135467.6 | 121484.3 | -9.2198 | -80196.7 | 3.8853 |
| 1900 | 9.0339 | 16209.9 | 69.4473 | 115740.0 | 136370.2 | 121335.4 | -8.4440 | -80305.3 | 3.3725 |
| 2000 | 9.0484 | 17114.0 | 69.9111 | 122708.1 | 137274.3 | 121181.8 | -7.7466 | -80412.1 | 2.9104 |
| 2100 | 9.0621 | 18019.6 | 70.3529 | 129721.5 | 138179.8 | 121024.0 | -7.1164 | -80517.5 | 2.4917 |
| 2200 | 9.0750 | 18926.4 | 70.7748 | 136778.0 | 139086.7 | 120862.6 | -6.5443 | -80621.7 | 2.1106 |
| 2300 | 9.0874 | 19834.6 | 71.1784 | 143875.8 | 139994.8 | 120697.8 | -6.0227 | -80725.2 | 1.7622 |
| 2400 | 9.0992 | 20743.9 | 71.5654 | 151013.2 | 140904.1 | 120530.0 | -5.5452 | -80828.1 | 1.4424 |
| 2500 | 9.1107 | 21654.4 | 71.9371 | 158188.4 | 141814.6 | 120359.4 | -5.1065 | -80930.7 | 1.1478 |
| 2600 | 9.1218 | 22566.0 | 72.2947 | 165400.1 | 142726.3 | 120186.5 | -4.7021 | -81033.3 | 0.8755 |
| 2700 | 9.1326 | 23478.7 | 72.6391 | 172646.9 | 143639.0 | 120011.4 | -4.3282 | -81135.9 | 0.6231 |
| 2800 | 9.1431 | 24392.5 | 72.9715 | 179927.6 | 144552.8 | 119834.1 | -3.9815 | -81238.7 | 0.3884 |
| 2900 | 9.1534 | 25307.3 | 73.2925 | 187240.8 | 145467.6 | 119654.8 | -3.6592 | -81341.9 | 0.1696 |
| 3000 | 9.1635 | 26223.2 | 73.6030 | 194585.7 | 146383.5 | 119473.7 | -3.3589 | -81445.5 | -0.0348 |
| 3100 | 9.1734 | 27140.0 | 73.9036 | 201961.1 | 147300.3 | 119290.8 | -3.0784 | -81549.6 | -0.2253 |
| 3200 | 9.1832 | 28057.9 | 74.1950 | 209366.1 | 148218.1 | 119106.1 | -2.8158 | -81654.3 | -0.4061 |
| 3300 | 9.1929 | 28976.7 | 74.4777 | 216799.8 | 149136.9 | 118919.9 | -2.5695 | -81759.5 | -0.5752 |
| 3400 | 9.2025 | 29896.5 | 74.7523 | 224261.4 | 150056.7 | 118732.3 | -2.3380 | -81865.4 | -0.7345 |
| 3500 | 9.2119 | 30817.2 | 75.0192 | 231750.0 | 150977.4 | 118543.4 | -2.1201 | -81971.8 | -0.8850 |
| 3600 | 9.2213 | 31738.8 | 75.2788 | 239265.0 | 151899.1 | 118353.2 | -1.9147 | -82078.9 | -1.0272 |
| 3700 | 9.2306 | 32661.4 | 75.5316 | 246805.6 | 152821.7 | 118161.8 | -1.7207 | -82186.5 | -1.1620 |
| 3800 | 9.2399 | 33585.0 | 75.7779 | 254371.1 | 153745.2 | 117969.0 | -1.5372 | -82294.7 | -1.2898 |
| 3900 | 9.2491 | 34509.4 | 76.0180 | 261960.9 | 154669.7 | 117775.1 | -1.3633 | -82403.4 | -1.4113 |
| 4000 | 9.2583 | 35434.8 | 76.2523 | 269574.5 | 155595.0 | 117580.1 | -1.1985 | -82512.6 | -1.5268 |
| 4100 | 9.2675 | 36361.1 | 76.4810 | 277211.2 | 156521.3 | 117385.2 | ----- | -82622.2 | -1.6368 |
| 4200 | 9.2767 | 37288.3 | 76.7045 | 284870.5 | 157448.6 | 117190.3 | ----- | -82732.2 | -1.7417 |
| 4300 | 9.2860 | 38216.4 | 76.9229 | 292551.9 | 158376.7 | 117000.0 | ----- | -82842.5 | -1.8419 |
| 4400 | 9.2952 | 39145.5 | 77.1365 | 300255.0 | 159305.7 | 116810.0 | ----- | -82953.1 | -1.9377 |
| 4500 | 9.3045 | 40075.5 | 77.3455 | 307979.1 | 160235.7 | 116620.0 | ----- | -83064.0 | -2.0293 |
| 4600 | 9.3138 | 41006.4 | 77.5501 | 315723.9 | 161166.6 | 116430.0 | ----- | -83175.0 | -2.1170 |
| 4700 | 9.3232 | 41938.2 | 77.7505 | 323489.0 | 162098.5 | 116240.0 | ----- | -83286.1 | -2.2012 |
| 4800 | 9.3326 | 42871.0 | 77.9468 | 331273.9 | 163031.3 | 116050.0 | ----- | -83397.2 | -2.2819 |
| 4900 | 9.3421 | 43804.8 | 78.1394 | 339078.2 | 163965.0 | 115860.0 | ----- | -83508.4 | -2.3594 |
| 5000 | 9.3517 | 44739.4 | 78.3282 | 346901.6 | 164899.7 | 115670.0 | ----- | -83619.5 | -2.4340 |
| 5100 | 9.3614 | 45675.1 | 78.5135 | 354743.7 | 165835.4 | 115480.0 | ----- | -83730.5 | -2.5057 |
| 5200 | 9.3713 | 46611.7 | 78.6954 | 362604.2 | 166772.0 | 115290.0 | ----- | -83841.3 | -2.5747 |
| 5300 | 9.3812 | 47549.4 | 78.8740 | 370482.7 | 167709.6 | 115100.0 | ----- | -83951.8 | -2.6413 |
| 5400 | 9.3913 | 48488.0 | 79.0494 | 378378.9 | 168648.2 | 114910.0 | ----- | -84062.1 | -2.7054 |
| 5500 | 9.4015 | 49427.6 | 79.2218 | 386292.5 | 169587.9 | 114720.0 | ----- | -84172.1 | -2.7673 |
| 5600 | 9.4118 | 50368.3 | 79.3913 | 394223.2 | 170528.5 | 114530.0 | ----- | -84281.7 | -2.8271 |
| 5700 | 9.4223 | 51310.0 | 79.5580 | 402170.6 | 171470.2 | 114340.0 | ----- | -84390.8 | -2.8848 |
| 5800 | 9.4329 | 52252.7 | 79.7220 | 410134.7 | 172413.0 | 114150.0 | ----- | -84499.4 | -2.9406 |
| 5900 | 9.4437 | 53196.6 | 79.8833 | 418114.9 | 173356.8 | 113960.0 | ----- | -84607.6 | -2.9946 |
| 6000 | 9.4546 | 54141.5 | 80.0421 | 426111.2 | 174301.7 | 113770.0 | ----- | -84715.1 | -3.0469 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(62) CCl_4 (gas); molecular weight, 153.839

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_o^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_o^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -29618.9 | -24980.8 | ----- | -309164.2 | ----- |
| 100 | 11.3356 | 884.5 | 57.0531 | 4820.8 | -28734.4 | -25502.9 | 48.4178 | -310837.2 | 655.0323 |
| 200 | 16.7122 | 2311.3 | 66.7281 | 11034.3 | -27307.6 | -25605.1 | 20.4771 | -311909.0 | 314.8836 |
| 298.15 | 19.8658 | 4118.9 | 74.0395 | 17955.9 | -25500.0 | -25500.0 | 11.2797 | -312603.4 | 202.5707 |
| 300 | 19.9116 | 4155.7 | 74.1625 | 18093.0 | -25463.2 | -25496.9 | 11.1643 | -312614.5 | 201.1577 |
| 400 | 21.8471 | 6251.8 | 80.1792 | 25819.9 | -23367.2 | -25306.6 | 6.5359 | -313137.4 | 144.1805 |
| 500 | 23.0272 | 8500.2 | 85.1914 | 34095.5 | -21118.7 | -25085.0 | 3.7817 | -313550.0 | 109.9423 |
| 600 | 23.7734 | 10842.9 | 89.4607 | 42833.5 | -18776.0 | -24857.1 | 1.9621 | -313882.1 | 87.0895 |
| 700 | 24.2663 | 13246.5 | 93.1649 | 51968.9 | -16372.4 | -24634.7 | 0.5743 | -314150.0 | 70.7504 |
| 800 | 24.6055 | 15691.1 | 96.4287 | 61451.8 | -13927.8 | -24420.8 | -0.2831 | -314365.4 | 58.4866 |
| 900 | 24.8475 | 18164.4 | 99.3415 | 71243.0 | -11454.5 | -24215.1 | -1.0213 | -314537.2 | 48.9421 |
| 1000 | 25.0255 | 20658.5 | 101.9691 | 81310.6 | -8960.4 | -24016.7 | -1.6069 | -314673.1 | 41.3028 |
| 1100 | 25.1600 | 23168.1 | 104.3609 | 91628.9 | -6450.9 | -23824.9 | -2.0822 | -314779.1 | 35.0501 |
| 1200 | 25.2639 | 25689.5 | 106.5548 | 102176.2 | -3929.5 | -23640.2 | -2.4752 | -314860.2 | 29.8379 |
| 1300 | 25.3457 | 28220.1 | 108.5803 | 112934.3 | -1398.8 | -23463.0 | -2.8051 | -314920.3 | 25.4266 |
| 1400 | 25.4113 | 30758.1 | 110.4611 | 123887.5 | 1139.1 | -23293.5 | -3.0859 | -314962.9 | 21.6449 |
| 1500 | 25.4645 | 33302.0 | 112.2162 | 135022.3 | 3683.0 | -23131.2 | -3.3275 | -314990.6 | 18.3670 |
| 1600 | 25.5084 | 35850.7 | 113.8611 | 146327.0 | 6231.7 | -22975.8 | -3.5374 | -315005.8 | 15.4987 |
| 1700 | 25.5450 | 38403.4 | 115.4086 | 157791.3 | 8784.5 | -22826.8 | -3.7214 | -315010.3 | 12.9678 |
| 1800 | 25.5757 | 40959.5 | 116.8696 | 169405.9 | 11340.5 | -22684.1 | -3.8839 | -315005.9 | 10.7180 |
| 1900 | 25.6018 | 43518.4 | 118.2532 | 181162.6 | 13899.5 | -22547.5 | -4.0284 | -314993.8 | 8.7052 |
| 2000 | 25.6242 | 46079.7 | 119.5670 | 193054.2 | 16460.8 | -22417.0 | -4.1577 | -314975.3 | 6.8937 |
| 2100 | 25.6435 | 48643.1 | 120.8176 | 205073.9 | 19024.2 | -22292.4 | -4.2741 | -314951.5 | 5.2548 |
| 2200 | 25.6603 | 51208.3 | 122.0110 | 217215.8 | 21589.4 | -22173.1 | -4.3792 | -314923.2 | 3.7651 |
| 2300 | 25.6750 | 53775.1 | 123.1519 | 229474.4 | 24156.2 | -22059.0 | -4.4747 | -314891.1 | 2.4050 |
| 2400 | 25.6879 | 56343.3 | 124.2449 | 241844.6 | 26724.3 | -21949.8 | -4.5619 | -314856.1 | 1.1584 |
| 2500 | 25.6992 | 58912.6 | 125.2938 | 254321.9 | 29293.7 | -21845.4 | -4.6416 | -314818.6 | 0.0117 |
| 2600 | 25.7094 | 61483.1 | 126.3020 | 266902.0 | 31864.2 | -21745.5 | -4.7149 | -314779.2 | -1.0467 |
| 2700 | 25.7184 | 64054.5 | 127.2724 | 279581.0 | 34435.5 | -21650.0 | -4.7824 | -314738.3 | -2.0266 |
| 2800 | 25.7265 | 66626.7 | 128.2079 | 292355.3 | 37007.8 | -21558.9 | -4.8449 | -314696.3 | -2.9364 |
| 2900 | 25.7337 | 69199.7 | 129.1108 | 305221.5 | 39580.8 | -21471.9 | -4.9028 | -314653.5 | -3.7833 |
| 3000 | 25.7403 | 71773.4 | 129.9833 | 318176.5 | 42154.5 | -21389.2 | -4.9566 | -314610.2 | -4.5736 |
| 3100 | 25.7462 | 74347.8 | 130.8274 | 331217.2 | 44728.9 | -21310.6 | -5.0068 | -314566.5 | -5.3129 |
| 3200 | 25.7516 | 76922.7 | 131.6449 | 344341.1 | 47303.8 | -21236.1 | -5.0537 | -314522.7 | -6.0058 |
| 3300 | 25.7565 | 79498.1 | 132.4374 | 357545.4 | 49879.2 | -21165.6 | -5.0976 | -314479.3 | -6.6567 |
| 3400 | 25.7610 | 82074.0 | 133.2064 | 370827.7 | 52455.0 | -21098.9 | -5.1387 | -314435.5 | -7.2692 |
| 3500 | 25.7651 | 84650.3 | 133.9532 | 384185.9 | 55031.4 | -21035.9 | -5.1774 | -314392.2 | -7.8466 |
| 3600 | 25.7689 | 87227.0 | 134.6791 | 397617.7 | 57608.1 | -20976.6 | -5.2138 | -314349.3 | -8.3918 |
| 3700 | 25.7724 | 89804.1 | 135.3852 | 411121.1 | 60185.1 | -20921.2 | -5.2482 | -314306.8 | -8.9075 |
| 3800 | 25.7756 | 92381.5 | 136.0725 | 424694.1 | 62762.5 | -20869.6 | -5.2807 | -314264.8 | -9.3961 |
| 3900 | 25.7786 | 94959.2 | 136.7421 | 438335.0 | 65340.2 | -20821.6 | -5.3114 | -314223.3 | -9.8594 |
| 4000 | 25.7813 | 97537.2 | 137.3948 | 452042.0 | 67918.2 | -20777.2 | -5.3406 | -314182.3 | -10.2996 |
| 4100 | 25.7839 | 100115.4 | 138.0314 | 465813.4 | 70496.5 | -20736.1 | -5.3682 | -314141.9 | -10.7182 |
| 4200 | 25.7862 | 102693.9 | 138.6528 | 479647.7 | 73075.0 | -20697.2 | -5.3943 | -314102.0 | -11.1169 |
| 4300 | 25.7884 | 105272.7 | 139.2596 | 493543.5 | 75653.7 | -20660.2 | -5.4190 | -314062.7 | -11.4970 |
| 4400 | 25.7905 | 107851.6 | 139.8525 | 507499.2 | 78232.7 | -20625.1 | -5.4424 | -314023.9 | -11.8597 |
| 4500 | 25.7924 | 110430.8 | 140.4321 | 521513.5 | 80811.8 | -20591.7 | -5.4646 | -313985.7 | -12.2063 |
| 4600 | 25.7942 | 113010.1 | 140.9990 | 535585.2 | 83391.2 | -20559.8 | -5.4856 | -313948.0 | -12.5378 |
| 4700 | 25.7959 | 115589.6 | 141.5537 | 549712.9 | 85970.7 | -20529.3 | -5.5054 | -313910.7 | -12.8551 |
| 4800 | 25.7975 | 118169.3 | 142.0968 | 563895.5 | 88550.4 | -20500.0 | -5.5241 | -313874.0 | -13.1591 |
| 4900 | 25.7990 | 120749.1 | 142.6288 | 578131.9 | 91130.2 | -20471.7 | -5.5417 | -313837.7 | -13.4508 |
| 5000 | 25.8004 | 123329.1 | 143.1500 | 592420.9 | 93710.2 | -20444.4 | -5.5583 | -313801.9 | -13.7307 |
| 5100 | 25.8017 | 125909.2 | 143.6609 | 606761.5 | 96290.3 | -20418.1 | -5.5738 | -313766.4 | -13.9996 |
| 5200 | 25.8029 | 128489.4 | 144.1620 | 621152.8 | 98870.5 | -20392.8 | -5.5883 | -313731.4 | -14.2582 |
| 5300 | 25.8041 | 131069.8 | 144.6535 | 635593.6 | 101450.8 | -20368.4 | -5.6018 | -313696.9 | -14.5069 |
| 5400 | 25.8052 | 133650.2 | 145.1358 | 650083.2 | 104031.3 | -20345.0 | -5.6144 | -313662.4 | -14.7464 |
| 5500 | 25.8063 | 136230.8 | 145.6093 | 664620.5 | 106611.9 | -20322.5 | -5.6261 | -313628.5 | -14.9772 |
| 5600 | 25.8073 | 138811.5 | 146.0743 | 679204.8 | 109192.6 | -20300.9 | -5.6369 | -313594.8 | -15.1998 |
| 5700 | 25.8082 | 141392.3 | 146.5311 | 693835.1 | 111773.3 | -20280.2 | -5.6468 | -313561.5 | -15.4144 |
| 5800 | 25.8091 | 143973.1 | 146.9800 | 708510.7 | 114354.2 | -20260.4 | -5.6558 | -313528.4 | -15.6217 |
| 5900 | 25.8099 | 146554.1 | 147.4212 | 723230.8 | 116935.2 | -20241.5 | -5.6640 | -313495.6 | -15.8219 |
| 6000 | 25.8108 | 149135.1 | 147.8550 | 737994.7 | 119516.2 | -20223.4 | -5.6714 | -313463.1 | -16.0155 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(83) CF (gas); molecular weight, 31.011

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 72524.8 | 73830.8 | ----- | -114514.0 | ----- |
| 100 | 7.4125 | 748.9 | 43.0291 | 3554.0 | 73273.7 | 74217.7 | -157.2878 | -114833.8 | 246.2869 |
| 200 | 7.1170 | 1470.8 | 48.0444 | 8138.1 | 73995.6 | 74511.7 | -76.0570 | -115140.3 | 120.6839 |
| 298.15 | 7.1843 | 2170.6 | 50.8904 | 13002.3 | 74695.4 | 74695.4 | -49.2226 | -115463.6 | 79.2159 |
| 300 | 7.1877 | 2183.9 | 50.9348 | 13096.5 | 74708.7 | 74698.1 | -48.8850 | -115469.6 | 78.6940 |
| 400 | 7.4317 | 2914.1 | 53.0338 | 18299.4 | 75438.9 | 74796.2 | -35.2720 | -115777.3 | 57.6393 |
| 500 | 7.7089 | 3671.3 | 54.7222 | 23689.8 | 76196.1 | 74831.7 | -27.0968 | -116049.6 | 44.9743 |
| 600 | 7.9546 | 4454.8 | 56.1501 | 29235.2 | 76979.6 | 74822.3 | -21.6457 | -116288.1 | 36.5121 |
| 700 | 8.1546 | 5260.6 | 57.3919 | 34913.7 | 77785.4 | 74778.9 | -17.7534 | -116498.6 | 30.4560 |
| 800 | 8.3134 | 6084.4 | 58.4915 | 40708.9 | 78609.1 | 74710.5 | -14.8363 | -116687.0 | 25.9060 |
| 900 | 8.4391 | 6922.2 | 59.4783 | 46608.2 | 79447.0 | 74624.3 | -12.5699 | -116857.9 | 22.3617 |
| 1000 | 8.5396 | 7771.3 | 60.3728 | 52601.5 | 80296.1 | 74525.1 | -10.7590 | -117015.0 | 19.5223 |
| 1100 | 8.6210 | 8629.5 | 61.1907 | 58680.2 | 81154.3 | 74415.9 | -9.2794 | -117161.2 | 17.1961 |
| 1200 | 8.6878 | 9495.1 | 61.9437 | 64837.4 | 82019.8 | 74297.8 | -8.0483 | -117298.5 | 15.2553 |
| 1300 | 8.7436 | 10366.7 | 62.6414 | 71067.1 | 82891.5 | 74171.5 | -7.0083 | -117428.5 | 13.6112 |
| 1400 | 8.7907 | 11243.5 | 63.2911 | 77364.1 | 83768.3 | 74037.7 | -6.1185 | -117552.5 | 12.2004 |
| 1500 | 8.8313 | 12124.6 | 63.8991 | 83724.0 | 84649.4 | 73897.1 | -5.3487 | -117671.5 | 10.9765 |
| 1600 | 8.8665 | 13009.6 | 64.4702 | 90142.7 | 85534.3 | 73750.5 | -4.6765 | -117786.4 | 9.9045 |
| 1700 | 8.8975 | 13897.8 | 65.0086 | 96616.9 | 86422.6 | 73598.7 | -4.0845 | -117897.8 | 8.9577 |
| 1800 | 8.9252 | 14789.0 | 65.5180 | 103143.5 | 87313.7 | 73442.0 | -3.5594 | -118006.4 | 8.1153 |
| 1900 | 8.9501 | 15682.7 | 66.0013 | 109719.6 | 88207.5 | 73280.7 | -3.0906 | -118112.7 | 7.3609 |
| 2000 | 8.9727 | 16578.9 | 66.4609 | 116342.9 | 89103.7 | 73115.0 | -2.6697 | -118217.1 | 6.6813 |
| 2100 | 8.9935 | 17477.2 | 66.8992 | 123011.1 | 90002.0 | 72945.2 | -2.2897 | -118320.1 | 6.0659 |
| 2200 | 9.0127 | 18377.5 | 67.3180 | 129722.1 | 90902.3 | 72772.0 | -1.9450 | -118422.0 | 5.5060 |
| 2300 | 9.0306 | 19279.7 | 67.7191 | 136474.1 | 91804.5 | 72595.5 | -1.6311 | -118523.2 | 4.9943 |
| 2400 | 9.0474 | 20183.6 | 68.1038 | 143265.4 | 92708.4 | 72416.1 | -1.3440 | -118623.8 | 4.5249 |
| 2500 | 9.0632 | 21089.2 | 68.4734 | 150094.4 | 93613.9 | 72233.9 | -1.0806 | -118724.3 | 4.0926 |
| 2600 | 9.0782 | 21996.2 | 68.8292 | 156959.6 | 94521.0 | 72049.3 | -0.8380 | -118824.6 | 3.6933 |
| 2700 | 9.0926 | 22904.8 | 69.1721 | 163859.8 | 95429.6 | 71862.4 | -0.6140 | -118925.2 | 3.3232 |
| 2800 | 9.1063 | 23814.7 | 69.5030 | 170793.6 | 96339.5 | 71673.3 | -0.4066 | -119025.9 | 2.9733 |
| 2900 | 9.1195 | 24726.0 | 69.8228 | 177760.0 | 97250.8 | 71482.1 | -0.2139 | -119127.1 | 2.6588 |
| 3000 | 9.1323 | 25638.6 | 70.1321 | 184757.8 | 98163.4 | 71288.9 | -0.0346 | -119228.7 | 2.3595 |
| 3100 | 9.1446 | 26552.5 | 70.4318 | 191786.1 | 99077.2 | 71093.8 | 0.1327 | -119330.9 | 2.0792 |
| 3200 | 9.1566 | 27467.5 | 70.7223 | 198843.9 | 99992.3 | 70896.7 | 0.2891 | -119433.7 | 1.8162 |
| 3300 | 9.1683 | 28383.8 | 71.0043 | 205930.3 | 100908.6 | 70698.0 | 0.4356 | -119537.1 | 1.5689 |
| 3400 | 9.1797 | 29301.2 | 71.2781 | 213044.5 | 101826.0 | 70497.6 | 0.5731 | -119641.1 | 1.3320 |
| 3500 | 9.1909 | 30219.7 | 71.5444 | 220185.6 | 102744.5 | 70295.8 | 0.7024 | -119745.8 | 1.1162 |
| 3600 | 9.2018 | 31139.3 | 71.8035 | 227353.1 | 103664.1 | 70092.5 | 0.8242 | -119851.1 | 0.9084 |
| 3700 | 9.2125 | 32060.1 | 72.0557 | 234546.1 | 104584.8 | 69887.6 | 0.9390 | -119957.0 | 0.7117 |
| 3800 | 9.2231 | 32981.8 | 72.3015 | 241764.0 | 105506.6 | 69681.2 | 1.0475 | -120063.6 | 0.5251 |
| 3900 | 9.2335 | 33904.7 | 72.5413 | 249006.2 | 106429.5 | 69473.5 | 1.1501 | -120170.6 | 0.3480 |
| 4000 | 9.2438 | 34828.5 | 72.7752 | 256272.1 | 107353.3 | 69264.3 | 1.2472 | -120278.2 | 0.1796 |
| 4100 | 9.2539 | 35753.4 | 73.0035 | 263561.1 | 108278.2 | | | -120386.3 | 0.0192 |
| 4200 | 9.2639 | 36679.3 | 73.2266 | 270872.6 | 109204.1 | | | -120494.8 | -0.1336 |
| 4300 | 9.2738 | 37606.2 | 73.4447 | 278206.2 | 110131.0 | | | -120603.6 | -0.2795 |
| 4400 | 9.2836 | 38534.1 | 73.6581 | 285561.4 | 111058.8 | | | -120712.8 | -0.4189 |
| 4500 | 9.2933 | 39462.9 | 73.8668 | 292937.7 | 111987.7 | | | -120822.3 | -0.5522 |
| 4600 | 9.3029 | 40392.7 | 74.0712 | 300334.6 | 112917.5 | | | -120932.0 | -0.6798 |
| 4700 | 9.3125 | 41323.5 | 74.2713 | 307751.8 | 113848.3 | | | -121041.9 | -0.8021 |
| 4800 | 9.3220 | 42255.2 | 74.4675 | 315188.7 | 114780.0 | | | -121151.9 | -0.9194 |
| 4900 | 9.3314 | 43187.9 | 74.6598 | 322645.2 | 115712.7 | | | -121262.0 | -1.0320 |
| 5000 | 9.3408 | 44121.5 | 74.8484 | 330120.6 | 116646.3 | | | -121372.1 | -1.1402 |
| 5100 | 9.3501 | 45056.0 | 75.0335 | 337614.7 | 117580.8 | | | -121482.3 | -1.2443 |
| 5200 | 9.3593 | 45991.5 | 75.2151 | 345127.2 | 118516.3 | | | -121592.3 | -1.3444 |
| 5300 | 9.3686 | 46927.9 | 75.3935 | 352657.6 | 119452.7 | | | -121702.3 | -1.4409 |
| 5400 | 9.3777 | 47865.2 | 75.5687 | 360205.8 | 120390.0 | | | -121812.1 | -1.5339 |
| 5500 | 9.3869 | 48803.5 | 75.7409 | 367771.3 | 121328.2 | | | -121921.8 | -1.6235 |
| 5600 | 9.3960 | 49742.6 | 75.9101 | 375353.8 | 122267.4 | | | -122031.2 | -1.7101 |
| 5700 | 9.4050 | 50682.6 | 76.0765 | 382953.2 | 123207.4 | | | -122140.4 | -1.7937 |
| 5800 | 9.4140 | 51623.6 | 76.2401 | 390569.0 | 124148.4 | | | -122249.3 | -1.8744 |
| 5900 | 9.4230 | 52565.5 | 76.4011 | 398201.1 | 125090.2 | | | -122357.9 | -1.9526 |
| 6000 | 9.4320 | 53508.2 | 76.5596 | 405849.2 | 126033.0 | | | -122466.1 | -2.0281 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (64) CF_2 (gas); molecular weight, 50.011

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -32465.4 | -30104.6 | ----- | -236804.4 | ----- |
| 100 | 7.9615 | 794.7 | 48.1287 | 4018.1 | -31670.7 | -30019.3 | 67.1787 | -237577.0 | 508.6249 |
| 200 | 8.3719 | 1606.3 | 53.7379 | 9141.3 | -30859.2 | -29985.7 | 34.3947 | -238319.7 | 248.7137 |
| 298.15 | 9.1676 | 2465.4 | 57.2225 | 14595.4 | -30000.0 | -30000.0 | 23.6077 | -239017.2 | 162.8762 |
| 300 | 9.1840 | 2482.4 | 57.2792 | 14701.3 | -29983.0 | -30000.6 | 23.4720 | -239029.6 | 161.7958 |
| 400 | 10.0641 | 3445.2 | 60.0428 | 20571.9 | -29020.3 | -30055.0 | 18.0045 | -239644.8 | 118.2125 |
| 500 | 10.8438 | 4491.7 | 62.3749 | 26695.7 | -27973.7 | -30132.8 | 14.7166 | -240159.8 | 91.9997 |
| 600 | 11.4743 | 5608.9 | 64.4100 | 33037.1 | -26856.5 | -30224.3 | 12.5184 | -240589.6 | 74.4897 |
| 700 | 11.9668 | 6782.0 | 66.2174 | 39570.1 | -25683.4 | -30325.5 | 10.9433 | -240952.1 | 61.9619 |
| 800 | 12.3488 | 7998.6 | 67.8413 | 46274.5 | -24466.9 | -30433.1 | 9.7579 | -241262.6 | 52.5528 |
| 900 | 12.6471 | 9249.0 | 69.3137 | 53133.4 | -23216.5 | -30544.2 | 8.8325 | -241532.8 | 45.2258 |
| 1000 | 12.8827 | 10525.9 | 70.6589 | 60133.0 | -21939.5 | -30657.1 | 8.0895 | -241771.5 | 39.3580 |
| 1100 | 13.0716 | 11824.0 | 71.8959 | 67261.5 | -20641.5 | -30771.4 | 7.4794 | -241985.1 | 34.5526 |
| 1200 | 13.2254 | 13139.1 | 73.0401 | 74509.1 | -19326.4 | -30887.7 | 6.9690 | -242178.7 | 30.5447 |
| 1300 | 13.3525 | 14468.2 | 74.1039 | 81866.9 | -17997.3 | -31006.7 | 6.5355 | -242355.9 | 27.1508 |
| 1400 | 13.4589 | 15808.9 | 75.0974 | 89327.5 | -16656.6 | -31129.0 | 6.1624 | -242519.6 | 24.2397 |
| 1500 | 13.5494 | 17159.4 | 76.0292 | 96884.3 | -15306.0 | -31254.5 | 5.8379 | -242672.1 | 21.7151 |
| 1600 | 13.6272 | 18518.3 | 76.9062 | 104531.5 | -13947.1 | -31383.1 | 5.5527 | -242815.1 | 19.5047 |
| 1700 | 13.6950 | 19884.5 | 77.7344 | 112263.9 | -12580.9 | -31514.6 | 5.3000 | -242950.1 | 17.5533 |
| 1800 | 13.7547 | 21257.1 | 78.5189 | 120076.9 | -11208.4 | -31649.0 | 5.0745 | -243078.4 | 15.8177 |
| 1900 | 13.8078 | 22635.3 | 79.2640 | 127966.4 | -9830.2 | -31786.5 | 4.8718 | -243201.0 | 14.2641 |
| 2000 | 13.8555 | 24018.5 | 79.9735 | 135928.5 | -8447.0 | -31927.0 | 4.6886 | -243318.7 | 12.8651 |
| 2100 | 13.8988 | 25406.2 | 80.6506 | 143960.0 | -7059.2 | -32070.6 | 4.5221 | -243432.2 | 11.5987 |
| 2200 | 13.9383 | 26798.1 | 81.2981 | 152057.7 | -5667.3 | -32216.7 | 4.3701 | -243542.3 | 10.4470 |
| 2300 | 13.9747 | 28193.8 | 81.9185 | 160218.7 | -4271.7 | -32365.3 | 4.2306 | -243649.4 | 9.3949 |
| 2400 | 14.0084 | 29592.9 | 82.5140 | 168440.5 | -2872.5 | -32516.4 | 4.1022 | -243754.1 | 8.4301 |
| 2500 | 14.0399 | 30995.4 | 83.0864 | 176720.7 | -1470.1 | -32669.7 | 3.9835 | -243856.7 | 7.5420 |
| 2600 | 14.0694 | 32400.9 | 83.6377 | 185057.1 | -64.6 | -32825.0 | 3.8734 | -243957.6 | 6.7220 |
| 2700 | 14.0973 | 33809.2 | 84.1692 | 193447.6 | 1343.8 | -32982.3 | 3.7710 | -244057.1 | 5.9624 |
| 2800 | 14.1238 | 35220.3 | 84.6824 | 201890.3 | 2754.8 | -33141.6 | 3.6754 | -244155.4 | 5.2567 |
| 2900 | 14.1490 | 36633.9 | 85.1784 | 210383.5 | 4168.5 | -33302.9 | 3.5860 | -244252.7 | 4.5995 |
| 3000 | 14.1731 | 38050.0 | 85.6585 | 218925.5 | 5584.6 | -33466.0 | 3.5021 | -244349.3 | 3.9858 |
| 3100 | 14.1962 | 39468.5 | 86.1236 | 227514.7 | 7003.1 | -33631.0 | 3.4233 | -244445.1 | 3.4115 |
| 3200 | 14.2185 | 40889.3 | 86.5747 | 236149.8 | 8423.8 | -33798.0 | 3.3490 | -244540.5 | 2.8729 |
| 3300 | 14.2401 | 42312.2 | 87.0126 | 244829.2 | 9846.8 | -33966.7 | 3.2789 | -244635.3 | 2.3667 |
| 3400 | 14.2610 | 43737.3 | 87.4380 | 253551.9 | 11271.8 | -34137.0 | 3.2126 | -244729.7 | 1.8901 |
| 3500 | 14.2813 | 45164.4 | 87.8517 | 262316.4 | 12698.9 | -34308.9 | 3.1497 | -244823.8 | 1.4406 |
| 3600 | 14.3011 | 46593.5 | 88.2543 | 271121.8 | 14128.1 | -34482.4 | 3.0901 | -244917.6 | 1.0159 |
| 3700 | 14.3204 | 48024.6 | 88.6464 | 279966.9 | 15559.1 | -34657.6 | 3.0334 | -245011.0 | 0.6140 |
| 3800 | 14.3393 | 49457.6 | 89.0285 | 288850.8 | 16992.1 | -34834.4 | 2.9794 | -245104.1 | 0.2331 |
| 3900 | 14.3578 | 50892.4 | 89.4012 | 297772.3 | 18427.0 | -35012.9 | 2.9279 | -245196.9 | -0.1284 |
| 4000 | 14.3760 | 52329.1 | 89.7650 | 306730.7 | 19863.7 | -35192.9 | 2.8787 | -245289.4 | -0.4720 |
| 4100 | 14.3938 | 53767.6 | 90.1202 | 315725.0 | 21302.2 | -35368.2 | 2.8317 | -245381.5 | -0.7989 |
| 4200 | 14.4114 | 55207.9 | 90.4672 | 324754.5 | 22742.4 | -35544.6 | 2.7866 | -245473.3 | -1.1134 |
| 4300 | 14.4287 | 56649.9 | 90.8065 | 333818.2 | 24184.4 | -35722.0 | 2.7432 | -245564.7 | -1.4075 |
| 4400 | 14.4457 | 58093.6 | 91.1384 | 342915.5 | 25628.1 | -35900.5 | 2.7013 | -245655.6 | -1.6912 |
| 4500 | 14.4626 | 59539.0 | 91.4633 | 352045.7 | 27073.6 | -36080.0 | 2.6608 | -245746.0 | -1.9623 |
| 4600 | 14.4793 | 60986.1 | 91.7813 | 361207.9 | 28520.7 | -36260.5 | 2.6216 | -245835.9 | -2.2218 |
| 4700 | 14.4957 | 62434.9 | 92.0929 | 370401.7 | 29969.4 | -36442.0 | 2.5836 | -245925.3 | -2.4704 |
| 4800 | 14.5120 | 63885.2 | 92.3982 | 379626.3 | 31419.8 | -36624.5 | 2.5467 | -246014.1 | -2.7086 |
| 4900 | 14.5282 | 65337.3 | 92.6976 | 388881.2 | 32871.8 | -36808.0 | 2.5109 | -246102.3 | -2.9373 |
| 5000 | 14.5442 | 66790.9 | 92.9913 | 398165.7 | 34325.4 | -36992.5 | 2.4762 | -246189.8 | -3.1568 |
| 5100 | 14.5601 | 68246.1 | 93.2795 | 407479.2 | 35780.7 | -37178.0 | 2.4426 | -246276.6 | -3.3679 |
| 5200 | 14.5759 | 69702.9 | 93.5624 | 416821.4 | 37237.5 | -37364.5 | 2.4099 | -246362.7 | -3.5708 |
| 5300 | 14.5915 | 71161.3 | 93.8402 | 426191.5 | 38695.8 | -37552.0 | 2.3781 | -246448.1 | -3.7662 |
| 5400 | 14.6071 | 72621.2 | 94.1130 | 435589.2 | 40155.8 | -37740.5 | 2.3472 | -246532.6 | -3.9545 |
| 5500 | 14.6226 | 74082.7 | 94.3812 | 445014.0 | 41617.2 | -37930.0 | 2.3172 | -246616.3 | -4.1359 |
| 5600 | 14.6379 | 75545.7 | 94.6448 | 454465.3 | 43080.3 | -38120.5 | 2.2880 | -246699.1 | -4.3109 |
| 5700 | 14.6532 | 77010.3 | 94.9041 | 463942.8 | 44544.8 | -38312.0 | 2.2596 | -246781.0 | -4.4798 |
| 5800 | 14.6684 | 78476.4 | 95.1590 | 473446.0 | 46010.9 | -38504.5 | 2.2320 | -246862.1 | -4.6430 |
| 5900 | 14.6836 | 79944.0 | 95.4099 | 482974.5 | 47478.5 | -38698.0 | 2.2052 | -246942.1 | -4.8007 |
| 6000 | 14.6986 | 81413.1 | 95.6568 | 492527.8 | 48947.6 | -38892.5 | 2.1792 | -247021.3 | -4.9531 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(65) CF_3 (gas); molecular weight, 69.011

| T , °K | C_p^o , cal/mole °K | $H_T^o - H_0^o$, cal/mole | S_T^o , cal/mole °K | $-(F_T^o - H_0^o)$, cal/mole | H_T^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^o)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^o , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -122151.8 | -118736.1 | ----- | -343790.9 | ----- |
| 100 | 7.9928 | 795.4 | 51.5869 | 4363.3 | -121356.4 | -118997.6 | 257.9402 | -345061.4 | 737.2578 |
| 200 | 9.2566 | 1643.5 | 57.4159 | 9839.7 | -120508.3 | -119277.5 | 127.7907 | -346293.3 | 359.6880 |
| 298.15 | 11.3004 | 2651.8 | 61.4904 | 15681.6 | -119500.0 | -119500.0 | 84.8488 | -347375.4 | 234.9475 |
| 300 | 11.3384 | 2672.7 | 61.5604 | 15795.4 | -119479.1 | -119503.5 | 84.3086 | -347393.8 | 233.3773 |
| 400 | 13.2161 | 3903.5 | 65.0883 | 22131.8 | -118248.2 | -119674.9 | 62.5303 | -348281.1 | 170.0350 |
| 500 | 14.6939 | 5302.4 | 68.2037 | 28799.4 | -116849.4 | -119803.2 | 49.4466 | -348975.9 | 131.9417 |
| 600 | 15.8039 | 6830.0 | 70.9858 | 35761.4 | -115321.7 | -119899.9 | 40.7159 | -349520.1 | 106.5007 |
| 700 | 16.6283 | 8453.7 | 73.4870 | 42987.2 | -113698.1 | -119975.7 | 34.4752 | -349951.4 | 88.3029 |
| 800 | 17.2440 | 10148.8 | 75.7496 | 50450.9 | -112003.0 | -120036.9 | 29.7920 | -350298.4 | 74.6394 |
| 900 | 17.7097 | 11897.5 | 77.8087 | 58130.4 | -110254.3 | -120087.1 | 26.1478 | -350582.1 | 64.0027 |
| 1000 | 18.0674 | 13687.1 | 79.6940 | 66006.9 | -108464.7 | -120128.8 | 23.2313 | -350817.4 | 55.4869 |
| 1100 | 18.3465 | 15508.4 | 81.4296 | 74064.2 | -106643.4 | -120164.8 | 20.8443 | -351015.2 | 48.5152 |
| 1200 | 18.5675 | 17354.5 | 83.0358 | 82288.5 | -104797.3 | -120197.9 | 18.8546 | -351183.7 | 42.7024 |
| 1300 | 18.7451 | 19220.4 | 84.5293 | 90667.6 | -102931.3 | -120230.3 | 17.1705 | -351328.7 | 37.7817 |
| 1400 | 18.8895 | 21102.4 | 85.9239 | 99191.0 | -101049.4 | -120263.6 | 15.7267 | -351454.8 | 33.5623 |
| 1500 | 19.0085 | 22997.5 | 87.2313 | 107849.5 | -99154.3 | -120298.9 | 14.4750 | -351565.5 | 29.9043 |
| 1600 | 19.1074 | 24903.4 | 88.4613 | 116634.7 | -97248.3 | -120336.4 | 13.3794 | -351663.7 | 26.7025 |
| 1700 | 19.1906 | 26818.4 | 89.6223 | 125539.4 | -95333.3 | -120376.8 | 12.4124 | -351751.4 | 23.8767 |
| 1800 | 19.2610 | 28741.1 | 90.7212 | 134557.1 | -93410.6 | -120420.2 | 11.5525 | -351830.7 | 21.3643 |
| 1900 | 19.3213 | 30670.3 | 91.7643 | 143681.8 | -91481.5 | -120467.2 | 10.7829 | -351902.9 | 19.1159 |
| 2000 | 19.3731 | 32605.1 | 92.7567 | 152908.3 | -89546.7 | -120518.1 | 10.0899 | -351969.3 | 17.0919 |
| 2100 | 19.4181 | 34544.7 | 93.7030 | 162231.6 | -87607.1 | -120573.0 | 9.4627 | -352031.0 | 15.2603 |
| 2200 | 19.4573 | 36488.5 | 94.6073 | 171647.5 | -85663.2 | -120631.6 | 8.8922 | -352088.8 | 13.5949 |
| 2300 | 19.4916 | 38436.0 | 95.4730 | 181151.8 | -83715.8 | -120694.1 | 8.3711 | -352143.6 | 12.0742 |
| 2400 | 19.5220 | 40386.7 | 96.3032 | 190740.9 | -81765.0 | -120760.5 | 7.8931 | -352196.1 | 10.6799 |
| 2500 | 19.5488 | 42340.3 | 97.1006 | 200411.3 | -79811.5 | -120830.6 | 7.4531 | -352246.6 | 9.3970 |
| 2600 | 19.5727 | 44296.4 | 97.8678 | 210160.0 | -77855.4 | -120904.4 | 7.0468 | -352295.8 | 8.2126 |
| 2700 | 19.5941 | 46254.7 | 98.6069 | 219984.0 | -75897.0 | -120982.0 | 6.6703 | -352344.1 | 7.1158 |
| 2800 | 19.6133 | 48215.1 | 99.3199 | 229880.5 | -73936.6 | -121063.3 | 6.3204 | -352391.7 | 6.0972 |
| 2900 | 19.6306 | 50177.3 | 100.0084 | 239847.1 | -71974.4 | -121148.4 | 5.9945 | -352439.0 | 5.1487 |
| 3000 | 19.6462 | 52141.2 | 100.6742 | 249881.4 | -70010.6 | -121237.3 | 5.6901 | -352486.2 | 4.2634 |
| 3100 | 19.6603 | 54106.5 | 101.3186 | 259981.3 | -68045.2 | -121330.0 | 5.4051 | -352533.5 | 3.4350 |
| 3200 | 19.6732 | 56073.2 | 101.9430 | 270144.5 | -66078.6 | -121426.5 | 5.1377 | -352581.1 | 2.6583 |
| 3300 | 19.6849 | 58041.1 | 102.5486 | 280369.2 | -64110.6 | -121526.9 | 4.8863 | -352629.1 | 1.9286 |
| 3400 | 19.6957 | 60010.2 | 103.1364 | 290653.6 | -62141.6 | -121630.8 | 4.6495 | -352677.6 | 1.2417 |
| 3500 | 19.7055 | 61980.2 | 103.7075 | 300996.0 | -60171.5 | -121738.4 | 4.4260 | -352726.7 | 0.5940 |
| 3600 | 19.7146 | 63951.3 | 104.2627 | 311394.6 | -58200.5 | -121849.7 | 4.2147 | -352776.5 | -0.0178 |
| 3700 | 19.7229 | 65923.1 | 104.8030 | 321848.0 | -56228.6 | -121964.8 | 4.0147 | -352827.0 | -0.5967 |
| 3800 | 19.7306 | 67895.8 | 105.3291 | 332354.7 | -54256.0 | -122083.7 | 3.8251 | -352878.3 | -1.1451 |
| 3900 | 19.7377 | 69869.2 | 105.8417 | 342913.4 | -52282.5 | -122206.2 | 3.6450 | -352930.3 | -1.6655 |
| 4000 | 19.7443 | 71843.3 | 106.3415 | 353522.6 | -50308.4 | -122332.5 | 3.4737 | -352983.1 | -2.1600 |
| 4100 | 19.7505 | 73818.1 | 106.8291 | 364181.3 | -48333.7 | -122462.2 | 3.3081 | -353036.6 | -2.6304 |
| 4200 | 19.7562 | 75793.4 | 107.3051 | 374888.1 | -46358.3 | -122596.3 | 3.1561 | -353090.9 | -3.0784 |
| 4300 | 19.7615 | 77769.3 | 107.7701 | 385641.9 | -44382.5 | -122734.4 | 3.0074 | -353146.0 | -3.5057 |
| 4400 | 19.7664 | 79745.7 | 108.2244 | 396441.7 | -42406.1 | -122876.1 | 2.8619 | -353201.8 | -3.9137 |
| 4500 | 19.7711 | 81722.6 | 108.6687 | 407286.5 | -40429.2 | -123021.1 | 2.7194 | -353258.3 | -4.3036 |
| 4600 | 19.7754 | 83699.9 | 109.1033 | 418175.1 | -38451.9 | -123169.1 | 2.5797 | -353315.5 | -4.6765 |
| 4700 | 19.7795 | 85677.7 | 109.5286 | 429106.8 | -36474.1 | -123320.0 | 2.4427 | -353373.4 | -5.0337 |
| 4800 | 19.7833 | 87655.8 | 109.9451 | 440080.6 | -34496.0 | -123473.6 | 2.3081 | -353431.9 | -5.3760 |
| 4900 | 19.7869 | 89634.3 | 110.3530 | 451095.5 | -32517.5 | -123630.4 | 2.1758 | -353491.0 | -5.7045 |
| 5000 | 19.7902 | 91613.2 | 110.7528 | 462150.9 | -30538.6 | -123790.1 | 2.0466 | -353550.7 | -6.0198 |
| 5100 | 19.7934 | 93592.3 | 111.1447 | 473245.8 | -28559.4 | -123952.4 | 1.9204 | -353610.9 | -6.3228 |
| 5200 | 19.7964 | 95571.8 | 111.5291 | 484379.6 | -26579.9 | -124117.1 | 1.7971 | -353671.7 | -6.6143 |
| 5300 | 19.7993 | 97551.6 | 111.9062 | 495551.4 | -24600.1 | -124284.1 | 1.6764 | -353732.9 | -6.8947 |
| 5400 | 19.8019 | 99531.7 | 112.2764 | 506760.6 | -22620.1 | -124453.1 | 1.5581 | -353794.6 | -7.1649 |
| 5500 | 19.8045 | 101512.0 | 112.6397 | 518006.5 | -20639.8 | -124624.1 | 1.4421 | -353856.8 | -7.4252 |
| 5600 | 19.8069 | 103492.6 | 112.9966 | 529288.3 | -18659.2 | -124797.1 | 1.3284 | -353919.3 | -7.6763 |
| 5700 | 19.8091 | 105473.4 | 113.3472 | 540605.6 | -16678.4 | -124972.1 | 1.2169 | -353982.3 | -7.9186 |
| 5800 | 19.8113 | 107454.4 | 113.6917 | 551957.6 | -14697.4 | -125149.1 | 1.1074 | -354045.6 | -8.1527 |
| 5900 | 19.8134 | 109435.6 | 114.0304 | 563343.7 | -12716.1 | -125328.1 | 1.0000 | -354109.3 | -8.3788 |
| 6000 | 19.8153 | 111417.1 | 114.3634 | 574763.5 | -10734.7 | -125509.1 | 0.8945 | -354173.4 | -8.5974 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (66) CF₄ (gas); molecular weight, 88.011

| T, °K | C _p , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -220249.5 | -215779.0 | ----- | -459188.8 | ----- |
| 100 | 8.3045 | 860.2 | 50.7467 | 4274.5 | -219449.3 | -216383.1 | 466.1354 | -460953.1 | 983.3244 |
| 200 | 11.3474 | 1767.3 | 57.3282 | 9698.3 | -218482.2 | -216894.0 | 229.4602 | -462591.7 | 478.9356 |
| 298.15 | 14.6958 | 3049.5 | 62.4995 | 15584.7 | -217200.0 | -217200.0 | 151.3883 | -463933.6 | 312.3170 |
| 300 | 14.7534 | 3076.7 | 62.5906 | 15700.4 | -217172.8 | -217204.2 | 150.4065 | -463955.8 | 310.2199 |
| 400 | 17.5043 | 4695.5 | 67.2286 | 22195.9 | -215553.9 | -217372.6 | 110.8345 | -464995.2 | 225.6359 |
| 500 | 19.5859 | 6555.2 | 71.3696 | 29129.6 | -213694.3 | -217442.9 | 87.0779 | -465761.3 | 174.7851 |
| 600 | 21.1297 | 8594.8 | 75.0840 | 36455.6 | -211654.7 | -217443.3 | 71.2376 | -466318.4 | 140.8359 |
| 700 | 22.2791 | 10768.0 | 78.4317 | 44134.2 | -209481.5 | -217394.7 | 59.9244 | -466719.4 | 116.5613 |
| 800 | 23.1491 | 13041.3 | 81.4661 | 52131.5 | -207208.1 | -217309.7 | 51.4421 | -467003.2 | 98.3421 |
| 900 | 23.8222 | 15391.3 | 84.2331 | 60418.6 | -204858.2 | -217196.0 | 44.8477 | -467197.5 | 84.1642 |
| 1000 | 24.3551 | 17801.1 | 86.7717 | 68970.6 | -202448.4 | -217059.1 | 39.5753 | -467321.9 | 72.8181 |
| 1100 | 24.7870 | 20258.9 | 89.1139 | 77766.3 | -199990.5 | -216903.5 | 35.2644 | -467390.6 | 63.5330 |
| 1200 | 25.1447 | 22756.1 | 91.2864 | 86787.7 | -197493.4 | -216733.3 | 31.6747 | -467413.9 | 55.7946 |
| 1300 | 25.4470 | 25286.0 | 93.3113 | 96108.7 | -194963.4 | -216551.9 | 28.6397 | -467399.5 | 49.2467 |
| 1400 | 25.7075 | 27844.1 | 95.2069 | 105445.6 | -192405.4 | -216361.6 | 26.0406 | -467353.2 | 43.8345 |
| 1500 | 25.9356 | 30426.5 | 96.9885 | 115056.3 | -189823.0 | -216163.8 | 23.7900 | -467279.4 | 38.7713 |
| 1600 | 26.1386 | 33030.4 | 98.6690 | 124840.0 | -187219.1 | -215959.4 | 21.8225 | -467181.7 | 34.5168 |
| 1700 | 26.3216 | 35653.5 | 100.2592 | 134787.1 | -184596.0 | -215749.2 | 20.0882 | -467062.9 | 30.7637 |
| 1800 | 26.4888 | 38294.2 | 101.7685 | 144889.1 | -181955.3 | -215533.8 | 18.5481 | -466925.3 | 27.4285 |
| 1900 | 26.6430 | 40950.8 | 103.2048 | 155138.4 | -179298.6 | -215313.9 | 17.1715 | -466770.7 | 24.4453 |
| 2000 | 26.7868 | 43622.4 | 104.5751 | 165527.9 | -176627.1 | -215089.9 | 15.9339 | -466600.6 | 21.7613 |
| 2100 | 26.9218 | 46307.9 | 105.8854 | 176051.4 | -173941.6 | -214862.0 | 14.8153 | -466416.4 | 19.3339 |
| 2200 | 27.0497 | 49006.5 | 107.1408 | 186703.1 | -171243.0 | -214630.3 | 13.7995 | -466219.2 | 17.1281 |
| 2300 | 27.1715 | 51717.6 | 108.3459 | 197477.9 | -168531.8 | -214394.9 | 12.8730 | -466009.8 | 15.1149 |
| 2400 | 27.2882 | 54440.7 | 109.5048 | 208370.8 | -165808.8 | -214155.8 | 12.0247 | -465789.2 | 13.2704 |
| 2500 | 27.4006 | 57175.1 | 110.6210 | 219377.4 | -163074.3 | -213913.0 | 11.2451 | -465558.0 | 11.5743 |
| 2600 | 27.5094 | 59920.7 | 111.6978 | 230493.7 | -160328.8 | -213666.5 | 10.5263 | -465316.6 | 10.0094 |
| 2700 | 27.6149 | 62676.9 | 112.7380 | 241715.7 | -157572.6 | -213416.5 | 9.8615 | -465065.8 | 8.5612 |
| 2800 | 27.7177 | 65443.6 | 113.7442 | 253040.1 | -154805.9 | -213162.8 | 9.2449 | -464805.8 | 7.2172 |
| 2900 | 27.8181 | 68220.4 | 114.7186 | 264463.5 | -152029.1 | -212905.7 | 8.6716 | -464537.0 | 5.9666 |
| 3000 | 27.9164 | 71007.1 | 115.6633 | 275982.8 | -149242.4 | -212645.2 | 8.1371 | -464259.7 | 4.8000 |
| 3100 | 28.0130 | 73803.6 | 116.5803 | 287595.2 | -146445.9 | -212381.2 | 7.6377 | -463974.2 | 3.7094 |
| 3200 | 28.1079 | 76609.7 | 117.4712 | 299298.0 | -143639.8 | -212114.0 | 7.1701 | -463680.5 | 2.6876 |
| 3300 | 28.2014 | 79425.1 | 118.3375 | 311088.7 | -140824.4 | -211843.4 | 6.7314 | -463379.2 | 1.7283 |
| 3400 | 28.2936 | 82249.9 | 119.1808 | 322964.8 | -137999.6 | -211569.3 | 6.3191 | -463070.1 | 0.8260 |
| 3500 | 28.3848 | 85083.8 | 120.0023 | 334924.1 | -135165.7 | -211291.7 | 5.9308 | -462753.3 | -0.0241 |
| 3600 | 28.4749 | 87926.8 | 120.8032 | 346964.5 | -132322.7 | -211010.7 | 5.5645 | -462429.1 | -0.8264 |
| 3700 | 28.5641 | 90778.8 | 121.5846 | 359084.1 | -129470.7 | -210726.4 | 5.2186 | -462097.4 | -1.5849 |
| 3800 | 28.6526 | 93639.6 | 122.3475 | 371280.8 | -126609.9 | -210438.7 | 4.8912 | -461758.3 | -2.3028 |
| 3900 | 28.7403 | 96509.3 | 123.0929 | 383553.0 | -123740.2 | -210147.8 | 4.5811 | -461411.8 | -2.9835 |
| 4000 | 28.8274 | 99387.7 | 123.8216 | 395898.8 | -120861.8 | -209853.4 | 4.2869 | -461058.0 | -3.6297 |
| 4100 | 28.9139 | 102274.7 | 124.5345 | 408316.8 | -117974.8 | -209559.8 | 4.0082 | -460696.9 | -4.2438 |
| 4200 | 28.9998 | 105170.4 | 125.2323 | 420805.2 | -115079.1 | -209267.0 | 3.7415 | -460328.5 | -4.8282 |
| 4300 | 29.0853 | 108074.7 | 125.9157 | 433362.8 | -112174.8 | -208974.9 | 3.4849 | -459952.8 | -5.3851 |
| 4400 | 29.1703 | 110987.5 | 126.5853 | 445987.9 | -109262.0 | -208683.4 | 3.2382 | -459569.8 | -5.9161 |
| 4500 | 29.2549 | 113908.7 | 127.2418 | 458679.4 | -106340.8 | -208391.5 | 3.0015 | -459179.5 | -6.4231 |
| 4600 | 29.3392 | 116838.4 | 127.8857 | 471435.9 | -103411.1 | -208100.0 | 2.7748 | -458781.8 | -6.9077 |
| 4700 | 29.4231 | 119776.5 | 128.5176 | 484256.1 | -100472.9 | -207808.7 | 2.5581 | -458376.8 | -7.3713 |
| 4800 | 29.5067 | 122723.0 | 129.1379 | 497139.0 | -97526.5 | -207517.6 | 2.3514 | -457964.4 | -7.8151 |
| 4900 | 29.5900 | 125677.9 | 129.7472 | 510083.3 | -94571.6 | -207226.7 | 2.1547 | -457544.6 | -8.2404 |
| 5000 | 29.6730 | 128641.0 | 130.3458 | 523088.1 | -91608.5 | -206936.0 | 1.9680 | -457117.4 | -8.6484 |
| 5100 | 29.7558 | 131612.5 | 130.9342 | 536152.2 | -88637.0 | -206645.6 | 1.7913 | -456682.7 | -9.0399 |
| 5200 | 29.8384 | 134592.2 | 131.5128 | 549274.6 | -85657.3 | -206355.3 | 1.6246 | -456240.6 | -9.4161 |
| 5300 | 29.9208 | 137580.1 | 132.0820 | 562454.4 | -82669.3 | -206065.1 | 1.4679 | -455791.0 | -9.7777 |
| 5400 | 30.0029 | 140576.3 | 132.6420 | 575690.7 | -79673.1 | -205775.0 | 1.3212 | -455333.9 | -10.1255 |
| 5500 | 30.0849 | 143580.7 | 133.1933 | 588982.5 | -76668.8 | -205484.9 | 1.1845 | -454869.3 | -10.4604 |
| 5600 | 30.1668 | 146593.3 | 133.7361 | 602329.1 | -73656.2 | -205194.8 | 1.0578 | -454397.1 | -10.7830 |
| 5700 | 30.2485 | 149614.1 | 134.2708 | 615729.5 | -70635.4 | -204904.7 | 0.9411 | -453917.4 | -11.0939 |
| 5800 | 30.3300 | 152643.0 | 134.7976 | 629183.0 | -67606.5 | -204614.6 | 0.8344 | -453430.1 | -11.3948 |
| 5900 | 30.4114 | 155680.1 | 135.3168 | 642688.8 | -64569.4 | -204324.5 | 0.7377 | -452935.2 | -11.6833 |
| 6000 | 30.4926 | 158725.3 | 135.8286 | 656246.1 | -61524.2 | -204034.4 | 0.6510 | -452432.6 | -11.9627 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(67) CH (gas); molecular weight, 13.019

| T, °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 140325.1 | 141588.2 | ----- | -80030.0 | ----- |
| 100 | 6.9913 | 677.2 | 36.0947 | 2932.2 | 141002.3 | 141871.3 | -304.8710 | -80419.8 | 171.7817 |
| 200 | 6.9739 | 1375.2 | 40.9336 | 6811.5 | 141700.3 | 142190.1 | -149.7029 | -80721.2 | 83.7795 |
| 298.15 | 6.9732 | 2059.6 | 43.7164 | 10974.4 | 142384.7 | 142384.7 | -98.5220 | -81013.9 | 54.6971 |
| 300 | 6.9735 | 2072.5 | 43.7608 | 11055.7 | 142397.6 | 142387.6 | -97.8783 | -81019.4 | 54.3311 |
| 400 | 6.9909 | 2770.5 | 45.7687 | 15537.0 | 143095.6 | 142491.2 | -71.9376 | -81316.0 | 39.5518 |
| 500 | 7.0559 | 3472.3 | 47.3345 | 20194.9 | 143797.4 | 142524.7 | -56.3653 | -81508.4 | 30.6515 |
| 600 | 7.1890 | 4184.0 | 48.6316 | 24995.0 | 144509.1 | 142509.2 | -45.9831 | -81890.7 | 24.6969 |
| 700 | 7.3835 | 4912.2 | 49.7537 | 29915.4 | 145237.3 | 142462.3 | -38.5690 | -82156.4 | 20.4292 |
| 800 | 7.6163 | 5661.9 | 50.7546 | 34941.7 | 145987.0 | 142399.2 | -33.0106 | -82400.5 | 17.2185 |
| 900 | 7.8623 | 6435.8 | 51.6658 | 40063.4 | 146760.9 | 142330.8 | -28.6893 | -82620.3 | 14.7141 |
| 1000 | 8.1022 | 7234.2 | 52.5067 | 45272.5 | 147559.3 | 142263.3 | -25.2338 | -82815.8 | 12.7056 |
| 1100 | 8.3240 | 8055.7 | 53.2895 | 50562.8 | 148380.8 | 142199.2 | -22.4082 | -82988.0 | 11.0586 |
| 1200 | 8.5216 | 8898.2 | 54.0225 | 55928.8 | 149223.3 | 142138.1 | -20.0544 | -83139.3 | 9.6834 |
| 1300 | 8.6934 | 9759.1 | 54.7115 | 61365.8 | 150084.2 | 142078.4 | -18.0636 | -83272.1 | 8.5177 |
| 1400 | 8.8403 | 10636.0 | 55.3613 | 66869.8 | 150961.1 | 142019.0 | -16.3581 | -83389.2 | 7.5172 |
| 1500 | 8.9645 | 11526.4 | 55.9756 | 72437.0 | 151851.5 | 141958.3 | -14.8804 | -83493.0 | 6.6488 |
| 1600 | 9.0690 | 12428.3 | 56.5576 | 78063.9 | 152753.4 | 141896.0 | -13.5880 | -83585.6 | 5.8881 |
| 1700 | 9.1567 | 13339.7 | 57.1101 | 83747.5 | 153664.8 | 141831.4 | -12.4481 | -83669.1 | 5.2162 |
| 1800 | 9.2305 | 14259.2 | 57.6356 | 89484.9 | 154584.3 | 141764.1 | -11.4354 | -83745.0 | 4.6184 |
| 1900 | 9.2928 | 15185.4 | 58.1364 | 95273.8 | 155510.5 | 141692.6 | -10.5297 | -83815.1 | 4.0830 |
| 2000 | 9.3459 | 16117.4 | 58.6144 | 101111.4 | 156442.5 | 141617.1 | -9.7152 | -83880.2 | 3.6008 |
| 2100 | 9.3916 | 17054.3 | 59.0715 | 106995.8 | 157379.4 | 141537.3 | -8.9784 | -83941.4 | 3.1642 |
| 2200 | 9.4315 | 17995.5 | 59.5094 | 112925.2 | 158320.6 | 141453.7 | -8.3092 | -83999.5 | 2.7670 |
| 2300 | 9.4670 | 18940.5 | 59.9294 | 118897.1 | 159265.6 | 141366.0 | -7.6983 | -84055.2 | 2.4041 |
| 2400 | 9.4991 | 19888.8 | 60.3330 | 124910.4 | 160213.9 | 141274.6 | -7.1390 | -84109.0 | 2.0712 |
| 2500 | 9.5287 | 20840.2 | 60.7214 | 130963.3 | 161165.3 | 141179.6 | -6.6245 | -84161.3 | 1.7648 |
| 2600 | 9.5566 | 21794.5 | 61.0957 | 137054.3 | 162119.6 | 141081.5 | -6.1501 | -84212.4 | 1.4817 |
| 2700 | 9.5834 | 22751.5 | 61.4569 | 143182.1 | 163076.6 | 140980.4 | -5.7109 | -84262.5 | 1.2195 |
| 2800 | 9.6096 | 23711.2 | 61.8059 | 149345.3 | 164036.3 | 140876.3 | -5.3036 | -84311.7 | 0.9758 |
| 2900 | 9.6355 | 24673.4 | 62.1435 | 155542.7 | 164998.5 | 140769.7 | -4.9246 | -84360.2 | 0.7489 |
| 3000 | 9.6614 | 25638.2 | 62.4706 | 161773.6 | 165963.3 | 140660.6 | -4.5710 | -84408.1 | 0.5369 |
| 3100 | 9.6876 | 26605.7 | 62.7878 | 168036.5 | 166930.8 | 140549.1 | -4.2407 | -84455.1 | 0.3385 |
| 3200 | 9.7143 | 27575.8 | 63.0958 | 174330.8 | 167900.9 | 140435.4 | -3.9312 | -84501.4 | 0.1524 |
| 3300 | 9.7415 | 28548.6 | 63.3952 | 180655.6 | 168873.7 | 140320.6 | -3.6406 | -84547.0 | -0.0225 |
| 3400 | 9.7692 | 29524.1 | 63.6864 | 187009.7 | 169849.2 | 140203.6 | -3.3675 | -84591.7 | -0.1873 |
| 3500 | 9.7976 | 30502.5 | 63.9700 | 193392.5 | 170827.6 | 140085.0 | -3.1103 | -84635.3 | -0.3427 |
| 3600 | 9.8265 | 31483.6 | 64.2464 | 199803.4 | 171808.7 | 139965.8 | -2.8671 | -84678.0 | -0.4895 |
| 3700 | 9.8558 | 32467.8 | 64.5160 | 206241.4 | 172792.9 | 139845.9 | -2.6377 | -84719.4 | -0.6285 |
| 3800 | 9.8854 | 33454.8 | 64.7792 | 212706.2 | 173779.9 | 139723.9 | -2.4204 | -84759.7 | -0.7602 |
| 3900 | 9.9151 | 34444.8 | 65.0364 | 219197.2 | 174769.9 | 139602.5 | -2.2146 | -84798.6 | -0.8852 |
| 4000 | 9.9449 | 35437.8 | 65.2878 | 225713.4 | 175762.9 | 139479.8 | -2.0189 | -84836.2 | -1.0040 |
| 4100 | 9.9746 | 36433.8 | 65.5338 | 232254.8 | 176758.9 | ----- | ----- | -84872.3 | -1.1171 |
| 4200 | 10.0039 | 37432.7 | 65.7745 | 238820.2 | 177757.8 | ----- | ----- | -84906.9 | -1.2248 |
| 4300 | 10.0327 | 38434.6 | 66.0102 | 245409.3 | 178759.7 | ----- | ----- | -84940.0 | -1.3276 |
| 4400 | 10.0607 | 39439.3 | 66.2412 | 252022.0 | 179764.4 | ----- | ----- | -84971.6 | -1.4257 |
| 4500 | 10.0878 | 40446.7 | 66.4676 | 258657.5 | 180771.8 | ----- | ----- | -85001.8 | -1.5195 |
| 4600 | 10.1138 | 41456.7 | 66.6896 | 265315.5 | 181781.8 | ----- | ----- | -85030.6 | -1.6093 |
| 4700 | 10.1384 | 42469.4 | 66.9074 | 271995.4 | 182794.5 | ----- | ----- | -85057.9 | -1.6952 |
| 4800 | 10.1616 | 43484.4 | 67.1210 | 278696.4 | 183809.5 | ----- | ----- | -85084.0 | -1.7776 |
| 4900 | 10.1832 | 44501.7 | 67.3308 | 285419.2 | 184826.8 | ----- | ----- | -85108.9 | -1.8567 |
| 5000 | 10.2030 | 45521.0 | 67.5367 | 292162.5 | 185846.1 | ----- | ----- | -85132.8 | -1.9326 |
| 5100 | 10.2209 | 46542.2 | 67.7390 | 298926.7 | 186867.3 | ----- | ----- | -85155.7 | -2.0056 |
| 5200 | 10.2368 | 47565.1 | 67.9376 | 305710.4 | 187890.2 | ----- | ----- | -85177.8 | -2.0758 |
| 5300 | 10.2505 | 48589.5 | 68.1327 | 312513.8 | 188914.6 | ----- | ----- | -85199.2 | -2.1433 |
| 5400 | 10.2620 | 49615.1 | 68.3244 | 319336.7 | 189940.2 | ----- | ----- | -85220.2 | -2.2084 |
| 5500 | 10.2713 | 50641.8 | 68.5128 | 326178.6 | 190966.9 | ----- | ----- | -85240.9 | -2.2711 |
| 5600 | 10.2782 | 51669.3 | 68.6980 | 333039.5 | 191994.4 | ----- | ----- | -85261.5 | -2.3316 |
| 5700 | 10.2828 | 52697.4 | 68.8799 | 339918.0 | 193022.5 | ----- | ----- | -85282.2 | -2.3900 |
| 5800 | 10.2850 | 53725.8 | 69.0588 | 346815.2 | 194050.9 | ----- | ----- | -85303.2 | -2.4464 |
| 5900 | 10.2848 | 54754.3 | 69.2346 | 353729.8 | 195079.4 | ----- | ----- | -85324.8 | -2.5008 |
| 6000 | 10.2821 | 55782.6 | 69.4074 | 360661.8 | 196107.7 | ----- | ----- | -85347.1 | -2.5535 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(68) CH₂ (gas); molecular weight, 14.027

| T, °K | C _p ^o , cal/mole °K | H _f ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _f ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 66865.7 | 69140.7 | ----- | -204105.9 | ----- |
| 100 | 6.9554 | 695.5 | 35.5551 | 2860.0 | 67561.2 | 69062.6 | -148.5381 | -204974.2 | 439.0640 |
| 200 | 6.9766 | 1391.5 | 40.3786 | 6684.2 | 68257.2 | 69078.0 | -73.0514 | -205774.5 | 214.7507 |
| 298.15 | 7.1965 | 2084.7 | 43.1956 | 10794.1 | 68950.4 | 68950.4 | -48.2196 | -206546.3 | 140.6100 |
| 300 | 7.2035 | 2098.0 | 43.2401 | 10874.0 | 68963.7 | 68947.2 | -47.9083 | -206560.3 | 139.6764 |
| 400 | 7.6860 | 2841.0 | 45.3742 | 15308.7 | 69706.7 | 68748.6 | -35.3679 | -207308.7 | 101.9961 |
| 500 | 8.2668 | 3638.3 | 47.1511 | 19937.2 | 70504.0 | 68528.4 | -27.8667 | -208002.3 | 79.3079 |
| 600 | 8.8503 | 4494.4 | 48.7102 | 24731.7 | 71360.1 | 68307.3 | -22.8821 | -208637.1 | 64.1336 |
| 700 | 9.4072 | 5407.5 | 50.1167 | 29674.2 | 72273.2 | 68094.1 | -19.3334 | -209214.7 | 53.2631 |
| 800 | 9.9291 | 6374.6 | 51.4073 | 34751.2 | 73240.3 | 67895.7 | -16.6797 | -209738.2 | 45.0885 |
| 900 | 10.4116 | 7392.0 | 52.6051 | 39952.6 | 74257.7 | 67715.2 | -14.6214 | -210211.4 | 38.7154 |
| 1000 | 10.8519 | 8455.5 | 53.7252 | 45269.7 | 75321.2 | 67553.8 | -12.9788 | -210638.5 | 33.6059 |
| 1100 | 11.2494 | 9561.0 | 54.7785 | 50695.4 | 76426.6 | 67410.4 | -11.6383 | -211023.6 | 29.4174 |
| 1200 | 11.6053 | 10704.0 | 55.7728 | 56223.4 | 77569.7 | 67282.0 | -10.5233 | -211371.1 | 25.9208 |
| 1300 | 11.9221 | 11880.7 | 56.7145 | 61848.2 | 78746.4 | 67165.2 | -9.5814 | -211685.1 | 22.9575 |
| 1400 | 12.2030 | 13087.2 | 57.6085 | 67564.7 | 79952.9 | 67057.4 | -8.7760 | -211969.3 | 20.4140 |
| 1500 | 12.4518 | 14320.2 | 58.4591 | 73368.4 | 81185.9 | 66955.7 | -8.0786 | -212227.3 | 18.2068 |
| 1600 | 12.6720 | 15576.7 | 59.2699 | 79255.2 | 82442.4 | 66859.2 | -7.4691 | -212462.1 | 16.2732 |
| 1700 | 12.8671 | 16853.8 | 60.0441 | 85221.2 | 83719.5 | 66766.8 | -6.9322 | -212676.7 | 14.5653 |
| 1800 | 13.0400 | 18149.3 | 60.7846 | 91262.9 | 85015.0 | 66677.5 | -6.4557 | -212873.5 | 13.0457 |
| 1900 | 13.1937 | 19461.2 | 61.4938 | 97377.1 | 86326.9 | 66588.6 | -6.0298 | -213054.7 | 11.6849 |
| 2000 | 13.3305 | 20787.5 | 62.1741 | 103560.7 | 87653.2 | 66499.8 | -5.6474 | -213222.2 | 10.4591 |
| 2100 | 13.4527 | 22126.8 | 62.8275 | 109811.0 | 88992.5 | 66410.5 | -5.3015 | -213377.9 | 9.3493 |
| 2200 | 13.5621 | 23477.6 | 63.4559 | 116125.4 | 90343.3 | 66320.8 | -4.9877 | -213523.2 | 8.3396 |
| 2300 | 13.6602 | 24838.8 | 64.0610 | 122501.4 | 91704.5 | 66229.6 | -4.7011 | -213659.5 | 7.4171 |
| 2400 | 13.7484 | 26209.3 | 64.6442 | 128936.8 | 93075.0 | 66137.2 | -4.4394 | -213787.9 | 6.5710 |
| 2500 | 13.8281 | 27588.2 | 65.2071 | 135429.6 | 94453.9 | 66043.2 | -4.1986 | -213909.6 | 5.7920 |
| 2600 | 13.9001 | 28974.7 | 65.7509 | 141977.6 | 95840.4 | 65947.2 | -3.9768 | -214025.3 | 5.0727 |
| 2700 | 13.9654 | 30368.0 | 66.2767 | 148579.2 | 97233.7 | 65849.6 | -3.7715 | -214135.8 | 4.4062 |
| 2800 | 14.0248 | 31767.6 | 66.7857 | 155232.4 | 98633.3 | 65749.4 | -3.5815 | -214242.0 | 3.7870 |
| 2900 | 14.0789 | 33172.8 | 67.2788 | 161935.8 | 100038.5 | 65647.1 | -3.4047 | -214344.4 | 3.2103 |
| 3000 | 14.1283 | 34583.2 | 67.7570 | 168687.7 | 101448.9 | 65541.8 | -3.2396 | -214443.4 | 2.6718 |
| 3100 | 14.1736 | 35998.3 | 68.2210 | 175486.7 | 102864.0 | 65433.5 | -3.0858 | -214539.6 | 2.1677 |
| 3200 | 14.2151 | 37417.8 | 68.6716 | 182331.4 | 104283.5 | 65322.0 | -2.9419 | -214633.4 | 1.6950 |
| 3300 | 14.2532 | 38841.2 | 69.1096 | 189220.6 | 105706.9 | 65208.5 | -2.8067 | -214725.1 | 1.2507 |
| 3400 | 14.2884 | 40268.3 | 69.5357 | 196153.0 | 107134.0 | 65090.6 | -2.6799 | -214815.0 | 0.8324 |
| 3500 | 14.3208 | 41698.8 | 69.9503 | 203127.4 | 108564.5 | 64968.9 | -2.5605 | -214903.4 | 0.4378 |
| 3600 | 14.3508 | 43132.4 | 70.3542 | 210142.7 | 109998.1 | 64845.3 | -2.4477 | -214990.4 | 0.0650 |
| 3700 | 14.3786 | 44568.9 | 70.7478 | 217197.9 | 111434.6 | 64718.4 | -2.3416 | -215076.3 | -0.2878 |
| 3800 | 14.4044 | 46008.1 | 71.1316 | 224291.9 | 112873.8 | 64586.1 | -2.2410 | -215161.3 | -0.6222 |
| 3900 | 14.4284 | 47449.7 | 71.5061 | 231423.9 | 114315.4 | 64452.7 | -2.1462 | -215245.4 | -0.9395 |
| 4000 | 14.4507 | 48893.7 | 71.8716 | 238592.8 | 115759.4 | 64314.7 | -2.0557 | -215328.8 | -1.2411 |
| 4100 | 14.4715 | 50339.8 | 72.2287 | 245797.9 | 117205.5 | 64170.5 | ----- | -215411.5 | -1.5281 |
| 4200 | 14.4910 | 51788.0 | 72.5777 | 253038.3 | 118653.7 | 64026.2 | ----- | -215493.8 | -1.8015 |
| 4300 | 14.5091 | 53238.0 | 72.9189 | 260313.2 | 120103.7 | 63881.9 | ----- | -215575.5 | -2.0623 |
| 4400 | 14.5262 | 54689.8 | 73.2526 | 267621.8 | 121555.5 | 63737.6 | ----- | -215656.9 | -2.3114 |
| 4500 | 14.5421 | 56143.2 | 73.5793 | 274963.5 | 123008.9 | 63593.3 | ----- | -215737.9 | -2.5495 |
| 4600 | 14.5571 | 57598.2 | 73.8990 | 282337.4 | 124463.8 | 63449.0 | ----- | -215818.6 | -2.7773 |
| 4700 | 14.5712 | 59054.6 | 74.2123 | 289743.1 | 125920.3 | 63304.7 | ----- | -215899.0 | -2.9955 |
| 4800 | 14.5844 | 60512.4 | 74.5192 | 297179.7 | 127378.1 | 63160.4 | ----- | -215979.1 | -3.2046 |
| 4900 | 14.5969 | 61971.4 | 74.8200 | 304646.7 | 128837.1 | 63016.1 | ----- | -216059.0 | -3.4054 |
| 5000 | 14.6087 | 63431.7 | 75.1150 | 312143.5 | 130297.4 | 62871.8 | ----- | -216138.7 | -3.5981 |
| 5100 | 14.6198 | 64893.2 | 75.4044 | 319669.5 | 131758.9 | 62727.5 | ----- | -216218.2 | -3.7834 |
| 5200 | 14.6303 | 66355.7 | 75.6884 | 327224.2 | 133221.4 | 62583.2 | ----- | -216297.5 | -3.9616 |
| 5300 | 14.6403 | 67819.2 | 75.9672 | 334807.0 | 134684.9 | 62438.9 | ----- | -216376.6 | -4.1331 |
| 5400 | 14.6497 | 69283.7 | 76.2410 | 342417.5 | 136149.4 | 62294.6 | ----- | -216455.5 | -4.2984 |
| 5500 | 14.6586 | 70749.1 | 76.5099 | 350055.0 | 137614.8 | 62150.3 | ----- | -216534.3 | -4.4577 |
| 5600 | 14.6671 | 72215.4 | 76.7741 | 357719.3 | 139081.1 | 62006.0 | ----- | -216612.9 | -4.6114 |
| 5700 | 14.6752 | 73682.5 | 77.0337 | 365409.7 | 140548.2 | 61861.7 | ----- | -216691.4 | -4.7597 |
| 5800 | 14.6828 | 75150.4 | 77.2890 | 373125.9 | 142016.1 | 61717.4 | ----- | -216769.8 | -4.9030 |
| 5900 | 14.6901 | 76619.1 | 77.5401 | 380867.4 | 143484.8 | 61573.1 | ----- | -216848.0 | -5.0414 |
| 6000 | 14.6970 | 78088.4 | 77.7870 | 388633.8 | 144954.1 | 61428.8 | ----- | -216926.0 | -5.1753 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(69) CH₃ (gas); molecular weight, 15.035

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 31002.3 | 34289.2 | ----- | -290585.8 | ----- |
| 100 | 7.9819 | 795.3 | 37.1851 | 2923.2 | 31797.6 | 33931.4 | -74.0713 | -291851.2 | 624.4803 |
| 200 | 8.5206 | 1616.2 | 42.8536 | 6954.5 | 32618.5 | 33770.3 | -37.0464 | -293023.3 | 305.0753 |
| 298.15 | 9.2665 | 2488.5 | 46.3923 | 11343.4 | 33490.8 | 33490.8 | -24.9398 | -294103.3 | 199.5005 |
| 300 | 9.2811 | 2505.7 | 46.4497 | 11429.2 | 33508.0 | 33485.1 | -24.7888 | -294123.0 | 198.1711 |
| 400 | 10.0855 | 3473.9 | 49.2297 | 16217.9 | 34476.2 | 33164.5 | -18.7174 | -295142.9 | 144.5213 |
| 500 | 10.8661 | 4521.9 | 51.5649 | 21260.5 | 35524.2 | 32845.6 | -15.1095 | -296082.7 | 112.2229 |
| 600 | 11.6009 | 5645.6 | 53.6116 | 26521.4 | 36647.9 | 32542.1 | -12.7271 | -296946.7 | 90.6243 |
| 700 | 12.2975 | 6840.8 | 55.4527 | 31976.1 | 37843.1 | 32260.0 | -11.0412 | -297739.0 | 75.1534 |
| 800 | 12.9599 | 8104.0 | 57.1384 | 37606.7 | 39106.3 | 32004.8 | -9.7870 | -298463.3 | 63.5205 |
| 900 | 13.5845 | 9431.5 | 58.7013 | 43399.6 | 40433.8 | 31778.9 | -8.8187 | -299123.1 | 54.4515 |
| 1000 | 14.1654 | 10819.4 | 60.1631 | 49343.6 | 41821.7 | 31582.8 | -8.0489 | -299722.6 | 47.1810 |
| 1100 | 14.6983 | 12263.0 | 61.5386 | 55429.4 | 43265.3 | 31414.4 | -7.4235 | -300266.4 | 41.2211 |
| 1200 | 15.1817 | 13757.4 | 62.8386 | 61648.8 | 44759.7 | 31269.5 | -6.9046 | -300759.4 | 36.2458 |
| 1300 | 15.6166 | 15297.7 | 64.0712 | 67994.9 | 46300.0 | 31143.4 | -6.4672 | -301206.5 | 32.0294 |
| 1400 | 16.0057 | 16879.2 | 65.2431 | 74461.1 | 47881.5 | 31032.5 | -6.0946 | -301612.6 | 28.4102 |
| 1500 | 16.3527 | 18497.5 | 66.3594 | 81041.6 | 49499.8 | 30932.6 | -5.7719 | -301982.2 | 25.2695 |
| 1600 | 16.6617 | 20148.5 | 67.4248 | 87731.2 | 51150.8 | 30842.0 | -5.4904 | -302319.2 | 22.5182 |
| 1700 | 16.9367 | 21828.7 | 68.4434 | 94525.0 | 52831.0 | 30759.0 | -5.2429 | -302627.6 | 20.0880 |
| 1800 | 17.1816 | 23534.8 | 69.4185 | 101418.5 | 54537.1 | 30682.3 | -5.0235 | -302910.5 | 17.9257 |
| 1900 | 17.3999 | 25264.1 | 70.3534 | 108407.4 | 56266.4 | 30607.7 | -4.8274 | -303171.1 | 15.9292 |
| 2000 | 17.5950 | 27014.1 | 71.2510 | 115487.9 | 58016.4 | 30534.9 | -4.6520 | -303411.9 | 14.2450 |
| 2100 | 17.7695 | 28782.4 | 72.1137 | 122656.4 | 59784.7 | 30462.8 | -4.4931 | -303635.3 | 12.6657 |
| 2200 | 17.9261 | 30567.4 | 72.9441 | 129909.6 | 61569.7 | 30391.5 | -4.3495 | -303843.3 | 11.2289 |
| 2300 | 18.0669 | 32367.1 | 73.7441 | 137244.2 | 63369.4 | 30319.2 | -4.2179 | -304037.8 | 9.9162 |
| 2400 | 18.1938 | 34180.3 | 74.5157 | 144657.4 | 65182.6 | 30246.3 | -4.0985 | -304220.5 | 8.7121 |
| 2500 | 18.3084 | 36005.5 | 75.2608 | 152146.5 | 67007.8 | 30171.9 | -3.9883 | -304392.6 | 7.6037 |
| 2600 | 18.4122 | 37841.6 | 75.9809 | 159708.8 | 68843.9 | 30095.7 | -3.8871 | -304555.4 | 6.5801 |
| 2700 | 18.5065 | 39687.6 | 76.6776 | 167341.9 | 70689.9 | 30017.8 | -3.7933 | -304710.2 | 5.6317 |
| 2800 | 18.5923 | 41542.6 | 77.3522 | 175043.6 | 72544.9 | 29937.1 | -3.7069 | -304857.7 | 4.7507 |
| 2900 | 18.6705 | 43405.8 | 78.0060 | 182811.6 | 74408.1 | 29854.0 | -3.6265 | -304998.9 | 3.9370 |
| 3000 | 18.7420 | 45276.5 | 78.6402 | 190644.1 | 76278.8 | 29767.4 | -3.5511 | -305134.5 | 3.1637 |
| 3100 | 18.8076 | 47154.0 | 79.2558 | 198539.1 | 78156.3 | 29677.0 | -3.4815 | -305265.1 | 2.4465 |
| 3200 | 18.8677 | 49037.8 | 79.8539 | 206494.7 | 80040.1 | 29582.5 | -3.4163 | -305391.4 | 1.7738 |
| 3300 | 18.9231 | 50927.4 | 80.4354 | 214509.3 | 81929.7 | 29486.0 | -3.3551 | -305513.8 | 1.1417 |
| 3400 | 18.9741 | 52822.3 | 81.0010 | 222581.2 | 83824.6 | 29383.4 | -3.2978 | -305632.7 | 0.5465 |
| 3500 | 19.0212 | 54722.1 | 81.5517 | 230709.0 | 85724.4 | 29275.7 | -3.2441 | -305748.6 | -0.0149 |
| 3600 | 19.0648 | 56626.4 | 82.0882 | 238891.1 | 87628.7 | 29165.9 | -3.1930 | -305861.7 | -0.5453 |
| 3700 | 19.1052 | 58534.9 | 82.6111 | 247126.2 | 89537.2 | 29051.9 | -3.1455 | -305972.4 | -1.0472 |
| 3800 | 19.1427 | 60447.3 | 83.1211 | 255412.9 | 91449.6 | 28930.2 | -3.1003 | -306080.9 | -1.5228 |
| 3900 | 19.1775 | 62363.4 | 83.6188 | 263750.0 | 93365.7 | 28807.7 | -3.0583 | -306187.4 | -1.9743 |
| 4000 | 19.2100 | 64282.8 | 84.1048 | 272136.3 | 95285.1 | 28678.8 | -3.0175 | -306292.2 | -2.4033 |
| 4100 | 19.2403 | 66205.3 | 84.5795 | 280570.6 | 97207.6 | 28557.0 | ----- | -306395.4 | -2.8115 |
| 4200 | 19.2686 | 68130.8 | 85.0435 | 289051.8 | 99133.1 | 28436.1 | ----- | -306497.1 | -3.2004 |
| 4300 | 19.2951 | 70059.0 | 85.4972 | 297578.9 | 101061.3 | 28316.2 | ----- | -306597.5 | -3.5714 |
| 4400 | 19.3199 | 71989.7 | 85.9411 | 306150.9 | 102992.0 | 28197.3 | ----- | -306696.7 | -3.9256 |
| 4500 | 19.3431 | 73922.9 | 86.3755 | 314766.8 | 104925.2 | 28079.4 | ----- | -306794.7 | -4.2641 |
| 4600 | 19.3650 | 75858.3 | 86.8009 | 323425.7 | 106860.6 | 27962.5 | ----- | -306891.8 | -4.5881 |
| 4700 | 19.3855 | 77795.8 | 87.2176 | 332126.7 | 108798.1 | 27846.6 | ----- | -306987.9 | -4.8983 |
| 4800 | 19.4048 | 79735.4 | 87.6259 | 340868.9 | 110737.7 | 27731.7 | ----- | -307083.1 | -5.1958 |
| 4900 | 19.4231 | 81676.8 | 88.0262 | 349651.6 | 112679.1 | 27617.8 | ----- | -307177.5 | -5.4811 |
| 5000 | 19.4402 | 83620.0 | 88.4188 | 358473.9 | 114622.3 | 27504.9 | ----- | -307271.1 | -5.7552 |
| 5100 | 19.4565 | 85564.8 | 88.8039 | 367335.1 | 116567.1 | 27392.0 | ----- | -307364.0 | -6.0186 |
| 5200 | 19.4718 | 87511.2 | 89.1819 | 376234.5 | 118513.5 | 27280.1 | ----- | -307456.2 | -6.2719 |
| 5300 | 19.4863 | 89459.1 | 89.5529 | 385171.3 | 120461.4 | 27168.2 | ----- | -307547.7 | -6.5157 |
| 5400 | 19.5001 | 91408.5 | 89.9173 | 394144.8 | 122410.8 | 27056.3 | ----- | -307638.7 | -6.7506 |
| 5500 | 19.5131 | 93359.1 | 90.2752 | 403154.5 | 124361.4 | 26944.4 | ----- | -307729.0 | -6.9770 |
| 5600 | 19.5255 | 95311.1 | 90.6269 | 412199.7 | 126313.4 | 26832.5 | ----- | -307818.8 | -7.1954 |
| 5700 | 19.5372 | 97264.2 | 90.9726 | 421279.7 | 128266.5 | 26720.6 | ----- | -307908.1 | -7.4061 |
| 5800 | 19.5484 | 99218.5 | 91.3125 | 430394.0 | 130220.8 | 26608.7 | ----- | -307996.9 | -7.6097 |
| 5900 | 19.5590 | 101173.9 | 91.6468 | 439542.0 | 132176.2 | 26496.8 | ----- | -308085.2 | -7.8064 |
| 6000 | 19.5691 | 103130.3 | 91.9756 | 448723.1 | 134132.6 | 26384.9 | ----- | -308173.0 | -7.9967 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(70) CH₄ (gas); molecular weight, 16.043

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -20281.2 | -15982.4 | ----- | -392485.8 | ----- |
| 100 | 7.9490 | 791.2 | 35.7221 | 2781.1 | -19490.0 | -16723.8 | 33.6458 | -394252.1 | 843.1467 |
| 200 | 8.0006 | 1587.1 | 41.2379 | 6660.4 | -18694.1 | -17211.2 | 15.1913 | -395946.0 | 411.6327 |
| 298.15 | 8.5187 | 2392.2 | 44.5062 | 10877.3 | -17889.0 | -17889.0 | 8.8986 | -397580.9 | 268.9494 |
| 300 | 8.5250 | 2408.0 | 44.5590 | 10959.7 | -17873.2 | -17902.4 | 8.8171 | -397611.1 | 267.1523 |
| 400 | 9.6846 | 3315.2 | 47.1611 | 15549.2 | -16966.0 | -18631.4 | 5.4958 | -399188.8 | 194.6092 |
| 500 | 11.0933 | 4353.3 | 49.4716 | 20382.5 | -15927.9 | -19309.4 | 3.4254 | -400535.4 | 150.9155 |
| 600 | 12.5212 | 5534.4 | 51.6210 | 25438.2 | -14746.8 | -19905.6 | 1.9980 | -401938.8 | 121.6852 |
| 700 | 13.8816 | 6855.2 | 53.6544 | 30702.9 | -13426.0 | -20413.2 | 0.9491 | -403102.2 | 100.7418 |
| 800 | 15.1467 | 8307.5 | 55.5918 | 36165.9 | -11973.7 | -20832.0 | 0.1444 | -404134.2 | 84.9911 |
| 900 | 16.3062 | 9881.0 | 57.4438 | 41818.4 | -10400.2 | -21167.5 | -0.4926 | -405044.9 | 72.7110 |
| 1000 | 17.3579 | 11565.1 | 59.2172 | 47652.0 | -8716.0 | -21426.4 | -1.0092 | -405845.0 | 62.8660 |
| 1100 | 18.3041 | 13349.1 | 60.9168 | 53659.3 | -6932.1 | -21617.7 | -1.4374 | -406545.3 | 54.7961 |
| 1200 | 19.1508 | 15222.6 | 62.5464 | 59833.1 | -5058.6 | -21751.2 | -1.7964 | -407155.9 | 48.0603 |
| 1300 | 19.9064 | 17176.2 | 64.1097 | 66166.4 | -3105.0 | -21836.9 | -2.1014 | -407686.6 | 42.3528 |
| 1400 | 20.5798 | 19201.2 | 65.6101 | 72652.9 | -1080.0 | -21882.4 | -2.3648 | -408146.1 | 37.4547 |
| 1500 | 21.1804 | 21269.8 | 67.0508 | 79286.4 | 1008.6 | -21895.7 | -2.5924 | -408542.1 | 33.2052 |
| 1600 | 21.7167 | 23435.1 | 68.4352 | 86061.2 | 3153.9 | -21880.6 | -2.7913 | -408881.6 | 29.4835 |
| 1700 | 22.1969 | 25631.2 | 69.7664 | 92971.7 | 5350.0 | -21841.2 | -2.9669 | -409170.9 | 26.1972 |
| 1800 | 22.6282 | 27872.9 | 71.0476 | 100012.8 | 7591.7 | -21780.5 | -3.1227 | -409415.2 | 23.2741 |
| 1900 | 23.0168 | 30155.5 | 72.2816 | 107179.7 | 9874.3 | -21705.0 | -3.2613 | -409619.2 | 20.6572 |
| 2000 | 23.3684 | 32475.0 | 73.4713 | 114467.7 | 12193.8 | -21615.7 | -3.3864 | -409787.2 | 18.3010 |
| 2100 | 23.6876 | 34828.1 | 74.6193 | 121872.5 | 14546.9 | -21514.9 | -3.4985 | -409922.8 | 16.1684 |
| 2200 | 23.9786 | 37211.6 | 75.7281 | 129390.2 | 16930.4 | -21403.3 | -3.6003 | -410029.0 | 14.2291 |
| 2300 | 24.2449 | 39623.0 | 76.8000 | 137016.9 | 19341.8 | -21283.7 | -3.6919 | -410108.8 | 12.4580 |
| 2400 | 24.4897 | 42059.9 | 77.8370 | 144749.1 | 21778.7 | -21156.2 | -3.7765 | -410164.4 | 10.8343 |
| 2500 | 24.7155 | 44520.3 | 78.8414 | 152583.2 | 24239.1 | -21021.9 | -3.8531 | -410198.2 | 9.3402 |
| 2600 | 24.9246 | 47002.4 | 79.8149 | 160516.3 | 26721.2 | -20882.0 | -3.9238 | -410211.8 | 7.9611 |
| 2700 | 25.1189 | 49504.7 | 80.7592 | 168545.3 | 29223.5 | -20736.5 | -3.9882 | -410207.1 | 6.6840 |
| 2800 | 25.3003 | 52025.7 | 81.6761 | 176667.2 | 31744.5 | -20587.1 | -4.0483 | -410185.4 | 5.4983 |
| 2900 | 25.4701 | 54564.4 | 82.5669 | 184879.6 | 34283.2 | -20433.6 | -4.1036 | -410148.0 | 4.3944 |
| 3000 | 25.6296 | 57119.4 | 83.4331 | 193179.8 | 36838.2 | -20277.5 | -4.1541 | -410096.0 | 3.3642 |
| 3100 | 25.7799 | 59690.0 | 84.2759 | 201565.4 | 39408.8 | -20119.4 | -4.2019 | -410030.4 | 2.4005 |
| 3200 | 25.9220 | 62275.1 | 85.0967 | 210034.2 | 41993.9 | -19959.7 | -4.2461 | -409952.1 | 1.4973 |
| 3300 | 26.0568 | 64874.1 | 85.8964 | 218584.1 | 44592.9 | -19796.1 | -4.2871 | -409861.9 | 0.6490 |
| 3400 | 26.1849 | 67486.3 | 86.6762 | 227212.9 | 47205.1 | -19633.8 | -4.3256 | -409760.4 | -0.1492 |
| 3500 | 26.3072 | 70110.9 | 87.4370 | 235918.7 | 49829.7 | -19471.9 | -4.3617 | -409648.2 | -0.9016 |
| 3600 | 26.4240 | 72747.5 | 88.1798 | 244699.7 | 52466.3 | -19306.4 | -4.3948 | -409525.9 | -1.6120 |
| 3700 | 26.5360 | 75395.5 | 88.9053 | 253554.1 | 55114.4 | -19140.2 | -4.4267 | -409393.9 | -2.2838 |
| 3800 | 26.6435 | 78054.6 | 89.6144 | 262480.2 | 57773.4 | -18977.8 | -4.4562 | -409252.6 | -2.9200 |
| 3900 | 26.7471 | 80724.1 | 90.3078 | 271476.4 | 60442.9 | -18810.3 | -4.4848 | -409102.5 | -3.5234 |
| 4000 | 26.8471 | 83403.9 | 90.9863 | 280541.3 | 63122.7 | -18645.2 | -4.5103 | -408943.7 | -4.0964 |
| 4100 | 26.9437 | 86093.4 | 91.6504 | 289673.2 | 65812.2 | -18482.0 | -4.5338 | -408776.7 | -4.6413 |
| 4200 | 27.0372 | 88792.5 | 92.3008 | 298870.9 | 68511.3 | -18320.0 | -4.5552 | -408601.6 | -5.1599 |
| 4300 | 27.1280 | 91500.8 | 92.9381 | 308132.9 | 71219.6 | -18158.0 | -4.5746 | -408418.7 | -5.6543 |
| 4400 | 27.2163 | 94218.0 | 93.5627 | 317458.1 | 73936.8 | -17996.0 | -4.5920 | -408228.2 | -6.1259 |
| 4500 | 27.3022 | 96944.0 | 94.1753 | 326845.1 | 76662.8 | -17834.0 | -4.6084 | -408030.3 | -6.5764 |
| 4600 | 27.3859 | 99678.4 | 94.7763 | 336292.7 | 79397.2 | -17672.0 | -4.6238 | -407825.2 | -7.0070 |
| 4700 | 27.4677 | 102421.1 | 95.3662 | 345800.0 | 82139.9 | -17510.0 | -4.6382 | -407612.9 | -7.4192 |
| 4800 | 27.5476 | 105171.9 | 95.9453 | 355365.6 | 84890.7 | -17348.0 | -4.6516 | -407393.7 | -7.8139 |
| 4900 | 27.6259 | 107930.6 | 96.5141 | 364988.7 | 87649.4 | -17186.0 | -4.6640 | -407167.6 | -8.1924 |
| 5000 | 27.7026 | 110697.0 | 97.0730 | 374668.1 | 90415.8 | -17024.0 | -4.6754 | -406934.8 | -8.5554 |
| 5100 | 27.7778 | 113471.0 | 97.6224 | 384403.0 | 93189.8 | -16862.0 | -4.6868 | -406695.3 | -8.9041 |
| 5200 | 27.8517 | 116252.5 | 98.1625 | 394192.3 | 95971.3 | -16700.0 | -4.6972 | -406449.3 | -9.2391 |
| 5300 | 27.9243 | 119041.3 | 98.6937 | 404035.2 | 98760.1 | -16538.0 | -4.7076 | -406196.7 | -9.5613 |
| 5400 | 27.9958 | 121837.3 | 99.2163 | 413930.7 | 101556.1 | -16376.0 | -4.7179 | -405937.8 | -9.8714 |
| 5500 | 28.0661 | 124640.4 | 99.7307 | 423878.2 | 104359.2 | -16214.0 | -4.7282 | -405672.6 | -10.1700 |
| 5600 | 28.1355 | 127450.5 | 100.2370 | 433876.6 | 107169.3 | -16052.0 | -4.7385 | -405401.0 | -10.4577 |
| 5700 | 28.2039 | 130267.5 | 100.7356 | 443925.3 | 109986.3 | -15890.0 | -4.7488 | -405123.3 | -10.7352 |
| 5800 | 28.2715 | 133091.3 | 101.2267 | 454023.5 | 112810.1 | -15728.0 | -4.7591 | -404839.4 | -11.0029 |
| 5900 | 28.3382 | 135921.8 | 101.7105 | 464170.4 | 115640.6 | -15566.0 | -4.7694 | -404549.3 | -11.2614 |
| 6000 | 28.4041 | 138758.9 | 102.1874 | 474365.3 | 118477.7 | -15404.0 | -4.7797 | -404253.3 | -11.5110 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(71) C₂H₂ (gas); molecular weight, 26.038

| T, °K | C _p ^o , cal/mole °K | H _f ^o -H ₀ ^o , cal/mole | S _F ^o , cal/mole °K | -(F _f ^o -H ₀ ^o), cal/mole | H _f ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 51800.8 | 54327.0 | ----- | -388909.4 | ----- |
| 100 | 7.0146 | 695.1 | 39.0033 | 3205.2 | 52495.9 | 54233.7 | -115.4274 | -390348.4 | 837.8780 |
| 200 | 8.5053 | 1455.5 | 44.2152 | 7387.5 | 53256.3 | 54235.8 | -56.1563 | -391585.7 | 410.8085 |
| 298.15 | 10.5342 | 2393.2 | 48.0026 | 11918.8 | 54194.0 | 54194.0 | -36.6527 | -392603.3 | 269.7853 |
| 300 | 10.5675 | 2412.7 | 48.0679 | 12007.6 | 54213.5 | 54193.4 | -36.4081 | -392620.6 | 268.0107 |
| 400 | 12.0617 | 3548.9 | 51.3261 | 16981.5 | 55349.7 | 54140.9 | -26.5430 | -393473.5 | 196.4356 |
| 500 | 13.1156 | 4810.5 | 54.1368 | 22257.9 | 56611.2 | 54065.9 | -20.6304 | -394200.3 | 153.4032 |
| 600 | 13.9325 | 6164.2 | 56.6028 | 27797.4 | 57965.0 | 53965.3 | -16.6951 | -394834.5 | 124.6649 |
| 700 | 14.6243 | 7592.9 | 58.8036 | 33569.7 | 59393.6 | 53843.6 | -13.8902 | -395393.7 | 104.1063 |
| 800 | 15.2424 | 9086.7 | 60.7975 | 39551.3 | 60887.5 | 53711.9 | -11.7914 | -395887.5 | 88.6667 |
| 900 | 15.8772 | 10639.6 | 62.6258 | 45723.7 | 62440.3 | 53580.1 | -10.1628 | -396322.2 | 76.6450 |
| 1000 | 16.3262 | 12246.6 | 64.3185 | 52071.9 | 64047.4 | 53455.5 | -8.8630 | -396702.7 | 67.0159 |
| 1100 | 16.8020 | 13903.4 | 65.8972 | 58583.6 | 65704.1 | 53340.9 | -7.8024 | -397033.4 | 59.1312 |
| 1200 | 17.2365 | 15605.6 | 67.3781 | 65248.1 | 67406.4 | 53236.0 | -6.9201 | -397318.7 | 52.5556 |
| 1300 | 17.6316 | 17349.3 | 68.7736 | 72056.4 | 69150.1 | 53138.5 | -6.1748 | -397562.6 | 46.9819 |
| 1400 | 17.9901 | 19130.7 | 70.0936 | 79000.3 | 70931.5 | 53047.2 | -5.5377 | -397769.2 | 42.2128 |
| 1500 | 18.3149 | 20946.2 | 71.3461 | 86072.8 | 72747.0 | 52960.6 | -4.9860 | -397942.0 | 38.0725 |
| 1600 | 18.6090 | 22792.7 | 72.5376 | 93267.5 | 74593.5 | 52878.7 | -4.5039 | -398084.5 | 34.4482 |
| 1700 | 18.8758 | 24667.1 | 73.6739 | 100578.5 | 76467.9 | 52801.1 | -4.0793 | -398199.8 | 31.2493 |
| 1800 | 19.1181 | 26567.0 | 74.7598 | 108000.6 | 78367.8 | 52727.4 | -3.7025 | -398290.9 | 28.4051 |
| 1900 | 19.3387 | 28490.0 | 75.7995 | 115529.0 | 80290.8 | 52655.1 | -3.3657 | -398360.3 | 25.8598 |
| 2000 | 19.5400 | 30434.1 | 76.7966 | 123159.1 | 82234.9 | 52584.1 | -3.0633 | -398410.4 | 23.5687 |
| 2100 | 19.7244 | 32397.5 | 77.7545 | 130887.0 | 84198.2 | 52514.1 | -2.7898 | -398443.3 | 21.4955 |
| 2200 | 19.8938 | 34378.5 | 78.6760 | 138708.8 | 86179.3 | 52445.4 | -2.5417 | -398461.0 | 19.6107 |
| 2300 | 20.0500 | 36375.8 | 79.5638 | 146621.0 | 88176.6 | 52377.4 | -2.3150 | -398465.0 | 17.8898 |
| 2400 | 20.1945 | 38388.1 | 80.4203 | 154620.5 | 90188.9 | 52310.2 | -2.1081 | -398456.9 | 16.3123 |
| 2500 | 20.3286 | 40414.3 | 81.2474 | 162704.1 | 92215.1 | 52243.8 | -1.9176 | -398438.1 | 14.8610 |
| 2600 | 20.4535 | 42453.5 | 82.0472 | 170869.1 | 94254.3 | 52178.0 | -1.7422 | -398409.6 | 13.5214 |
| 2700 | 20.5702 | 44504.8 | 82.8213 | 179112.7 | 96305.5 | 52113.1 | -1.5796 | -398372.6 | 12.2812 |
| 2800 | 20.6797 | 46567.3 | 83.5714 | 187432.5 | 98368.1 | 52048.2 | -1.4293 | -398327.8 | 11.1297 |
| 2900 | 20.7827 | 48640.5 | 84.2989 | 195826.2 | 100441.3 | 51983.8 | -1.2893 | -398276.2 | 10.0577 |
| 3000 | 20.8799 | 50723.7 | 85.0051 | 204291.6 | 102524.5 | 51919.0 | -1.1585 | -398218.3 | 9.0573 |
| 3100 | 20.9720 | 52816.3 | 85.6913 | 212826.6 | 104617.1 | 51853.7 | -1.0367 | -398154.7 | 8.1216 |
| 3200 | 21.0593 | 54917.9 | 86.3585 | 221429.2 | 106718.7 | 51787.8 | -0.9226 | -398086.0 | 7.2445 |
| 3300 | 21.1425 | 57028.0 | 87.0078 | 230097.7 | 108828.8 | 51722.6 | -0.8154 | -398012.5 | 6.4208 |
| 3400 | 21.2219 | 59146.3 | 87.6401 | 238830.2 | 110947.1 | 51655.8 | -0.7148 | -397934.6 | 5.6456 |
| 3500 | 21.2980 | 61272.3 | 88.2564 | 247625.2 | 113073.1 | 51587.9 | -0.6201 | -397852.7 | 4.9149 |
| 3600 | 21.3709 | 63405.8 | 88.8574 | 256481.0 | 115206.6 | 51520.9 | -0.5304 | -397766.9 | 4.2249 |
| 3700 | 21.4410 | 65546.4 | 89.4439 | 265396.2 | 117347.2 | 51453.2 | -0.4461 | -397677.4 | 3.5724 |
| 3800 | 21.5086 | 67693.9 | 90.0166 | 274369.3 | 119494.7 | 51382.7 | -0.3661 | -397584.5 | 2.9543 |
| 3900 | 21.5739 | 69848.1 | 90.5762 | 283399.1 | 121648.8 | 51314.0 | -0.2907 | -397488.2 | 2.3681 |
| 4000 | 21.6371 | 72008.6 | 91.1232 | 292484.1 | 123809.4 | 51243.3 | -0.2185 | -397388.8 | 1.8113 |
| 4100 | 21.6983 | 74175.4 | 91.6582 | 301623.3 | 125976.2 | 51178.0 | ----- | -397286.1 | 1.2819 |
| 4200 | 21.7578 | 76348.2 | 92.1818 | 310815.4 | 128149.0 | 51113.1 | ----- | -397180.4 | 0.7777 |
| 4300 | 21.8157 | 78526.9 | 92.6945 | 320059.3 | 130327.7 | 51048.2 | ----- | -397071.7 | 0.2972 |
| 4400 | 21.8721 | 80711.3 | 93.1966 | 329353.9 | 132512.1 | 50983.8 | ----- | -396959.9 | -0.1614 |
| 4500 | 21.9271 | 82901.3 | 93.6888 | 338698.3 | 134702.1 | 50919.0 | ----- | -396845.1 | -0.5995 |
| 4600 | 21.9809 | 85096.7 | 94.1713 | 348091.4 | 136897.5 | 50853.7 | ----- | -396727.4 | -1.0184 |
| 4700 | 22.0335 | 87297.4 | 94.6446 | 357532.2 | 139098.2 | 50787.8 | ----- | -396606.7 | -1.4193 |
| 4800 | 22.0850 | 89503.4 | 95.1090 | 367020.0 | 141304.1 | 50722.6 | ----- | -396482.9 | -1.8035 |
| 4900 | 22.1356 | 91714.4 | 95.5649 | 376553.8 | 143515.2 | 50655.8 | ----- | -396356.2 | -2.1718 |
| 5000 | 22.1852 | 93930.4 | 96.0126 | 386132.7 | 145731.2 | 50587.9 | ----- | -396226.5 | -2.5253 |
| 5100 | 22.2340 | 96151.4 | 96.4524 | 395756.0 | 147952.2 | 50520.9 | ----- | -396093.7 | -2.8648 |
| 5200 | 22.2820 | 98377.2 | 96.8846 | 405422.9 | 150178.0 | 50453.2 | ----- | -395957.9 | -3.1912 |
| 5300 | 22.3292 | 100607.8 | 97.3095 | 415132.7 | 152408.5 | 50382.7 | ----- | -395819.0 | -3.5051 |
| 5400 | 22.3758 | 102843.0 | 97.7273 | 424884.6 | 154643.8 | 50314.0 | ----- | -395677.1 | -3.8073 |
| 5500 | 22.4217 | 105082.9 | 98.1383 | 434678.0 | 156883.7 | 50243.3 | ----- | -395532.0 | -4.0984 |
| 5600 | 22.4670 | 107327.3 | 98.5428 | 444512.1 | 159128.1 | 50178.0 | ----- | -395383.7 | -4.3790 |
| 5700 | 22.5118 | 109576.3 | 98.9408 | 454386.3 | 161377.1 | 50113.1 | ----- | -395232.3 | -4.6496 |
| 5800 | 22.5561 | 111829.7 | 99.3327 | 464300.0 | 163630.5 | 50048.2 | ----- | -395077.8 | -4.9108 |
| 5900 | 22.5998 | 114087.5 | 99.7187 | 474252.6 | 165888.3 | 50000.0 | ----- | -394920.1 | -5.1631 |
| 6000 | 22.6432 | 116349.6 | 100.0989 | 484243.6 | 168150.4 | 50000.0 | ----- | -394759.1 | -5.4069 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(72) C_2H_4 (gas); molecular weight, 28.054

| T, °K | C_p° , cal/mole °K | $H_f^\circ - H_o^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_o^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| C | ----- | 0 | ----- | 0 | 9970.4 | 14520.4 | ----- | -531972.8 | ----- |
| 100 | 7.9523 | 794.9 | 43.1304 | 3518.1 | 10765.3 | 13768.0 | -31.4216 | -534305.6 | 1143.7826 |
| 200 | 8.4976 | 1606.2 | 48.7345 | 8140.7 | 11576.6 | 13218.2 | -16.5818 | -536486.7 | 559.0222 |
| 298.15 | 10.4117 | 2525.6 | 52.4493 | 13112.1 | 12496.0 | 12496.0 | -11.9371 | -538496.8 | 369.7221 |
| 300 | 10.4557 | 2544.9 | 52.5138 | 13209.2 | 12515.3 | 12482.4 | -11.8813 | -538532.7 | 363.2880 |
| 400 | 12.9058 | 3712.9 | 55.8569 | 18629.8 | 13683.3 | 11767.1 | -9.6686 | -540347.4 | 265.0594 |
| 500 | 15.1662 | 5119.1 | 58.9854 | 24373.6 | 15089.5 | 11138.3 | -8.4152 | -541923.2 | 205.9340 |
| 600 | 17.1052 | 6735.3 | 61.9267 | 30420.7 | 16705.7 | 10600.1 | -7.6225 | -543288.7 | 166.4090 |
| 700 | 18.7666 | 8530.9 | 64.6913 | 36753.0 | 18501.3 | 10143.1 | -7.0829 | -544474.5 | 138.1099 |
| 800 | 20.2079 | 10481.3 | 67.2936 | 43353.5 | 20451.7 | 9762.4 | -6.6944 | -545505.4 | 116.8422 |
| 900 | 21.4687 | 12566.5 | 69.7481 | 50206.8 | 22536.9 | 9451.8 | -5.4023 | -546401.4 | 100.2713 |
| 1000 | 22.5745 | 14769.9 | 72.0686 | 57298.7 | 24740.2 | 9205.4 | -6.1752 | -547179.1 | 86.9941 |
| 1100 | 23.5443 | 17076.9 | 74.2667 | 64616.4 | 27047.2 | 9014.7 | -5.9948 | -547853.3 | 76.1166 |
| 1200 | 24.3940 | 19474.7 | 76.3525 | 72148.3 | 29445.1 | 8869.7 | -5.8467 | -548436.6 | 67.0415 |
| 1300 | 25.1381 | 21952.2 | 78.3351 | 79883.5 | 31922.5 | 8760.1 | -5.7230 | -548940.4 | 59.3550 |
| 1400 | 25.7898 | 24499.3 | 80.2224 | 87812.2 | 34469.6 | 8678.5 | -5.6192 | -549374.8 | 52.7609 |
| 1500 | 26.3612 | 27107.4 | 82.0217 | 95925.1 | 37077.8 | 8617.4 | -5.5289 | -549748.5 | 47.0618 |
| 1600 | 26.8629 | 29769.2 | 83.7394 | 104213.8 | 39739.6 | 8573.3 | -5.4503 | -550069.4 | 42.0344 |
| 1700 | 27.3044 | 32478.0 | 85.3814 | 112670.4 | 42448.4 | 8543.0 | -5.3814 | -550344.0 | 37.6137 |
| 1800 | 27.6938 | 35228.3 | 86.9534 | 121287.7 | 45198.7 | 8523.7 | -5.3205 | -550578.3 | 33.6824 |
| 1900 | 28.0383 | 38015.3 | 88.4601 | 130058.9 | 47985.6 | 8509.0 | -5.2658 | -550777.4 | 30.1636 |
| 2000 | 28.3440 | 40834.7 | 89.9062 | 138977.7 | 50805.1 | 8498.2 | -5.2174 | -550945.8 | 26.9955 |
| 2100 | 28.6160 | 43683.0 | 91.2958 | 148038.3 | 53653.3 | 8489.3 | -5.1730 | -551087.5 | 24.1284 |
| 2200 | 28.8587 | 46556.9 | 92.6328 | 157235.1 | 56527.3 | 8482.3 | -5.1332 | -551205.8 | 21.5213 |
| 2300 | 29.0761 | 49453.9 | 93.9205 | 166563.2 | 59424.2 | 8474.5 | -5.0960 | -551303.8 | 19.1405 |
| 2400 | 29.2712 | 52371.4 | 95.1621 | 176017.7 | 62341.8 | 8466.1 | -5.0631 | -551384.2 | 16.9577 |
| 2500 | 29.4469 | 55307.5 | 96.3607 | 185594.2 | 65277.8 | 8456.3 | -5.0320 | -551449.1 | 14.9493 |
| 2600 | 29.6056 | 58260.2 | 97.5187 | 195288.5 | 68230.6 | 8444.3 | -5.0039 | -551500.7 | 13.0951 |
| 2700 | 29.7493 | 61228.1 | 98.6388 | 205096.7 | 71198.4 | 8430.2 | -4.9772 | -551540.7 | 11.3782 |
| 2800 | 29.8798 | 64209.6 | 99.7231 | 215015.0 | 74180.0 | 8412.3 | -4.9533 | -551570.6 | 9.7838 |
| 2900 | 29.9985 | 67203.6 | 100.7737 | 225040.1 | 77174.0 | 8391.2 | -4.9307 | -551591.7 | 8.2993 |
| 3000 | 30.1069 | 70209.0 | 101.7926 | 235168.7 | 80179.4 | 8365.2 | -4.9090 | -551605.3 | 6.9137 |
| 3100 | 30.2060 | 73224.7 | 102.7814 | 245397.7 | 83195.1 | 8334.0 | -4.8897 | -551612.2 | 5.6175 |
| 3200 | 30.2968 | 76249.9 | 103.7419 | 255724.1 | 86220.3 | 8297.2 | -4.8715 | -551613.5 | 4.4022 |
| 3300 | 30.3803 | 79283.8 | 104.6754 | 266145.1 | 89254.2 | 8257.4 | -4.8542 | -551609.9 | 3.2607 |
| 3400 | 30.4571 | 82325.8 | 105.5835 | 276658.3 | 92296.1 | 8209.3 | -4.8382 | -551602.0 | 2.1863 |
| 3500 | 30.5280 | 85375.1 | 106.4675 | 287261.0 | 95345.4 | 8154.2 | -4.8234 | -551590.4 | 1.1733 |
| 3600 | 30.5935 | 88431.2 | 107.3284 | 297951.0 | 98401.5 | 8095.9 | -4.8088 | -551575.5 | 0.2166 |
| 3700 | 30.6542 | 91493.6 | 108.1675 | 308726.0 | 101464.0 | 8031.6 | -4.7959 | -551557.9 | -0.6883 |
| 3800 | 30.7104 | 94561.9 | 108.9857 | 319583.8 | 104532.2 | 7956.8 | -4.7833 | -551537.9 | -1.5456 |
| 3900 | 30.7627 | 97635.6 | 109.7841 | 330522.5 | 107605.9 | 7880.5 | -4.7724 | -551515.7 | -2.3589 |
| 4000 | 30.8113 | 100714.3 | 110.5636 | 341540.0 | 110684.7 | 7795.3 | -4.7607 | -551491.7 | -3.1315 |
| 4100 | 30.8567 | 103797.7 | 111.3250 | 352634.6 | 113768.1 | | | -551466.1 | -3.8664 |
| 4200 | 30.8990 | 106885.5 | 112.0690 | 363804.4 | 116855.9 | | | -551439.0 | -4.5663 |
| 4300 | 30.9385 | 109977.4 | 112.7966 | 375047.8 | 119947.8 | | | -551410.6 | -5.2335 |
| 4400 | 30.9756 | 113073.1 | 113.5083 | 386363.2 | 123043.5 | | | -551381.2 | -5.8704 |
| 4500 | 31.0103 | 116172.5 | 114.2048 | 397749.0 | 126142.8 | | | -551350.7 | -6.4790 |
| 4600 | 31.0429 | 119275.1 | 114.8867 | 409203.7 | 129245.5 | | | -551319.3 | -7.0511 |
| 4700 | 31.0735 | 122381.0 | 115.5546 | 420725.9 | 132351.3 | | | -551287.1 | -7.6183 |
| 4800 | 31.1023 | 125489.8 | 116.2092 | 432314.1 | 135460.1 | | | -551254.2 | -8.1523 |
| 4900 | 31.1295 | 128601.4 | 116.8507 | 443967.3 | 138571.7 | | | -551220.5 | -8.6645 |
| 5000 | 31.1551 | 131715.6 | 117.4799 | 455683.9 | 141686.0 | | | -551186.2 | -9.1562 |
| 5100 | 31.1792 | 134832.4 | 118.0971 | 467462.8 | 144802.7 | | | -551151.3 | -9.6286 |
| 5200 | 31.2021 | 137951.4 | 118.7028 | 479302.9 | 147921.8 | | | -551115.9 | -10.0827 |
| 5300 | 31.2237 | 141072.7 | 119.2973 | 491203.0 | 151043.1 | | | -551079.9 | -10.5197 |
| 5400 | 31.2441 | 144196.1 | 119.8811 | 503162.0 | 154166.5 | | | -551043.4 | -10.9405 |
| 5500 | 31.2635 | 147321.5 | 120.4546 | 515178.9 | 157291.9 | | | -551006.4 | -11.3460 |
| 5600 | 31.2819 | 150448.8 | 121.0181 | 527252.6 | 160419.2 | | | -550969.0 | -11.7369 |
| 5700 | 31.2994 | 153577.9 | 121.5719 | 539382.2 | 163548.2 | | | -550931.1 | -12.1141 |
| 5800 | 31.3160 | 156708.7 | 122.1164 | 551566.7 | 166679.0 | | | -550892.8 | -12.4783 |
| 5900 | 31.3318 | 159841.0 | 122.6519 | 563805.2 | 169811.4 | | | -550854.1 | -12.8301 |
| 6000 | 31.3468 | 162975.0 | 123.1786 | 576096.8 | 172945.3 | | | -550815.0 | -13.1702 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(73) CN (gas); molecular weight, 26.019

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | (ΔH_f°) , cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 94282.0 | 95569.3 | ----- | -187000.0 | ----- |
| 100 | 6.9564 | 693.8 | 40.8075 | 3387.0 | 94975.7 | 95901.5 | -204.8852 | -187373.3 | 404.5316 |
| 200 | 6.9576 | 1389.5 | 45.6297 | 7736.5 | 95671.4 | 96171.6 | -99.9737 | -187677.0 | 199.6665 |
| 298.15 | 6.9686 | 2072.7 | 48.4089 | 12360.4 | 96354.7 | 96354.7 | -65.3485 | -187970.8 | 132.1049 |
| 300 | 6.9691 | 2085.6 | 48.4520 | 12450.0 | 96367.5 | 96374.4 | -64.9130 | -187976.3 | 131.2553 |
| 400 | 7.0294 | 2785.0 | 50.4636 | 17400.5 | 97066.9 | 96461.1 | -47.3550 | -188271.5 | 39.9973 |
| 500 | 7.1560 | 3493.7 | 52.0446 | 22528.6 | 97775.7 | 96499.6 | -36.8123 | -188556.9 | 75.4134 |
| 600 | 7.3268 | 4217.6 | 53.3640 | 27800.8 | 98499.6 | 96489.8 | -29.7827 | -188827.0 | 62.6654 |
| 700 | 7.5117 | 4959.5 | 54.5073 | 33195.5 | 99241.5 | 96444.0 | -24.7631 | -189079.0 | 52.8333 |
| 800 | 7.6903 | 5719.8 | 55.5221 | 38697.9 | 100001.7 | 96372.6 | -21.0006 | -189312.6 | 45.4536 |
| 900 | 7.8530 | 6497.1 | 56.4375 | 44296.7 | 100779.0 | 96283.6 | -18.0767 | -189529.1 | 39.7013 |
| 1000 | 7.9969 | 7289.7 | 57.2725 | 49982.8 | 101571.7 | 96182.3 | -15.7399 | -189730.2 | 35.0967 |
| 1100 | 8.1234 | 8095.9 | 58.0407 | 55748.9 | 102377.8 | 96071.9 | -13.8301 | -189917.8 | 31.3255 |
| 1200 | 8.2354 | 8913.9 | 58.7525 | 61589.0 | 103195.9 | 95954.0 | -12.2405 | -190093.5 | 28.1797 |
| 1300 | 8.3365 | 9742.6 | 59.4157 | 67497.8 | 104024.5 | 95829.4 | -10.8971 | -190258.7 | 25.5156 |
| 1400 | 8.4305 | 10581.0 | 60.0370 | 73470.8 | 104862.9 | 95699.2 | -9.7472 | -190414.2 | 23.2301 |
| 1500 | 8.5206 | 11428.6 | 60.6217 | 79504.0 | 105710.5 | 95564.8 | -8.7519 | -190560.8 | 21.2478 |
| 1600 | 8.6095 | 12285.1 | 61.1744 | 85594.1 | 106567.0 | 95427.8 | -7.8823 | -190698.8 | 19.5120 |
| 1700 | 8.6992 | 13150.5 | 61.6991 | 91738.0 | 107432.4 | 95289.5 | -7.1162 | -190828.3 | 17.9793 |
| 1800 | 8.7911 | 14025.0 | 62.1989 | 97933.0 | 108306.9 | 95151.2 | -6.4361 | -190949.3 | 16.6160 |
| 1900 | 8.8860 | 14908.8 | 62.6767 | 104177.0 | 109190.7 | 95014.0 | -5.8285 | -191061.7 | 15.3955 |
| 2000 | 8.9842 | 15802.3 | 63.1350 | 110467.7 | 110084.2 | 94878.8 | -5.2825 | -191165.4 | 14.2964 |
| 2100 | 9.0856 | 16705.7 | 63.5758 | 116803.4 | 110987.7 | 94746.7 | -4.7891 | -191260.2 | 13.3014 |
| 2200 | 9.1897 | 17619.5 | 64.0008 | 123182.4 | 111901.4 | 94618.9 | -4.3413 | -191346.0 | 12.3965 |
| 2300 | 9.2958 | 18543.7 | 64.4117 | 129603.1 | 112825.7 | 94496.2 | -3.9329 | -191422.8 | 11.5699 |
| 2400 | 9.4033 | 19478.7 | 64.8096 | 136064.3 | 113760.6 | 94379.1 | -3.5590 | -191490.5 | 10.8119 |
| 2500 | 9.5111 | 20424.4 | 65.1956 | 142564.6 | 114706.4 | 94268.4 | -3.2154 | -191549.2 | 10.1143 |
| 2600 | 9.6185 | 21380.9 | 65.5707 | 149103.0 | 115662.9 | 94164.4 | -2.8986 | -191599.3 | 9.4702 |
| 2700 | 9.7245 | 22348.1 | 65.9357 | 155678.4 | 116630.0 | 94067.4 | -2.6057 | -191640.8 | 8.8737 |
| 2800 | 9.8283 | 23325.7 | 66.2913 | 162289.9 | 117607.7 | 93977.3 | -2.3339 | -191674.2 | 8.3197 |
| 2900 | 9.9292 | 24313.6 | 66.6379 | 168936.4 | 118595.6 | 93894.3 | -2.0810 | -191700.0 | 7.8038 |
| 3000 | 10.0265 | 25311.4 | 66.9762 | 175617.2 | 119593.4 | 93818.1 | -1.8453 | -191718.5 | 7.3222 |
| 3100 | 10.1197 | 26318.8 | 67.3065 | 182331.4 | 120600.7 | 93748.4 | -1.6249 | -191730.5 | 6.8717 |
| 3200 | 10.2083 | 27335.2 | 67.6292 | 189078.2 | 121617.2 | 93685.1 | -1.4184 | -191736.5 | 6.4493 |
| 3300 | 10.2919 | 28360.3 | 67.9446 | 195857.0 | 122642.2 | 93627.8 | -1.2246 | -191737.1 | 6.0525 |
| 3400 | 10.3704 | 29393.4 | 68.2530 | 202666.9 | 123675.4 | 93576.3 | -1.0423 | -191733.1 | 5.6790 |
| 3500 | 10.4436 | 30434.2 | 68.5547 | 209507.4 | 124716.1 | 93530.1 | -0.8705 | -191725.2 | 5.3269 |
| 3600 | 10.5113 | 31482.0 | 68.8499 | 216377.6 | 125763.9 | 93488.9 | -0.7083 | -191714.0 | 4.9944 |
| 3700 | 10.5736 | 32536.3 | 69.1388 | 223277.1 | 126818.2 | 93452.0 | -0.5550 | -191700.3 | 4.6799 |
| 3800 | 10.6305 | 33596.5 | 69.4215 | 230205.2 | 127878.5 | 93418.9 | -0.4097 | -191684.8 | 4.3819 |
| 3900 | 10.6821 | 34662.2 | 69.6983 | 237161.2 | 128944.1 | 93389.4 | -0.2720 | -191668.1 | 4.0993 |
| 4000 | 10.7286 | 35732.8 | 69.9694 | 244144.7 | 130014.7 | 93363.0 | -0.1412 | -191651.0 | 3.8308 |
| 4100 | 10.7702 | 36807.7 | 70.2348 | 251154.9 | 131089.7 | | | -191634.1 | 3.5754 |
| 4200 | 10.8070 | 37886.6 | 70.4948 | 258191.4 | 132168.6 | | | -191618.1 | 3.3322 |
| 4300 | 10.8394 | 38969.0 | 70.7495 | 265253.7 | 133250.9 | | | -191603.4 | 3.1003 |
| 4400 | 10.8674 | 40054.4 | 70.9990 | 272341.2 | 134336.3 | | | -191590.8 | 2.8790 |
| 4500 | 10.8915 | 41142.3 | 71.2435 | 279453.3 | 135424.3 | | | -191580.6 | 2.6676 |
| 4600 | 10.9118 | 42232.5 | 71.4831 | 286589.7 | 136514.5 | | | -191573.5 | 2.4653 |
| 4700 | 10.9287 | 43324.6 | 71.7180 | 293749.8 | 137606.5 | | | -191569.8 | 2.2717 |
| 4800 | 10.9423 | 44418.2 | 71.9482 | 300933.1 | 138700.1 | | | -191570.0 | 2.0861 |
| 4900 | 10.9530 | 45513.0 | 72.1739 | 308139.3 | 139794.9 | | | -191574.4 | 1.9081 |
| 5000 | 10.9609 | 46608.7 | 72.3953 | 315367.8 | 140890.6 | | | -191583.5 | 1.7372 |
| 5100 | 10.9663 | 47705.1 | 72.6124 | 322618.2 | 141987.0 | | | -191597.5 | 1.5733 |
| 5200 | 10.9695 | 48801.9 | 72.8254 | 329890.1 | 143083.8 | | | -191616.7 | 1.4151 |
| 5300 | 10.9706 | 49898.9 | 73.0343 | 337183.1 | 144180.8 | | | -191641.4 | 1.2632 |
| 5400 | 10.9698 | 50995.9 | 73.2394 | 344496.9 | 145277.9 | | | -191671.7 | 1.1168 |
| 5500 | 10.9673 | 52092.8 | 73.4407 | 351830.9 | 146374.7 | | | -191707.9 | 0.9758 |
| 5600 | 10.9634 | 53189.3 | 73.6382 | 359184.9 | 147471.3 | | | -191750.1 | 0.8397 |
| 5700 | 10.9581 | 54285.4 | 73.8323 | 366558.4 | 148567.4 | | | -191798.4 | 0.7084 |
| 5800 | 10.9516 | 55380.9 | 74.0228 | 373951.2 | 149662.9 | | | -191853.0 | 0.5816 |
| 5900 | 10.9441 | 56475.7 | 74.2099 | 381362.9 | 150757.6 | | | -191913.9 | 0.4591 |
| 6000 | 10.9356 | 57569.7 | 74.3938 | 388793.1 | 151851.6 | | | -191981.2 | 0.3406 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(74) C_2N_2 (gas); molecular weight, 52.038

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 70812.9 | 73387.6 | ----- | -491751.0 | ----- |
| 100 | 8.7572 | 744.7 | 45.6895 | 3824.2 | 71557.6 | 73409.2 | -158.8843 | -493140.4 | 1059.9493 |
| 200 | 11.7225 | 1777.8 | 52.7314 | 8768.5 | 72590.7 | 73591.0 | -78.6072 | -494106.1 | 520.6613 |
| 298.15 | 13.5815 | 3027.1 | 57.7889 | 14202.6 | 73840.0 | 73840.0 | -52.0969 | -494811.0 | 342.8099 |
| 300 | 13.6085 | 3052.3 | 57.8730 | 14309.6 | 73865.1 | 73844.9 | -51.7632 | -494822.6 | 340.5732 |
| 400 | 14.7827 | 4475.9 | 61.9604 | 20308.3 | 75288.8 | 74077.1 | -38.2950 | -495388.1 | 250.4097 |
| 500 | 15.6233 | 5998.0 | 65.3533 | 26678.7 | 76810.8 | 74258.7 | -30.1910 | -495854.4 | 196.2545 |
| 600 | 16.3108 | 7595.6 | 68.2643 | 33363.0 | 78408.5 | 74388.9 | -24.7768 | -496244.8 | 160.1195 |
| 700 | 16.9040 | 9257.0 | 70.8242 | 40319.9 | 80069.9 | 74474.9 | -20.9038 | -496571.2 | 134.2900 |
| 800 | 17.4196 | 10973.8 | 73.1158 | 47518.9 | 81786.6 | 74528.5 | -17.9963 | -496842.1 | 114.9061 |
| 900 | 17.8629 | 12738.5 | 75.1938 | 54936.0 | 83551.3 | 74560.4 | -15.7337 | -497065.0 | 99.8223 |
| 1000 | 18.2425 | 14544.2 | 77.0960 | 62551.8 | 85357.1 | 74578.3 | -13.9230 | -497246.7 | 87.7502 |
| 1100 | 18.5656 | 16385.1 | 78.8503 | 70350.3 | 87197.9 | 74586.1 | -12.4412 | -497393.3 | 77.8699 |
| 1200 | 18.8403 | 18255.7 | 80.4778 | 78317.6 | 89068.6 | 74584.8 | -11.2064 | -497510.2 | 69.6341 |
| 1300 | 19.0740 | 20151.8 | 81.9953 | 86442.2 | 90964.6 | 74574.3 | -10.1616 | -497601.8 | 62.6638 |
| 1400 | 19.2733 | 22069.4 | 83.4163 | 94713.5 | 92882.3 | 74554.7 | -9.2662 | -497672.1 | 56.6884 |
| 1500 | 19.4441 | 24005.5 | 84.7520 | 103122.6 | 94818.3 | 74526.9 | -8.4905 | -497724.3 | 51.5090 |
| 1600 | 19.5910 | 25957.4 | 86.0117 | 111661.4 | 96770.3 | 74491.8 | -7.8120 | -497761.3 | 46.9766 |
| 1700 | 19.7179 | 27923.0 | 87.2033 | 120322.7 | 98735.9 | 74450.0 | -7.2136 | -497785.6 | 42.9772 |
| 1800 | 19.8281 | 29900.4 | 88.3336 | 129100.0 | 100713.3 | 74401.9 | -6.6821 | -497799.1 | 39.4221 |
| 1900 | 19.9243 | 31888.2 | 89.4083 | 137987.5 | 102701.0 | 74347.5 | -6.2068 | -497803.9 | 36.2411 |
| 2000 | 20.0087 | 33884.9 | 90.4324 | 146980.0 | 104697.8 | 74286.9 | -5.7794 | -497801.5 | 33.3782 |
| 2100 | 20.0829 | 35889.6 | 91.4105 | 156072.5 | 106702.4 | 74220.5 | -5.3931 | -497793.4 | 30.7880 |
| 2200 | 20.1487 | 37901.2 | 92.3463 | 165260.7 | 108714.1 | 74149.0 | -5.0421 | -497780.8 | 28.4334 |
| 2300 | 20.2071 | 39919.1 | 93.2433 | 174540.4 | 110731.9 | 74072.9 | -4.7221 | -497765.0 | 26.2835 |
| 2400 | 20.2592 | 41942.4 | 94.1044 | 183908.1 | 112755.3 | 73992.3 | -4.4290 | -497747.0 | 24.3129 |
| 2500 | 20.3058 | 43970.7 | 94.9324 | 193360.2 | 114783.6 | 73907.7 | -4.1596 | -497727.6 | 22.4999 |
| 2600 | 20.3478 | 46003.4 | 95.7296 | 202893.6 | 116816.3 | 73819.4 | -3.9113 | -497707.9 | 20.8265 |
| 2700 | 20.3856 | 48040.1 | 96.4983 | 212505.2 | 118853.0 | 73727.7 | -3.6816 | -497688.6 | 19.2772 |
| 2800 | 20.4199 | 50080.4 | 97.2403 | 222192.3 | 120893.3 | 73632.6 | -3.4686 | -497670.5 | 17.8385 |
| 2900 | 20.4510 | 52124.0 | 97.9574 | 231952.4 | 122936.9 | 73534.3 | -3.2706 | -497654.2 | 16.4991 |
| 3000 | 20.4794 | 54170.5 | 98.6512 | 241783.0 | 124983.4 | 73432.8 | -3.0860 | -497640.4 | 15.2490 |
| 3100 | 20.5053 | 56219.8 | 99.3231 | 251681.9 | 127032.7 | 73328.0 | -2.9135 | -497629.8 | 14.0797 |
| 3200 | 20.5290 | 58271.5 | 99.9745 | 261647.0 | 129084.4 | 73220.2 | -2.7521 | -497622.9 | 12.9834 |
| 3300 | 20.5508 | 60325.5 | 100.6066 | 27176.2 | 131138.4 | 73109.5 | -2.6007 | -497620.3 | 11.9535 |
| 3400 | 20.5709 | 62381.6 | 101.2204 | 281767.7 | 133194.5 | 72996.3 | -2.4584 | -497622.5 | 10.9843 |
| 3500 | 20.5895 | 64439.7 | 101.8170 | 291919.7 | 135252.5 | 72880.5 | -2.3244 | -497630.1 | 10.0704 |
| 3600 | 20.6066 | 66499.5 | 102.3972 | 302130.5 | 137312.4 | 72762.3 | -2.1981 | -497643.5 | 9.2073 |
| 3700 | 20.6226 | 68561.0 | 102.9621 | 312398.6 | 139373.8 | 72641.3 | -2.0789 | -497653.1 | 8.3908 |
| 3800 | 20.6374 | 70624.0 | 103.5122 | 322722.5 | 141436.8 | 72517.8 | -1.9660 | -497689.6 | 7.6173 |
| 3900 | 20.6512 | 72688.4 | 104.0485 | 333100.6 | 143501.3 | 72391.9 | -1.8592 | -497723.2 | 6.8833 |
| 4000 | 20.6640 | 74754.2 | 104.5715 | 343531.7 | 145567.0 | 72263.6 | -1.7579 | -497764.4 | 6.1860 |
| 4100 | 20.6761 | 76821.2 | 105.0819 | 354014.5 | 147634.0 | | | -497813.6 | 5.5227 |
| 4200 | 20.6873 | 78889.4 | 105.5802 | 364547.7 | 149702.2 | | | -497871.1 | 4.8909 |
| 4300 | 20.6979 | 80958.6 | 106.0672 | 375130.1 | 151771.5 | | | -497937.2 | 4.2884 |
| 4400 | 20.7079 | 83028.9 | 106.5431 | 385760.7 | 153841.8 | | | -498012.4 | 3.7132 |
| 4500 | 20.7173 | 85100.2 | 107.0086 | 396438.4 | 155913.1 | | | -498096.8 | 3.1635 |
| 4600 | 20.7261 | 87172.4 | 107.4640 | 407162.1 | 157985.2 | | | -498190.7 | 2.6376 |
| 4700 | 20.7345 | 89245.4 | 107.9099 | 417930.9 | 160058.3 | | | -498294.4 | 2.1339 |
| 4800 | 20.7424 | 91319.2 | 108.3465 | 428743.8 | 162132.1 | | | -498408.1 | 1.6512 |
| 4900 | 20.7499 | 93393.9 | 108.7742 | 439599.9 | 164206.7 | | | -498532.0 | 1.1880 |
| 5000 | 20.7570 | 95469.2 | 109.1935 | 450498.4 | 166282.1 | | | -498666.2 | 0.7433 |
| 5100 | 20.7637 | 97545.2 | 109.6046 | 461438.3 | 168358.1 | | | -498810.9 | 0.3159 |
| 5200 | 20.7702 | 99621.9 | 110.0079 | 472419.0 | 170434.8 | | | -498966.3 | -0.0953 |
| 5300 | 20.7763 | 101699.3 | 110.4036 | 483439.7 | 172512.1 | | | -499132.3 | -0.4910 |
| 5400 | 20.7821 | 103777.2 | 110.7920 | 494499.5 | 174590.0 | | | -499309.1 | -0.8722 |
| 5500 | 20.7877 | 105855.7 | 111.1734 | 505597.8 | 176668.5 | | | -499496.7 | -1.2396 |
| 5600 | 20.7930 | 107934.7 | 111.5480 | 516733.9 | 178747.6 | | | -499695.1 | -1.5941 |
| 5700 | 20.7982 | 110014.3 | 111.9160 | 527907.2 | 180827.1 | | | -499904.4 | -1.9363 |
| 5800 | 20.8030 | 112094.3 | 112.2778 | 539116.9 | 182907.2 | | | -500124.5 | -2.2568 |
| 5900 | 20.8077 | 114174.9 | 112.6335 | 550362.6 | 184987.7 | | | -500355.3 | -2.5863 |
| 6000 | 20.8123 | 116255.9 | 112.9832 | 561643.4 | 187068.7 | | | -500596.9 | -2.8953 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(75) CO (gas); molecular weight, 28.011

| T, °K | C_p° , cal/mole °K | $H_f^\circ - H_o^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_o^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -28488.3 | -27199.7 | ----- | -256176.0 | ----- |
| 100 | 6.9564 | 693.8 | 39.6169 | 3267.9 | -27794.5 | -26867.4 | 62.8006 | -256579.9 | 555.2357 |
| 200 | 6.9574 | 1389.4 | 44.4390 | 7498.4 | -27098.8 | -26597.4 | 33.5628 | -256944.2 | 274.7150 |
| 298.15 | 6.9652 | 2072.6 | 47.2178 | 12005.4 | -26415.7 | -26415.7 | 24.0264 | -257273.2 | 182.2370 |
| 300 | 6.9656 | 2085.4 | 47.2609 | 12092.8 | -26402.8 | -26413.0 | 23.9070 | -257279.2 | 181.0741 |
| 400 | 7.0129 | 2783.9 | 49.2699 | 16924.1 | -25704.4 | -26316.7 | 19.1060 | -257596.5 | 134.1931 |
| 500 | 7.1211 | 3490.1 | 50.8453 | 21932.6 | -24998.2 | -26295.0 | 16.2320 | -257898.2 | 106.3302 |
| 600 | 7.2760 | 4209.7 | 52.1568 | 27084.4 | -24278.6 | -26330.2 | 14.3156 | -258182.1 | 87.2334 |
| 700 | 7.4507 | 4945.9 | 53.2914 | 32358.1 | -23542.3 | -26407.0 | 12.9438 | -258446.7 | 73.7927 |
| 800 | 7.6246 | 5699.8 | 54.2978 | 37738.5 | -22788.5 | -26512.0 | 11.9114 | -258692.1 | 63.7022 |
| 900 | 7.7860 | 6470.4 | 55.2053 | 43214.3 | -22017.8 | -26635.2 | 11.1050 | -258919.4 | 55.8469 |
| 1000 | 7.9305 | 7256.4 | 56.0333 | 48776.9 | -21231.8 | -26769.8 | 10.4566 | -259130.6 | 49.5573 |
| 1100 | 8.0571 | 8055.9 | 56.7952 | 54418.8 | -20432.3 | -26912.1 | 9.9234 | -259327.7 | 44.4071 |
| 1200 | 8.1671 | 8867.3 | 57.5011 | 60134.1 | -19621.0 | -27060.8 | 9.4767 | -259512.5 | 40.1122 |
| 1300 | 8.2623 | 9688.9 | 58.1587 | 65917.4 | -18799.4 | -27215.3 | 9.0966 | -259686.7 | 36.4755 |
| 1400 | 8.3447 | 10519.3 | 58.7741 | 71764.4 | -17968.9 | -27375.1 | 8.7688 | -259851.9 | 33.3563 |
| 1500 | 8.4161 | 11357.4 | 59.3523 | 77671.0 | -17130.8 | -27539.9 | 8.4831 | -260009.5 | 30.6513 |
| 1600 | 8.4783 | 12202.2 | 59.8975 | 83633.7 | -16286.0 | -27709.0 | 8.2316 | -260160.5 | 28.2830 |
| 1700 | 8.5327 | 13052.8 | 60.4131 | 89649.5 | -15435.4 | -27882.3 | 8.0083 | -260306.0 | 26.1922 |
| 1800 | 8.5805 | 13908.5 | 60.9022 | 95715.5 | -14579.7 | -28059.7 | 7.8085 | -260446.8 | 24.3326 |
| 1900 | 8.6227 | 14768.7 | 61.3673 | 101829.2 | -13719.5 | -28241.2 | 7.6287 | -260583.8 | 22.6679 |
| 2000 | 8.6603 | 15632.9 | 61.8106 | 107988.2 | -12855.3 | -28426.9 | 7.4657 | -260717.7 | 21.1689 |
| 2100 | 8.6938 | 16500.7 | 62.2339 | 114190.6 | -11987.6 | -28616.9 | 7.3173 | -260849.1 | 19.8120 |
| 2200 | 8.7238 | 17371.6 | 62.6391 | 120434.4 | -11116.7 | -28810.6 | 7.1815 | -260978.5 | 18.5778 |
| 2300 | 8.7509 | 18245.3 | 63.0275 | 126717.9 | -10242.9 | -29008.1 | 7.0567 | -261106.5 | 17.4504 |
| 2400 | 8.7755 | 19121.7 | 63.4004 | 133039.4 | -9366.6 | -29209.3 | 6.9414 | -261233.6 | 16.4164 |
| 2500 | 8.7979 | 20000.4 | 63.7591 | 139397.5 | -8487.9 | -29414.1 | 6.8347 | -261360.0 | 15.4667 |
| 2600 | 8.8184 | 20881.2 | 64.1046 | 145790.8 | -7607.1 | -29622.1 | 6.7354 | -261486.2 | 14.5857 |
| 2700 | 8.8372 | 21764.0 | 64.4378 | 152218.0 | -6724.3 | -29833.5 | 6.6429 | -261612.5 | 13.7715 |
| 2800 | 8.8546 | 22648.6 | 64.7595 | 158677.9 | -5839.7 | -30048.1 | 6.5563 | -261739.2 | 13.0151 |
| 2900 | 8.8706 | 23534.8 | 65.0705 | 165169.5 | -4953.4 | -30265.8 | 6.4752 | -261866.5 | 12.3105 |
| 3000 | 8.8856 | 24422.7 | 65.3715 | 171691.7 | -4065.6 | -30486.7 | 6.3989 | -261994.6 | 11.6525 |
| 3100 | 8.8996 | 25311.9 | 65.6630 | 178243.5 | -3176.3 | -30710.5 | 6.3270 | -262123.8 | 11.0367 |
| 3200 | 8.9127 | 26202.6 | 65.9458 | 184824.0 | -2285.7 | -30937.4 | 6.2591 | -262254.2 | 10.4591 |
| 3300 | 8.9250 | 27094.4 | 66.2203 | 191432.4 | -1393.8 | -31167.1 | 6.1948 | -262385.9 | 9.9162 |
| 3400 | 8.9366 | 27987.5 | 66.4869 | 198067.8 | -500.7 | -31399.4 | 6.1339 | -262519.1 | 9.4050 |
| 3500 | 8.9475 | 28881.7 | 66.7461 | 204729.5 | 393.5 | -31634.2 | 6.0760 | -262653.8 | 8.9228 |
| 3600 | 8.9579 | 29777.0 | 66.9983 | 211416.8 | 1288.8 | -31871.5 | 6.0209 | -262790.1 | 8.4671 |
| 3700 | 8.9678 | 30673.3 | 67.2439 | 218128.9 | 2185.1 | -32111.2 | 5.9685 | -262928.1 | 8.0359 |
| 3800 | 8.9773 | 31570.6 | 67.4831 | 224865.3 | 3082.3 | -32353.4 | 5.9184 | -263067.8 | 7.6271 |
| 3900 | 8.9863 | 32468.7 | 67.7164 | 231625.4 | 3980.5 | -32597.8 | 5.8705 | -263209.3 | 7.2391 |
| 4000 | 8.9950 | 33367.8 | 67.9441 | 238408.4 | 4879.6 | -32844.4 | 5.8246 | -263352.5 | 6.8702 |
| 4100 | 9.0033 | 34267.7 | 68.1663 | 245214.0 | 5779.5 | -263497.6 | | | 6.5192 |
| 4200 | 9.0113 | 35168.5 | 68.3833 | 252041.5 | 6680.2 | -263644.4 | | | 6.1847 |
| 4300 | 9.0190 | 36070.0 | 68.5955 | 258890.5 | 7581.7 | -263793.1 | | | 5.8656 |
| 4400 | 9.0265 | 36972.3 | 68.8029 | 265760.5 | 8484.0 | -263943.5 | | | 5.5608 |
| 4500 | 9.0337 | 37875.3 | 69.0058 | 272650.9 | 9387.0 | -264095.6 | | | 5.2694 |
| 4600 | 9.0407 | 38779.0 | 69.2045 | 279561.5 | 10290.7 | -264249.4 | | | 4.9905 |
| 4700 | 9.0475 | 39683.4 | 69.3990 | 286491.7 | 11195.2 | -264405.0 | | | 4.7233 |
| 4800 | 9.0542 | 40588.5 | 69.5895 | 293441.1 | 12100.2 | -264562.2 | | | 4.4671 |
| 4900 | 9.0606 | 41494.2 | 69.7763 | 300409.5 | 13006.0 | -264721.0 | | | 4.2212 |
| 5000 | 9.0669 | 42400.6 | 69.9594 | 307396.3 | 13912.4 | -264881.4 | | | 3.9850 |
| 5100 | 9.0731 | 43307.6 | 70.1390 | 314401.2 | 14819.4 | -265043.3 | | | 3.7579 |
| 5200 | 9.0791 | 44215.2 | 70.3152 | 321424.0 | 15727.0 | -265206.7 | | | 3.5395 |
| 5300 | 9.0850 | 45123.4 | 70.4882 | 328464.2 | 16635.2 | -265371.5 | | | 3.3291 |
| 5400 | 9.0908 | 46032.2 | 70.6581 | 335521.5 | 17544.0 | -265537.7 | | | 3.1264 |
| 5500 | 9.0964 | 46941.6 | 70.8250 | 342595.7 | 18453.3 | -265705.3 | | | 2.9309 |
| 5600 | 9.1020 | 47851.5 | 70.9889 | 349686.4 | 19363.2 | -265874.2 | | | 2.7424 |
| 5700 | 9.1075 | 48762.0 | 71.1501 | 356793.4 | 20273.7 | -266044.2 | | | 2.5603 |
| 5800 | 9.1129 | 49673.0 | 71.3085 | 363916.3 | 21184.7 | -266215.5 | | | 2.3843 |
| 5900 | 9.1182 | 50584.5 | 71.4643 | 371055.0 | 22096.3 | -266388.0 | | | 2.2143 |
| 6000 | 9.1234 | 51496.6 | 71.6176 | 378209.1 | 23008.4 | -266561.5 | | | 2.0498 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(76) CO₂ (gas); molecular weight, 44.011

| T, °K | C _p ^o , cal/mole °K | H _f ^o - H _o ^o , cal/mole | S _f ^o , cal/mole °K | -(F _f ^o - H _o ^o), cal/mole | H _f ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| C | ----- | 0 | ----- | 0 | -96290.0 | -93964.1 | ----- | -381926.9 | ----- |
| 100 | 6.9806 | 695.5 | 42.7568 | 3580.2 | -95594.5 | -93976.8 | 205.6239 | -382856.6 | 824.7910 |
| 200 | 7.7331 | 1422.6 | 47.7676 | 8130.9 | -94867.4 | -94023.3 | 102.9158 | -383746.8 | 406.0574 |
| 298.15 | 8.8740 | 2238.2 | 51.0701 | 12988.3 | -94051.8 | -94051.8 | 69.0895 | -384466.0 | 267.9023 |
| 300 | 8.8942 | 2254.6 | 51.1250 | 13082.9 | -94035.4 | -94052.1 | 68.6644 | -384478.1 | 266.1644 |
| 400 | 9.8762 | 3195.0 | 53.8234 | 18334.4 | -93095.0 | -94068.9 | 51.5346 | -385071.4 | 196.0941 |
| 500 | 10.6646 | 4223.4 | 56.1150 | 23834.1 | -92066.6 | -94090.6 | 41.2547 | -385561.4 | 153.9919 |
| 600 | 11.3098 | 5323.1 | 58.1183 | 29547.8 | -90966.8 | -94123.3 | 34.3995 | -385971.5 | 125.8907 |
| 700 | 11.8456 | 6481.7 | 59.9032 | 35450.5 | -89808.3 | -94166.7 | 29.5009 | -386317.7 | 105.7986 |
| 800 | 12.2929 | 7689.3 | 61.5151 | 41522.7 | -88600.7 | -94216.8 | 25.8251 | -386611.4 | 90.7169 |
| 900 | 12.6670 | 8937.9 | 62.9852 | 47748.8 | -87352.1 | -94269.1 | 22.9646 | -386861.9 | 78.9785 |
| 1000 | 12.9804 | 10220.7 | 64.3365 | 54115.8 | -86069.3 | -94320.7 | 20.6750 | -387076.5 | 69.5821 |
| 1100 | 13.2438 | 11532.3 | 65.5864 | 60612.8 | -84757.7 | -94370.4 | 18.8006 | -387261.1 | 61.8901 |
| 1200 | 13.4660 | 12868.1 | 66.7486 | 67230.2 | -83421.9 | -94418.9 | 17.2378 | -387420.6 | 55.4773 |
| 1300 | 13.6545 | 14224.4 | 67.8341 | 73959.9 | -82056.6 | -94467.0 | 15.9148 | -387559.0 | 50.0490 |
| 1400 | 13.8154 | 15598.1 | 68.8520 | 80794.7 | -80691.9 | -94515.6 | 14.7802 | -387679.5 | 45.3946 |
| 1500 | 13.9536 | 16986.7 | 69.8100 | 87728.3 | -79303.3 | -94565.2 | 13.7963 | -387784.9 | 41.3596 |
| 1600 | 14.0732 | 18388.2 | 70.7145 | 94755.0 | -77901.8 | -94616.1 | 12.9350 | -387877.3 | 37.8281 |
| 1700 | 14.1773 | 19800.8 | 71.5708 | 101869.6 | -76489.2 | -94668.8 | 12.1746 | -387958.8 | 34.7113 |
| 1800 | 14.2686 | 21223.2 | 72.3838 | 109067.7 | -75066.8 | -94723.8 | 11.4983 | -388030.8 | 31.9404 |
| 1900 | 14.3491 | 22654.2 | 73.1575 | 116345.1 | -73635.8 | -94781.8 | 10.8929 | -388094.9 | 29.4606 |
| 2000 | 14.4206 | 24092.7 | 73.8954 | 123698.0 | -72197.3 | -94843.2 | 10.3476 | -388152.2 | 27.2285 |
| 2100 | 14.4844 | 25538.0 | 74.6005 | 131123.0 | -70752.0 | -94908.3 | 9.8539 | -388203.8 | 25.2087 |
| 2200 | 14.5418 | 26989.4 | 75.2757 | 138617.1 | -69300.6 | -94977.2 | 9.4048 | -388250.6 | 23.3723 |
| 2300 | 14.5937 | 28446.2 | 75.9232 | 146177.3 | -67843.8 | -95049.9 | 8.9945 | -388293.5 | 21.6953 |
| 2400 | 14.6409 | 29908.0 | 76.5454 | 153800.9 | -66382.0 | -95126.7 | 8.6180 | -388333.1 | 20.1580 |
| 2500 | 14.6840 | 31374.3 | 77.1439 | 161485.5 | -64915.7 | -95207.6 | 8.2714 | -388370.2 | 18.7435 |
| 2600 | 14.7235 | 32844.7 | 77.7206 | 169228.9 | -63445.3 | -95292.4 | 7.9511 | -388405.4 | 17.4377 |
| 2700 | 14.7600 | 34318.9 | 78.2770 | 177029.0 | -61971.1 | -95381.3 | 7.6544 | -388439.1 | 16.2285 |
| 2800 | 14.7938 | 35796.6 | 78.8144 | 184883.7 | -60493.4 | -95474.2 | 7.3785 | -388471.8 | 15.1056 |
| 2900 | 14.8253 | 37277.5 | 79.3341 | 192791.3 | -59012.5 | -95571.2 | 7.1214 | -388504.1 | 14.0600 |
| 3000 | 14.8547 | 38761.5 | 79.8372 | 200750.0 | -57528.4 | -95672.2 | 6.8812 | -388536.2 | 13.0841 |
| 3100 | 14.8823 | 40248.4 | 80.3247 | 208758.2 | -56041.6 | -95777.2 | 6.6563 | -388568.5 | 12.1710 |
| 3200 | 14.9082 | 41737.9 | 80.7976 | 216814.4 | -54552.0 | -95886.1 | 6.4452 | -388601.3 | 11.3149 |
| 3300 | 14.9328 | 43230.0 | 81.2567 | 224917.3 | -53060.0 | -95998.8 | 6.2466 | -388634.9 | 10.5107 |
| 3400 | 14.9560 | 44724.5 | 81.7029 | 233065.3 | -51565.5 | -96115.0 | 6.0595 | -388669.6 | 9.7537 |
| 3500 | 14.9781 | 46221.2 | 82.1367 | 241257.4 | -50068.8 | -96234.6 | 5.8829 | -388705.4 | 9.0399 |
| 3600 | 14.9992 | 47720.1 | 82.5590 | 249492.3 | -48569.9 | -96357.5 | 5.7159 | -388742.7 | 8.3657 |
| 3700 | 15.0194 | 49221.0 | 82.9702 | 257768.9 | -47069.0 | -96483.8 | 5.5577 | -388781.6 | 7.7278 |
| 3800 | 15.0387 | 50723.9 | 83.3710 | 266086.0 | -45566.1 | -96613.3 | 5.4076 | -388822.2 | 7.1235 |
| 3900 | 15.0573 | 52228.7 | 83.7619 | 274442.7 | -44061.3 | -96745.8 | 5.2651 | -388864.6 | 6.5501 |
| 4000 | 15.0752 | 53735.3 | 84.1434 | 282838.1 | -42554.7 | -96881.1 | 5.1294 | -388908.9 | 6.0053 |
| 4100 | 15.0925 | 55243.7 | 84.5158 | 291271.1 | -41046.3 | -97018.6 | 5.0000 | -388955.2 | 5.4870 |
| 4200 | 15.1092 | 56753.8 | 84.8797 | 299740.9 | -39536.2 | -97157.1 | 4.8764 | -389003.5 | 4.9934 |
| 4300 | 15.1253 | 58265.5 | 85.2354 | 308246.8 | -38024.4 | -97296.6 | 4.7577 | -389053.9 | 4.5226 |
| 4400 | 15.1411 | 59778.9 | 85.5833 | 316787.8 | -36511.1 | -97437.1 | 4.6437 | -389106.4 | 4.0732 |
| 4500 | 15.1563 | 61293.7 | 85.9238 | 325363.2 | -34996.3 | -97578.6 | 4.5349 | -389161.1 | 3.6437 |
| 4600 | 15.1712 | 62810.1 | 86.2570 | 333972.3 | -33479.9 | -97721.1 | 4.4311 | -389217.8 | 3.2328 |
| 4700 | 15.1857 | 64328.0 | 86.5835 | 342614.4 | -31962.0 | -97864.6 | 4.3322 | -389276.7 | 2.8394 |
| 4800 | 15.1998 | 65847.2 | 86.9033 | 351288.8 | -30442.7 | -98008.1 | 4.2381 | -389337.7 | 2.4623 |
| 4900 | 15.2137 | 67367.9 | 87.2169 | 359994.8 | -28922.1 | -98152.6 | 4.1486 | -389400.8 | 2.1005 |
| 5000 | 15.2272 | 68890.0 | 87.5244 | 368731.9 | -27400.0 | -98298.1 | 4.0644 | -389465.9 | 1.7531 |
| 5100 | 15.2405 | 70413.4 | 87.8261 | 377499.5 | -25876.6 | -98444.6 | 3.9853 | -389533.1 | 1.4193 |
| 5200 | 15.2535 | 71938.1 | 88.1221 | 386297.0 | -24351.9 | -98592.1 | 3.9111 | -389602.2 | 1.0983 |
| 5300 | 15.2662 | 73464.0 | 88.4128 | 395123.8 | -22826.0 | -98740.6 | 3.8417 | -389673.3 | 0.7893 |
| 5400 | 15.2787 | 74991.3 | 88.6983 | 403979.3 | -21298.7 | -98890.1 | 3.7769 | -389746.2 | 0.4917 |
| 5500 | 15.2911 | 76519.8 | 88.9787 | 412863.2 | -19770.2 | -99040.6 | 3.7167 | -389821.0 | 0.2049 |
| 5600 | 15.3032 | 78049.5 | 89.2544 | 421774.9 | -18240.5 | -99192.1 | 3.6609 | -389897.5 | -0.0717 |
| 5700 | 15.3151 | 79580.4 | 89.5253 | 430714.0 | -16709.6 | -99344.6 | 3.6094 | -389975.8 | -0.3387 |
| 5800 | 15.3269 | 81112.5 | 89.7918 | 439679.8 | -15177.5 | -99498.1 | 3.5621 | -390055.7 | -0.5965 |
| 5900 | 15.3384 | 82645.8 | 90.0539 | 448672.2 | -13644.2 | -99652.6 | 3.5189 | -390137.2 | -0.8456 |
| 6000 | 15.3499 | 84180.2 | 90.3118 | 457690.5 | -12109.8 | -99808.1 | 3.4800 | -390220.2 | -1.0865 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(77) COCl₂ (gas); molecular weight, 98.925

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -56378.3 | -52896.2 | ----- | -338969.3 | ----- |
| 100 | 8.7359 | 811.7 | 55.8406 | 4772.3 | -55566.5 | -53141.9 | 113.8988 | -340248.9 | 726.7896 |
| 200 | 11.5767 | 1824.9 | 62.7484 | 10724.8 | -54553.4 | -53280.1 | 95.7588 | -341293.8 | 354.5328 |
| 298.15 | 13.8070 | 3078.3 | 67.8174 | 17141.5 | -53300.0 | -53300.0 | 36.5880 | -342058.8 | 231.6399 |
| 300 | 13.8404 | 3103.8 | 67.9029 | 17267.0 | -53274.4 | -53299.6 | 36.3470 | -342071.4 | 230.0937 |
| 400 | 15.2951 | 4565.8 | 72.0987 | 24273.7 | -51812.5 | -53269.1 | 26.6424 | -342685.8 | 167.7445 |
| 500 | 16.2788 | 6147.4 | 75.6238 | 31664.5 | -50230.9 | -53226.0 | 20.8239 | -343193.9 | 130.2728 |
| 600 | 16.9887 | 7812.5 | 78.6578 | 39382.1 | -48565.7 | -53184.5 | 16.9480 | -343621.1 | 105.2573 |
| 700 | 17.5209 | 9539.2 | 81.3184 | 47383.7 | -46839.0 | -53149.4 | 14.1815 | -343982.6 | 87.3684 |
| 800 | 17.9287 | 11312.6 | 83.6858 | 55636.1 | -45065.7 | -53120.2 | 12.1079 | -344289.8 | 73.9386 |
| 900 | 18.2460 | 13122.0 | 85.8166 | 64113.0 | -43256.3 | -53095.1 | 10.4960 | -344552.6 | 63.4886 |
| 1000 | 18.4962 | 14959.6 | 87.7525 | 72792.9 | -41418.7 | -53072.5 | 9.2070 | -344778.6 | 55.1154 |
| 1100 | 18.6957 | 16819.5 | 89.5250 | 81658.0 | -39558.8 | -53052.1 | 8.1528 | -344974.6 | 48.2637 |
| 1200 | 18.8568 | 18697.4 | 91.1589 | 90693.3 | -37680.8 | -53034.7 | 7.2746 | -345145.5 | 42.5009 |
| 1300 | 18.9883 | 20589.9 | 92.6737 | 99885.9 | -35788.4 | -53021.2 | 6.5317 | -345295.8 | 37.7147 |
| 1400 | 19.0967 | 22494.3 | 94.0849 | 109224.6 | -33884.0 | -53012.1 | 5.8951 | -345428.8 | 33.5677 |
| 1500 | 19.1869 | 24408.6 | 95.4056 | 118699.8 | -31969.6 | -53007.7 | 5.3435 | -345547.2 | 29.9723 |
| 1600 | 19.2627 | 26331.2 | 96.6464 | 128303.1 | -30047.0 | -53007.9 | 4.8608 | -345653.6 | 26.8254 |
| 1700 | 19.3269 | 28260.8 | 97.8162 | 138026.7 | -28117.5 | -53012.9 | 4.4349 | -345749.7 | 24.0478 |
| 1800 | 19.3817 | 30196.3 | 98.9225 | 147864.2 | -26182.0 | -53022.8 | 4.0562 | -345837.2 | 21.5782 |
| 1900 | 19.4289 | 32136.9 | 99.9717 | 157809.3 | -24241.4 | -53037.9 | 3.7174 | -345917.6 | 19.3681 |
| 2000 | 19.4696 | 34081.9 | 100.9693 | 167856.8 | -22296.4 | -53058.3 | 3.4123 | -345991.9 | 17.3785 |
| 2100 | 19.5051 | 36030.6 | 101.9201 | 178001.6 | -20347.6 | -53084.1 | 3.1362 | -346061.4 | 15.5780 |
| 2200 | 19.5362 | 37982.7 | 102.8282 | 188239.4 | -18395.5 | -53115.1 | 2.8850 | -346126.8 | 13.9409 |
| 2300 | 19.5635 | 39937.7 | 103.6973 | 198566.0 | -16440.5 | -53151.2 | 2.6555 | -346189.0 | 12.4458 |
| 2400 | 19.5877 | 41895.3 | 104.5304 | 208977.7 | -14482.9 | -53192.4 | 2.4450 | -346248.7 | 11.0751 |
| 2500 | 19.6092 | 43855.2 | 105.3305 | 219471.0 | -12523.1 | -53238.6 | 2.2512 | -346306.5 | 9.8139 |
| 2600 | 19.6284 | 45817.1 | 106.0999 | 230042.7 | -10561.2 | -53289.5 | 2.0721 | -346362.9 | 8.6494 |
| 2700 | 19.6456 | 47780.8 | 106.8410 | 240690.0 | -8597.5 | -53345.3 | 1.9061 | -346418.4 | 7.5711 |
| 2800 | 19.6610 | 49746.1 | 107.5558 | 251410.1 | -6632.1 | -53405.8 | 1.7518 | -346473.4 | 6.5696 |
| 2900 | 19.6749 | 51713.0 | 108.2460 | 262200.3 | -4665.3 | -53471.1 | 1.6080 | -346528.3 | 5.6371 |
| 3000 | 19.6875 | 53681.1 | 108.9132 | 273058.5 | -2697.2 | -53540.9 | 1.4736 | -346583.4 | 4.7665 |
| 3100 | 19.6990 | 55650.4 | 109.5589 | 283982.3 | -727.8 | -53615.4 | 1.3477 | -346639.0 | 3.9520 |
| 3200 | 19.7094 | 57620.9 | 110.1845 | 294969.6 | 1242.6 | -53694.4 | 1.2295 | -346695.3 | 3.1883 |
| 3300 | 19.7189 | 59592.3 | 110.7912 | 306018.5 | 3214.0 | -53777.8 | 1.1183 | -346752.5 | 2.4708 |
| 3400 | 19.7277 | 61564.6 | 111.3800 | 317127.2 | 5186.4 | -53865.3 | 1.0135 | -346810.9 | 1.7953 |
| 3500 | 19.7357 | 63537.8 | 111.9519 | 328294.0 | 7159.5 | -53957.0 | 0.9145 | -346870.6 | 1.1584 |
| 3600 | 19.7430 | 65511.7 | 112.5080 | 339517.1 | 9133.5 | -54052.7 | 0.8208 | -346931.6 | 0.5567 |
| 3700 | 19.7498 | 67486.4 | 113.0490 | 350795.1 | 11108.1 | -54152.5 | 0.7320 | -346994.2 | -0.0126 |
| 3800 | 19.7561 | 69461.7 | 113.5758 | 362126.4 | 13083.4 | -54256.2 | 0.6478 | -347058.3 | -0.5520 |
| 3900 | 19.7619 | 71437.6 | 114.0891 | 373509.8 | 15059.3 | -54363.8 | 0.5677 | -347124.1 | -1.0638 |
| 4000 | 19.7673 | 73414.0 | 114.5895 | 384943.8 | 17035.8 | -54475.2 | 0.4915 | -347191.6 | -1.5501 |
| 4100 | 19.7723 | 75391.0 | 115.0776 | 396427.3 | 19012.8 | -54589.5 | - | -347260.9 | -2.0128 |
| 4200 | 19.7769 | 77368.5 | 115.5542 | 407958.9 | 20990.2 | -54706.5 | - | -347332.0 | -2.4536 |
| 4300 | 19.7813 | 79346.4 | 116.0196 | 419537.7 | 22968.1 | -54825.8 | - | -347404.8 | -2.8739 |
| 4400 | 19.7853 | 81324.7 | 116.4744 | 431162.5 | 24946.5 | -54947.5 | - | -347479.5 | -3.2752 |
| 4500 | 19.7891 | 83303.5 | 116.9190 | 442832.3 | 26925.2 | -55071.5 | - | -347556.0 | -3.6588 |
| 4600 | 19.7927 | 85282.5 | 117.3540 | 454546.0 | 28904.3 | -55197.0 | - | -347634.3 | -4.0258 |
| 4700 | 19.7960 | 87262.0 | 117.7797 | 466302.8 | 30883.7 | -55324.0 | - | -347714.3 | -4.3772 |
| 4800 | 19.7991 | 89241.7 | 118.1965 | 478101.6 | 32863.5 | -55452.5 | - | -347796.2 | -4.7141 |
| 4900 | 19.8021 | 91221.8 | 118.6048 | 489941.8 | 34843.5 | -55582.5 | - | -347879.8 | -5.0373 |
| 5000 | 19.8048 | 93202.1 | 119.0049 | 501822.3 | 36823.9 | -55714.0 | - | -347965.1 | -5.3476 |
| 5100 | 19.8074 | 95182.8 | 119.3971 | 513742.5 | 38804.5 | -55847.0 | - | -348052.1 | -5.6459 |
| 5200 | 19.8099 | 97163.6 | 119.7818 | 525701.5 | 40785.4 | -55981.5 | - | -348140.7 | -5.9327 |
| 5300 | 19.8122 | 99144.7 | 120.1591 | 537698.6 | 42766.5 | -56117.5 | - | -348231.0 | -6.2088 |
| 5400 | 19.8144 | 101126.1 | 120.5295 | 549733.1 | 44747.8 | -56255.0 | - | -348322.8 | -6.4748 |
| 5500 | 19.8165 | 103107.6 | 120.8931 | 561804.3 | 46729.3 | -56394.0 | - | -348416.2 | -6.7311 |
| 5600 | 19.8185 | 105089.4 | 121.2502 | 573911.5 | 48711.1 | -56534.5 | - | -348511.1 | -6.9783 |
| 5700 | 19.8203 | 107071.3 | 121.6009 | 586054.1 | 50693.0 | -56676.5 | - | -348607.5 | -7.2170 |
| 5800 | 19.8221 | 109053.4 | 121.9457 | 598231.5 | 52675.2 | -56819.0 | - | -348705.3 | -7.4475 |
| 5900 | 19.8238 | 111035.7 | 122.2845 | 610443.0 | 54657.4 | -56963.0 | - | -348804.4 | -7.6702 |
| 6000 | 19.8254 | 113018.2 | 122.6177 | 622688.2 | 56639.9 | -57108.5 | - | -348904.9 | -7.8855 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(78) COF_2 (gas); molecular weight, 66.011

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -153057.5 | -149659.3 | ----- | -415345.6 | ----- |
| 100 | 8.0042 | 795.5 | 51.9183 | 4396.3 | -152262.0 | -149920.0 | 325.5136 | -416644.9 | 893.6917 |
| 200 | 9.2969 | 1646.8 | 57.7682 | 9906.8 | -151410.7 | -150194.5 | 161.5768 | -417905.2 | 437.8853 |
| 298.15 | 11.2945 | 2657.5 | 61.8529 | 15784.0 | -150400.0 | -150400.0 | 107.5160 | -418973.9 | 287.3867 |
| 300 | 11.3308 | 2678.4 | 61.9229 | 15898.5 | -150379.1 | -150403.1 | 106.8361 | -418992.0 | 285.4929 |
| 400 | 13.0927 | 3903.0 | 65.4336 | 22270.5 | -149154.5 | -150550.8 | 79.4324 | -419863.3 | 209.1129 |
| 500 | 14.4608 | 5283.7 | 68.5089 | 28970.7 | -147773.8 | -150660.0 | 62.9760 | -420554.7 | 163.1982 |
| 600 | 15.5060 | 6784.4 | 71.2421 | 35960.9 | -146273.1 | -150745.6 | 51.9979 | -421107.3 | 132.5426 |
| 700 | 16.3066 | 8376.8 | 73.6952 | 43209.8 | -144680.7 | -150816.5 | 44.1523 | -421554.4 | 110.6196 |
| 800 | 16.9247 | 10039.6 | 75.9147 | 50692.1 | -143017.8 | -150876.7 | 38.2656 | -421920.7 | 94.1615 |
| 900 | 17.4067 | 11757.2 | 77.9371 | 58386.2 | -141300.3 | -150927.7 | 33.6853 | -422224.8 | 81.3505 |
| 1000 | 17.7867 | 13517.6 | 79.7915 | 66273.9 | -139539.9 | -150971.0 | 30.0199 | -422480.2 | 71.0948 |
| 1100 | 18.0899 | 15312.0 | 81.5015 | 74339.7 | -137745.5 | -151008.3 | 27.0202 | -422697.2 | 62.6992 |
| 1200 | 18.3345 | 17133.6 | 83.0864 | 82570.1 | -135923.9 | -151042.3 | 24.5198 | -422883.4 | 55.6995 |
| 1300 | 18.5340 | 18977.4 | 84.5621 | 90953.4 | -134080.1 | -151075.0 | 22.4036 | -423044.8 | 49.7742 |
| 1400 | 18.6983 | 20839.2 | 85.9418 | 99479.3 | -132218.2 | -151108.1 | 20.5894 | -423185.9 | 44.6936 |
| 1500 | 18.8351 | 22716.1 | 87.2367 | 108138.9 | -130341.4 | -151142.7 | 19.0167 | -423310.3 | 40.2890 |
| 1600 | 18.9500 | 24605.5 | 88.4560 | 116924.1 | -128451.9 | -151179.2 | 17.6403 | -423421.0 | 36.4339 |
| 1700 | 19.0473 | 26505.5 | 89.6079 | 125827.9 | -126551.9 | -151218.4 | 16.4254 | -423520.2 | 33.0315 |
| 1800 | 19.1303 | 28414.5 | 90.6990 | 134843.7 | -124643.0 | -151260.7 | 15.3453 | -423610.0 | 30.0065 |
| 1900 | 19.2016 | 30331.2 | 91.7353 | 143965.8 | -122726.3 | -151306.9 | 14.3786 | -423691.8 | 27.2994 |
| 2000 | 19.2633 | 32254.5 | 92.7218 | 153189.1 | -120803.0 | -151357.3 | 13.5083 | -423767.2 | 24.8625 |
| 2100 | 19.3170 | 34183.6 | 93.6630 | 162508.7 | -118873.9 | -151412.3 | 12.7206 | -423837.2 | 22.6573 |
| 2200 | 19.3640 | 36117.7 | 94.5627 | 171920.3 | -116939.8 | -151471.8 | 12.0043 | -423902.9 | 20.6523 |
| 2300 | 19.4054 | 38056.2 | 95.4244 | 181420.0 | -115001.3 | -151535.9 | 11.3499 | -423965.1 | 18.8213 |
| 2400 | 19.4420 | 39998.6 | 96.2511 | 191004.0 | -113058.9 | -151604.7 | 10.7498 | -424024.6 | 17.1427 |
| 2500 | 19.4745 | 41944.5 | 97.0454 | 200699.1 | -111113.0 | -151678.3 | 10.1975 | -424082.1 | 15.5982 |
| 2600 | 19.5035 | 43893.4 | 97.8098 | 210412.1 | -109164.1 | -151756.5 | 9.6874 | -424138.0 | 14.1723 |
| 2700 | 19.5294 | 45845.1 | 98.5464 | 220230.1 | -107212.4 | -151839.4 | 9.2149 | -424193.0 | 12.8518 |
| 2800 | 19.5528 | 47799.2 | 99.2570 | 230120.5 | -105258.3 | -151927.1 | 8.7758 | -424247.4 | 11.6255 |
| 2900 | 19.5739 | 49755.5 | 99.9435 | 240080.7 | -103301.9 | -152019.6 | 8.3668 | -424301.7 | 10.4836 |
| 3000 | 19.5929 | 51713.9 | 100.6075 | 250108.5 | -101343.6 | -152116.9 | 7.9848 | -424356.1 | 9.4177 |
| 3100 | 19.6102 | 53674.1 | 101.2502 | 260201.5 | -99383.4 | -152218.9 | 7.6272 | -424411.0 | 8.4205 |
| 3200 | 19.6260 | 55635.9 | 101.8730 | 270357.8 | -97421.6 | -152325.7 | 7.2918 | -424466.6 | 7.4854 |
| 3300 | 19.6404 | 57599.2 | 102.4772 | 280575.5 | -95458.3 | -152437.2 | 6.9764 | -424523.1 | 6.6059 |
| 3400 | 19.6536 | 59563.9 | 103.0637 | 290852.7 | -93493.5 | -152553.1 | 6.6794 | -424580.8 | 5.7800 |
| 3500 | 19.6657 | 61529.9 | 103.6336 | 301187.7 | -91527.6 | -152673.5 | 6.3991 | -424639.7 | 5.0002 |
| 3600 | 19.6768 | 63497.0 | 104.1878 | 311578.9 | -89560.4 | -152798.2 | 6.1342 | -424700.0 | 4.2637 |
| 3700 | 19.6871 | 65465.2 | 104.7270 | 322024.7 | -87592.2 | -152927.5 | 5.8834 | -424761.9 | 3.5668 |
| 3800 | 19.6965 | 67434.4 | 105.2522 | 332523.8 | -85623.1 | -153061.1 | 5.6456 | -424825.3 | 2.9065 |
| 3900 | 19.7053 | 69404.5 | 105.7639 | 343074.7 | -83653.0 | -153199.0 | 5.4198 | -424890.4 | 2.2800 |
| 4000 | 19.7135 | 71375.5 | 106.2629 | 353676.2 | -81682.0 | -153341.1 | 5.2051 | -424957.2 | 1.6848 |
| 4100 | 19.7210 | 73347.2 | 106.7498 | 364326.9 | -79710.3 | -153488.2 | - | -425025.8 | 1.1184 |
| 4200 | 19.7280 | 75319.7 | 107.2251 | 375025.7 | -77737.8 | -153640.3 | - | -425096.2 | 0.5790 |
| 4300 | 19.7346 | 77292.8 | 107.6894 | 385771.6 | -75764.7 | -153797.4 | - | -425168.4 | 0.0645 |
| 4400 | 19.7407 | 79266.6 | 108.1431 | 396563.3 | -73790.9 | -153959.5 | - | -425242.5 | -0.4266 |
| 4500 | 19.7465 | 81240.9 | 108.5868 | 407399.8 | -71816.6 | -154126.6 | - | -425318.3 | -0.8960 |
| 4600 | 19.7518 | 83215.8 | 109.0209 | 418280.3 | -69841.6 | -154298.7 | - | -425396.0 | -1.3451 |
| 4700 | 19.7568 | 85191.3 | 109.4457 | 429203.7 | -67866.2 | -154475.8 | - | -425475.5 | -1.7751 |
| 4800 | 19.7616 | 87167.2 | 109.8617 | 440169.2 | -65890.3 | -154658.9 | - | -425556.7 | -2.1873 |
| 4900 | 19.7660 | 89143.6 | 110.2693 | 451175.8 | -63913.9 | -154847.0 | - | -425639.7 | -2.5827 |
| 5000 | 19.7702 | 91120.4 | 110.6686 | 462222.8 | -61937.1 | -155040.1 | - | -425724.5 | -2.9625 |
| 5100 | 19.7741 | 93097.6 | 111.0602 | 473309.2 | -59959.9 | -155237.2 | - | -425810.9 | -3.3273 |
| 5200 | 19.7779 | 95075.2 | 111.4442 | 484434.5 | -57982.3 | -155439.3 | - | -425899.1 | -3.6783 |
| 5300 | 19.7814 | 97053.2 | 111.8210 | 495597.9 | -56004.3 | -155646.4 | - | -425988.8 | -4.0160 |
| 5400 | 19.7847 | 99031.5 | 112.1907 | 506798.5 | -54026.0 | -155858.5 | - | -426080.1 | -4.3413 |
| 5500 | 19.7878 | 101010.1 | 112.5538 | 518035.8 | -52047.4 | -156075.6 | - | -426173.0 | -4.6549 |
| 5600 | 19.7908 | 102989.0 | 112.9104 | 529309.0 | -50068.4 | -156298.7 | - | -426267.4 | -4.9573 |
| 5700 | 19.7936 | 104968.3 | 113.2607 | 540617.6 | -48089.2 | -156526.8 | - | -426363.3 | -5.2492 |
| 5800 | 19.7963 | 106947.8 | 113.6050 | 551961.0 | -46109.7 | -156760.0 | - | -426460.6 | -5.5311 |
| 5900 | 19.7989 | 108927.5 | 113.9434 | 563338.4 | -44130.0 | -157000.0 | - | -426559.3 | -5.8034 |
| 6000 | 19.8013 | 110907.5 | 114.2762 | 574749.5 | -42150.0 | -157246.0 | - | -426659.4 | -6.0668 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (79) COFCl (gas); molecular weight, 82.468

| T, °K | C _p ^o , cal/mole °K | H _f ^o - H ₀ ^o , cal/mole | S _f ^o , cal/mole °K | -(F _f ^o - H ₀ ^o), cal/mole | H _f ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | | 0 | | 0 | | | | | |
| 100 | 8.2233 | 799.2 | 55.3066 | 4731.5 | -104695.1 | -101255.0 | | -377134.7 | |
| 200 | 10.3494 | 1718.4 | 61.5928 | 10600.1 | -103896.0 | -101512.7 | 219.9781 | -378428.6 | 810.5126 |
| 298.15 | 12.5233 | 2845.1 | 66.1472 | 16876.7 | -102976.7 | -101732.0 | 108.9536 | -379594.2 | 396.4949 |
| 300 | 12.5589 | 2868.3 | 66.2248 | 16999.1 | -101850.0 | -101850.0 | 72.3387 | -380516.3 | 259.8000 |
| 400 | 14.1590 | 4210.7 | 70.0752 | 23819.4 | -101826.8 | -101851.4 | 71.8783 | -380531.7 | 258.0800 |
| 500 | 15.3901 | 5693.2 | 73.3784 | 30996.0 | -100484.4 | -101910.9 | 53.3240 | -381275.5 | 188.7153 |
| | | | | | -99001.9 | -101942.6 | 42.1865 | -381873.9 | 147.0220 |
| 600 | 16.2735 | 7278.5 | 76.2663 | 38481.3 | -97416.6 | -101962.2 | 34.7596 | -382361.4 | 119.1866 |
| 700 | 16.9410 | 8940.7 | 78.8273 | 46238.4 | -95754.4 | -101977.5 | 29.4538 | -382763.0 | 99.2809 |
| 800 | 17.4529 | 10661.5 | 81.1244 | 54238.0 | -94033.6 | -101990.3 | 25.4739 | -383097.1 | 84.3372 |
| 900 | 17.8505 | 12427.5 | 83.2040 | 62456.0 | -92267.6 | -102000.7 | 22.3781 | -383378.0 | 72.7049 |
| 1000 | 18.1634 | 14228.8 | 85.1015 | 70872.7 | -90466.3 | -102008.7 | 19.9012 | -383616.4 | 63.3928 |
| 1100 | 18.4126 | 16058.1 | 86.8448 | 79471.2 | -88637.0 | -102015.1 | 17.8745 | -383820.8 | 55.7694 |
| 1200 | 18.6134 | 17909.7 | 88.4558 | 88237.3 | -86785.4 | -102021.5 | 16.1855 | -383997.5 | 49.4134 |
| 1300 | 18.7770 | 19779.5 | 89.9524 | 97158.6 | -84915.6 | -102029.5 | 14.7562 | -384151.6 | 44.0330 |
| 1400 | 18.9118 | 21664.2 | 91.3490 | 106224.4 | -83030.9 | -102040.0 | 13.5310 | -384287.2 | 39.4194 |
| 1500 | 19.0239 | 23561.1 | 92.6577 | 115425.4 | -81134.0 | -102053.6 | 12.4690 | -384407.3 | 35.4196 |
| 1600 | 19.1180 | 25468.4 | 93.8886 | 124753.4 | -79226.7 | -102070.8 | 11.5397 | -384514.5 | 31.9188 |
| 1700 | 19.1977 | 27384.3 | 95.0501 | 134200.8 | -77310.9 | -102091.8 | 10.7195 | -384611.1 | 28.8290 |
| 1800 | 19.2656 | 29307.5 | 96.1493 | 143761.3 | -75387.6 | -102116.9 | 9.9903 | -384698.7 | 26.0819 |
| 1900 | 19.3240 | 31237.1 | 97.1926 | 153428.8 | -73458.0 | -102146.6 | 9.3377 | -384778.9 | 23.6234 |
| 2000 | 19.3745 | 33172.1 | 98.1851 | 163198.1 | -71523.1 | -102181.2 | 8.7501 | -384852.9 | 21.4103 |
| 2100 | 19.4184 | 35111.8 | 99.1315 | 173064.3 | -69583.4 | -102220.8 | 8.2184 | -384921.9 | 19.4076 |
| 2200 | 19.4569 | 37055.6 | 100.0357 | 183023.0 | -67639.6 | -102265.3 | 7.7347 | -384986.8 | 17.5867 |
| 2300 | 19.4907 | 39003.0 | 100.9014 | 193070.2 | -65692.1 | -102314.8 | 7.2929 | -385048.3 | 15.9238 |
| 2400 | 19.5206 | 40953.6 | 101.7315 | 203202.1 | -63741.5 | -102369.2 | 6.8878 | -385107.3 | 14.3993 |
| 2500 | 19.5472 | 42907.0 | 102.5290 | 213415.4 | -61788.1 | -102428.5 | 6.5148 | -385164.3 | 12.9965 |
| 2600 | 19.5709 | 44862.9 | 103.2961 | 223706.9 | -59832.2 | -102492.6 | 6.1703 | -385220.0 | 11.7014 |
| 2700 | 19.5922 | 46821.1 | 104.0351 | 234073.7 | -57874.0 | -102561.5 | 5.8511 | -385274.7 | 10.5021 |
| 2800 | 19.6113 | 48781.3 | 104.7480 | 244513.0 | -55913.8 | -102635.1 | 5.5546 | -385329.0 | 9.3883 |
| 2900 | 19.6285 | 50743.3 | 105.4365 | 255022.5 | -53951.8 | -102713.5 | 5.2782 | -385383.2 | 8.3512 |
| 3000 | 19.6441 | 52706.9 | 106.1022 | 265599.6 | -51988.2 | -102796.7 | 5.0201 | -385437.5 | 7.3830 |
| 3100 | 19.6582 | 54672.1 | 106.7465 | 276242.2 | -50023.1 | -102884.6 | 4.7785 | -385492.4 | 6.4772 |
| 3200 | 19.6711 | 56638.5 | 107.3709 | 286948.2 | -48056.6 | -102977.1 | 4.5517 | -385548.0 | 5.6279 |
| 3300 | 19.6829 | 58606.2 | 107.9764 | 297715.7 | -46088.9 | -103074.2 | 4.3385 | -385604.6 | 4.8300 |
| 3400 | 19.6937 | 60575.1 | 108.5641 | 308542.9 | -44120.0 | -103175.6 | 4.1376 | -385662.3 | 4.0788 |
| 3500 | 19.7035 | 62544.9 | 109.1351 | 319428.0 | -42150.2 | -103281.4 | 3.9481 | -385721.3 | 3.3705 |
| 3600 | 19.7126 | 64515.8 | 109.6903 | 330369.4 | -40179.4 | -103391.3 | 3.7688 | -385781.7 | 2.7015 |
| 3700 | 19.7210 | 66487.5 | 110.2305 | 341365.6 | -38207.7 | -103505.6 | 3.5991 | -385843.6 | 2.0685 |
| 3800 | 19.7288 | 68459.9 | 110.7566 | 352415.0 | -36235.2 | -103624.0 | 3.4381 | -385907.1 | 1.4687 |
| 3900 | 19.7359 | 70433.2 | 111.2691 | 363516.4 | -34261.9 | -103746.5 | 3.2852 | -385972.4 | 0.8996 |
| 4000 | 19.7426 | 72407.1 | 111.7689 | 374668.4 | -32288.0 | -103873.0 | 3.1398 | -386039.3 | 0.3588 |
| 4100 | 19.7488 | 74381.7 | 112.2565 | 385869.8 | -30313.4 | | | -386108.0 | -0.1556 |
| 4200 | 19.7545 | 76356.9 | 112.7324 | 397119.3 | -28338.3 | | | -386178.6 | -0.6457 |
| 4300 | 19.7599 | 78332.6 | 113.1973 | 408415.9 | -26362.5 | | | -386250.9 | -1.1130 |
| 4400 | 19.7649 | 80308.8 | 113.6517 | 419758.4 | -24386.3 | | | -386325.1 | -1.5592 |
| 4500 | 19.7696 | 82285.5 | 114.0959 | 431145.9 | -22409.6 | | | -386401.0 | -1.9857 |
| 4600 | 19.7739 | 84262.7 | 114.5304 | 442577.3 | -20432.4 | | | -386478.8 | -2.3936 |
| 4700 | 19.7780 | 86240.3 | 114.9557 | 454051.7 | -18454.8 | | | -386558.5 | -2.7843 |
| 4800 | 19.7819 | 88218.3 | 115.3722 | 465568.1 | -16476.8 | | | -386639.8 | -3.1588 |
| 4900 | 19.7855 | 90196.7 | 115.7801 | 477125.8 | -14498.4 | | | -386723.0 | -3.5181 |
| 5000 | 19.7889 | 92175.4 | 116.1799 | 488723.9 | -12519.7 | | | -386807.9 | -3.8631 |
| 5100 | 19.7922 | 94154.5 | 116.5718 | 500361.5 | -10540.6 | | | -386894.5 | -4.1947 |
| 5200 | 19.7952 | 96133.8 | 116.9561 | 512038.0 | -8561.3 | | | -386982.7 | -4.5135 |
| 5300 | 19.7981 | 98113.5 | 117.3332 | 523752.5 | -6581.6 | | | -387072.6 | -4.8204 |
| 5400 | 19.8008 | 100093.5 | 117.7033 | 535504.4 | -4601.7 | | | -387164.0 | -5.1160 |
| 5500 | 19.8033 | 102073.7 | 118.0667 | 547292.9 | -2621.5 | | | -387257.1 | -5.4009 |
| 5600 | 19.8058 | 104054.1 | 118.4235 | 559117.5 | -641.0 | | | -387351.6 | -5.6757 |
| 5700 | 19.8081 | 106034.8 | 118.7741 | 570977.5 | 1339.7 | | | -387447.6 | -5.9410 |
| 5800 | 19.8103 | 108015.7 | 119.1186 | 582872.1 | 3320.7 | | | -387545.0 | -6.1971 |
| 5900 | 19.8124 | 109996.9 | 119.4573 | 594801.0 | 5301.7 | | | -387643.9 | -6.4447 |
| 6000 | 19.8143 | 111978.2 | 119.7903 | 606763.4 | 7283.1 | | | -387744.0 | -6.6840 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(80) COS (gas); molecular weight, 60.077

| T, °K | C _p , cal/mole °K | H _T ⁰ -H ₀ ⁰ , cal/mole | S _T ⁰ , cal/mole °K | -(F _T ⁰ -H ₀ ⁰), cal/mole | H _T ⁰ , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ⁰) _f , cal/mole | log ₁₀ K _f | ΔH _T ⁰ , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -35172.9 | -32830.6 | ----- | -327710.4 | ----- |
| 100 | 7.0772 | 697.0 | 46.3772 | 3940.7 | -34475.9 | -32659.8 | 76.2710 | -328510.2 | 706.6696 |
| 200 | 8.4763 | 1466.7 | 51.6558 | 8864.5 | -33706.2 | -32708.4 | 40.5739 | -329437.9 | 347.2381 |
| 298.15 | 9.9165 | 2372.9 | 55.3231 | 14121.7 | -32800.0 | -32800.0 | 28.7918 | -330098.3 | 228.6276 |
| 300 | 9.9393 | 2391.3 | 55.3846 | 14224.1 | -32781.6 | -32801.8 | 28.6433 | -330109.3 | 227.1355 |
| 400 | 10.9576 | 3439.3 | 58.3924 | 19917.7 | -31733.6 | -33454.4 | 22.6486 | -330638.0 | 166.9719 |
| 500 | 11.6861 | 4573.2 | 60.9198 | 25886.7 | -30599.7 | -33942.8 | 18.9699 | -331061.3 | 130.8210 |
| 600 | 12.2471 | 5771.0 | 63.1026 | 32090.2 | -29401.9 | -34356.7 | 16.4828 | -331405.7 | 106.6921 |
| 700 | 12.6972 | 7019.0 | 65.0249 | 38498.5 | -28153.9 | -34721.6 | 14.6859 | -331688.8 | 89.4408 |
| 800 | 13.0645 | 8307.6 | 66.7451 | 45088.5 | -26865.2 | -35062.1 | 13.3246 | -331923.0 | 76.4922 |
| 900 | 13.3665 | 9629.7 | 68.3019 | 51842.0 | -25543.2 | -35403.3 | 12.2554 | -332117.9 | 66.4145 |
| 1000 | 13.6164 | 10979.2 | 69.7236 | 58744.3 | -24193.7 | -35743.7 | 11.3917 | -332280.7 | 58.3480 |
| 1100 | 13.8246 | 12351.6 | 71.0314 | 65783.0 | -22821.3 | -36082.7 | 10.6783 | -332417.3 | 51.7452 |
| 1200 | 13.9994 | 13743.0 | 72.2420 | 72947.4 | -21429.9 | -36420.7 | 10.0782 | -332532.1 | 46.2407 |
| 1300 | 14.1474 | 15150.6 | 73.3686 | 80228.6 | -20022.3 | -36758.6 | 9.5657 | -332629.0 | 41.5816 |
| 1400 | 14.2739 | 16571.8 | 74.4218 | 87618.7 | -18601.1 | -37097.0 | 9.1223 | -332710.8 | 37.5870 |
| 1500 | 14.3830 | 18004.8 | 75.4104 | 95110.8 | -17168.1 | -37436.3 | 8.7345 | -332780.2 | 34.1242 |
| 1600 | 14.4779 | 19447.9 | 76.3417 | 102698.8 | -15725.0 | -37776.5 | 8.3921 | -332839.1 | 31.0937 |
| 1700 | 14.5613 | 20900.0 | 77.2220 | 110377.4 | -14272.9 | -38117.7 | 8.0873 | -332889.3 | 28.4193 |
| 1800 | 14.6352 | 22359.9 | 78.0564 | 118141.7 | -12813.0 | -38460.3 | 7.8138 | -332932.5 | 26.0418 |
| 1900 | 14.7011 | 23826.7 | 78.8495 | 125987.3 | -11346.2 | -38804.6 | 7.5670 | -332970.0 | 23.9142 |
| 2000 | 14.7605 | 25299.9 | 79.6051 | 133910.3 | -9873.0 | -39150.8 | 7.3429 | -333003.0 | 21.9922 |
| 2100 | 14.8143 | 26778.7 | 80.3266 | 141907.2 | -8394.2 | -39499.0 | 7.1383 | -333032.4 | 20.2664 |
| 2200 | 14.8635 | 28262.6 | 81.0169 | 149974.6 | -6910.3 | -39849.2 | 6.9506 | -333059.3 | 18.6910 |
| 2300 | 14.9087 | 29751.2 | 81.6786 | 158109.6 | -5421.7 | -40201.2 | 6.7777 | -333084.4 | 17.2524 |
| 2400 | 14.9505 | 31244.2 | 82.3140 | 166309.5 | -3928.7 | -40555.2 | 6.6179 | -333108.3 | 15.9337 |
| 2500 | 14.9894 | 32741.2 | 82.9251 | 174571.6 | -2431.7 | -40911.0 | 6.4695 | -333131.7 | 14.7204 |
| 2600 | 15.0258 | 34242.0 | 83.5138 | 182893.7 | -930.9 | -41267.7 | 6.3308 | -333155.1 | 13.6003 |
| 2700 | 15.0601 | 35746.3 | 84.0815 | 191273.7 | 573.4 | -41625.2 | 6.2007 | -333179.0 | 12.5631 |
| 2800 | 15.0924 | 37254.0 | 84.6298 | 199709.4 | 2081.1 | -41983.7 | 6.0777 | -333203.6 | 11.5999 |
| 2900 | 15.1231 | 38764.8 | 85.1599 | 208199.0 | 3591.9 | -42343.2 | 5.9617 | -333229.3 | 10.7031 |
| 3000 | 15.1523 | 40278.5 | 85.6731 | 216740.8 | 5105.6 | -42703.7 | 5.8529 | -333256.3 | 9.8660 |
| 3100 | 15.1803 | 41795.2 | 86.1704 | 225333.1 | 6622.3 | -43065.2 | 5.7504 | -333284.9 | 9.0829 |
| 3200 | 15.2071 | 43314.5 | 86.6528 | 233974.4 | 8141.7 | -43427.7 | 5.6543 | -333315.2 | 8.3486 |
| 3300 | 15.2329 | 44836.6 | 87.1211 | 242663.2 | 9663.7 | -43791.2 | 5.5645 | -333347.2 | 7.6588 |
| 3400 | 15.2578 | 46361.1 | 87.5763 | 251398.2 | 11188.2 | -44155.7 | 5.4808 | -333381.1 | 7.0095 |
| 3500 | 15.2819 | 47888.1 | 88.0189 | 260178.1 | 12715.2 | -44521.2 | 5.4033 | -333416.9 | 6.3972 |
| 3600 | 15.3053 | 49417.5 | 88.4497 | 269001.6 | 14244.6 | -44887.7 | 5.3318 | -333454.7 | 5.8189 |
| 3700 | 15.3280 | 50949.1 | 88.8694 | 277867.6 | 15776.2 | -45255.2 | 5.2653 | -333494.4 | 5.2718 |
| 3800 | 15.3502 | 52483.0 | 89.2785 | 286775.1 | 17310.2 | -45623.7 | 5.2038 | -333536.0 | 4.7534 |
| 3900 | 15.3718 | 54019.2 | 89.6775 | 295723.0 | 18846.3 | -45993.2 | 5.1473 | -333579.5 | 4.2615 |
| 4000 | 15.3930 | 55557.4 | 90.0669 | 304710.3 | 20384.5 | -46363.7 | 5.0958 | -333624.8 | 3.7942 |
| 4100 | 15.4137 | 57097.7 | 90.4473 | 313736.1 | 21924.8 | -46735.2 | 5.0493 | -333671.9 | 3.3496 |
| 4200 | 15.4341 | 58640.1 | 90.8189 | 322799.4 | 23467.2 | -47107.7 | 5.0078 | -333720.6 | 2.9261 |
| 4300 | 15.4540 | 60184.5 | 91.1824 | 331899.6 | 25011.6 | -47481.2 | 4.9713 | -333771.0 | 2.5222 |
| 4400 | 15.4737 | 61730.9 | 91.5379 | 341035.7 | 26558.0 | -47855.7 | 4.9398 | -333822.9 | 2.1366 |
| 4500 | 15.4930 | 63279.3 | 91.8858 | 350206.9 | 28106.4 | -48231.2 | 4.9133 | -333876.3 | 1.7682 |
| 4600 | 15.5121 | 64829.5 | 92.2265 | 359412.6 | 29656.6 | -48607.7 | 4.8918 | -333930.9 | 1.4156 |
| 4700 | 15.5309 | 66381.7 | 92.5604 | 368652.0 | 31208.8 | -48985.2 | 4.8753 | -333986.9 | 1.0781 |
| 4800 | 15.5495 | 67935.7 | 92.8875 | 377924.4 | 32762.8 | -49363.7 | 4.8638 | -334043.9 | 0.7545 |
| 4900 | 15.5678 | 69491.6 | 93.2083 | 387229.3 | 34318.7 | -49743.2 | 4.8573 | -334102.0 | 0.4441 |
| 5000 | 15.5860 | 71049.2 | 93.5230 | 396565.9 | 35876.4 | -50123.7 | 4.8558 | -334161.1 | 0.1461 |
| 5100 | 15.6040 | 72608.7 | 93.8318 | 405933.7 | 37435.9 | -50505.2 | 4.8593 | -334221.0 | -0.1403 |
| 5200 | 15.6218 | 74170.0 | 94.1350 | 415332.1 | 38997.1 | -50887.7 | 4.8628 | -334281.6 | -0.4158 |
| 5300 | 15.6394 | 75733.1 | 94.4328 | 424760.5 | 40560.2 | -51271.2 | 4.8663 | -334342.9 | -0.6809 |
| 5400 | 15.6569 | 77297.9 | 94.7253 | 434218.4 | 42125.0 | -51655.7 | 4.8698 | -334404.7 | -0.9362 |
| 5500 | 15.6743 | 78864.5 | 95.0127 | 443705.4 | 43691.6 | -52041.2 | 4.8733 | -334467.0 | -1.1823 |
| 5600 | 15.6915 | 80432.8 | 95.2953 | 453220.8 | 45259.9 | -52428.7 | 4.8768 | -334529.7 | -1.4196 |
| 5700 | 15.7086 | 82002.8 | 95.5732 | 462764.3 | 46829.9 | -52817.2 | 4.8803 | -334592.7 | -1.6487 |
| 5800 | 15.7256 | 83574.5 | 95.8465 | 472335.3 | 48401.6 | -53206.7 | 4.8838 | -334655.9 | -1.8699 |
| 5900 | 15.7425 | 85147.9 | 96.1155 | 481933.4 | 49975.0 | -53597.2 | 4.8873 | -334719.2 | -2.0836 |
| 6000 | 15.7592 | 86723.0 | 96.3802 | 491558.2 | 51550.1 | -53988.7 | 4.8908 | -334782.5 | -2.2903 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(81) CP (gas); molecular weight, 42.986

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_r$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 84437.3 | 85970.8 | ----- | -159000.0 | ----- |
| 100 | 6.9566 | 694.8 | 44.0246 | 3707.6 | 85132.2 | 86437.8 | -180.2885 | -159372.2 | 343.5244 |
| 200 | 6.9808 | 1391.1 | 48.8498 | 8378.9 | 85828.4 | 86515.2 | -85.7342 | -159675.4 | 169.2561 |
| 298.15 | 7.1492 | 2083.1 | 51.6627 | 13320.2 | 86520.4 | 86520.4 | -54.6089 | -159760.5 | 111.7679 |
| 300 | 7.1539 | 2096.3 | 51.7069 | 13415.8 | 86533.6 | 86519.4 | -54.2173 | -159965.6 | 111.0448 |
| 400 | 7.4466 | 2825.9 | 53.8038 | 18695.6 | 87263.2 | 86228.9 | -38.4930 | -160230.6 | 81.8902 |
| 500 | 7.7416 | 3585.6 | 55.4978 | 24163.3 | 88022.9 | 86045.4 | -29.5798 | -160465.1 | 64.3698 |
| 600 | 7.9892 | 4372.6 | 56.9320 | 29786.6 | 88809.9 | 85831.0 | -22.8189 | -160672.1 | 52.6732 |
| 700 | 8.1849 | 5181.7 | 58.1788 | 35543.5 | 89619.0 | 85591.8 | -18.3586 | -160856.9 | 44.3183 |
| 800 | 8.3385 | 6008.2 | 59.2822 | 41417.6 | 90445.5 | 85334.1 | -15.3232 | -161024.2 | 38.0277 |
| 900 | 8.4629 | 6848.4 | 60.2717 | 47396.1 | 91285.8 | 85063.4 | -12.4370 | -161177.8 | 33.1379 |
| 1000 | 8.5699 | 7700.2 | 61.1690 | 53468.9 | 92137.5 | 84784.2 | -10.3747 | -161319.8 | 29.2225 |
| 1100 | 8.6692 | 8562.2 | 61.9905 | 59627.4 | 92999.5 | 84499.5 | -8.6930 | -161451.6 | 26.0162 |
| 1200 | 8.7684 | 9434.0 | 62.7491 | 65864.9 | 93871.4 | 84211.4 | -7.2963 | -161573.5 | 23.3422 |
| 1300 | 8.8724 | 10316.0 | 63.4550 | 72175.5 | 94753.3 | 83921.4 | -6.1186 | -161685.5 | 21.0780 |
| 1400 | 8.9841 | 11208.7 | 64.1165 | 78554.4 | 95646.1 | 83631.7 | -5.1126 | -161787.2 | 19.1359 |
| 1500 | 9.1045 | 12113.1 | 64.7404 | 84997.5 | 96550.4 | 83344.4 | -4.2437 | -161877.8 | 17.4518 |
| 1600 | 9.2332 | 13029.9 | 65.3321 | 91501.4 | 97467.3 | 83061.6 | -3.4861 | -161956.9 | 15.9774 |
| 1700 | 9.3686 | 13960.0 | 65.8959 | 98063.0 | 98397.3 | 82784.9 | -2.8198 | -162024.2 | 14.6759 |
| 1800 | 9.5087 | 14903.8 | 66.4353 | 104679.8 | 99341.1 | 82515.8 | -2.2295 | -162079.6 | 13.5185 |
| 1900 | 9.6510 | 15861.8 | 66.9532 | 111349.4 | 100299.1 | 82255.1 | -1.7031 | -162123.5 | 12.4827 |
| 2000 | 9.7932 | 16834.0 | 67.4519 | 118069.8 | 101271.3 | 82003.2 | -1.2307 | -162156.4 | 11.5552 |
| 2100 | 9.9328 | 17820.3 | 67.9331 | 124839.2 | 102257.7 | 81760.4 | -0.8047 | -162179.2 | 10.7064 |
| 2200 | 10.0677 | 18820.4 | 68.3983 | 131655.9 | 103257.7 | 81527.2 | -0.4185 | -162192.8 | 9.9392 |
| 2300 | 10.1963 | 19833.7 | 68.8487 | 138518.3 | 104271.0 | 81303.3 | -0.0668 | -162198.7 | 9.2387 |
| 2400 | 10.3170 | 20859.4 | 69.2852 | 145425.1 | 105296.7 | 81088.3 | 0.2546 | -162198.3 | 8.5905 |
| 2500 | 10.4287 | 21896.8 | 69.7087 | 152374.9 | 106334.1 | 80881.7 | 0.5496 | -162192.9 | 8.0058 |
| 2600 | 10.5308 | 22944.8 | 70.1197 | 159366.4 | 107382.2 | | | -162184.3 | 7.4605 |
| 2700 | 10.6229 | 24002.6 | 70.5189 | 166398.5 | 108439.9 | | | -162173.8 | 6.9556 |
| 2800 | 10.7046 | 25069.1 | 70.9068 | 173469.9 | 109506.4 | | | -162163.1 | 6.4868 |
| 2900 | 10.7762 | 26143.2 | 71.2837 | 180579.5 | 110580.5 | | | -162153.6 | 6.0504 |
| 3000 | 10.8379 | 27224.0 | 71.6501 | 187726.2 | 111661.3 | | | -162146.5 | 5.6431 |
| 3100 | 10.8901 | 28310.4 | 72.0063 | 194909.1 | 112747.8 | | | -162143.3 | 5.2620 |
| 3200 | 10.9333 | 29401.7 | 72.3528 | 202127.2 | 113839.0 | | | -162144.9 | 4.9048 |
| 3300 | 10.9682 | 30496.8 | 72.6898 | 209379.4 | 114934.2 | | | -162152.4 | 4.5693 |
| 3400 | 10.9953 | 31595.1 | 73.0176 | 216664.8 | 116032.4 | | | -162166.6 | 4.2534 |
| 3500 | 11.0153 | 32695.6 | 73.3366 | 223982.6 | 117133.0 | | | -162188.3 | 3.9556 |
| 3600 | 11.0290 | 33797.9 | 73.6472 | 231331.9 | 118235.3 | | | -162218.1 | 3.6743 |
| 3700 | 11.0369 | 34901.3 | 73.9495 | 238711.8 | 119338.6 | | | -162256.4 | 3.4081 |
| 3800 | 11.0398 | 36005.1 | 74.2438 | 246121.5 | 120442.5 | | | -162303.7 | 3.1559 |
| 3900 | 11.0383 | 37109.1 | 74.5306 | 253560.3 | 121546.4 | | | -162360.2 | 2.9165 |
| 4000 | 11.0329 | 38212.7 | 74.8106 | 261027.4 | 122650.0 | | | -162426.0 | 2.6890 |
| 4100 | 11.0242 | 39315.5 | 75.0823 | 268522.0 | 123752.9 | | | -162501.3 | 2.4725 |
| 4200 | 11.0127 | 40417.4 | 75.3479 | 276043.6 | 124854.8 | | | -162586.0 | 2.2662 |
| 4300 | 10.9988 | 41518.0 | 75.6068 | 283591.4 | 125955.3 | | | -162680.0 | 2.0694 |
| 4400 | 10.9830 | 42617.1 | 75.8595 | 291164.8 | 127054.5 | | | -162783.2 | 1.8814 |
| 4500 | 10.9657 | 43714.6 | 76.1061 | 298763.1 | 128151.9 | | | -162895.4 | 1.7017 |
| 4600 | 10.9472 | 44810.2 | 76.3470 | 306385.8 | 129247.6 | | | -163016.4 | 1.5297 |
| 4700 | 10.9277 | 45904.0 | 76.5822 | 314032.3 | 130341.3 | | | -163145.7 | 1.3648 |
| 4800 | 10.9076 | 46995.7 | 76.8120 | 321702.1 | 131433.1 | | | -163283.2 | 1.2067 |
| 4900 | 10.8871 | 48085.5 | 77.0367 | 329394.5 | 132522.8 | | | -163428.5 | 1.0549 |
| 5000 | 10.8664 | 49173.2 | 77.2565 | 337109.2 | 133610.5 | | | -163581.2 | 0.9091 |
| 5100 | 10.8457 | 50258.8 | 77.4715 | 344845.7 | 134696.1 | | | -163740.8 | 0.7688 |
| 5200 | 10.8251 | 51342.3 | 77.6819 | 352603.4 | 135779.6 | | | -163907.1 | 0.6338 |
| 5300 | 10.8048 | 52423.8 | 77.8879 | 360381.9 | 136861.1 | | | -164079.6 | 0.5038 |
| 5400 | 10.7848 | 53503.3 | 78.0896 | 368180.8 | 137940.6 | | | -164258.0 | 0.3784 |
| 5500 | 10.7654 | 54580.8 | 78.2874 | 375999.7 | 139018.1 | | | -164441.7 | 0.2575 |
| 5600 | 10.7465 | 55656.4 | 78.4812 | 383838.2 | 140093.7 | | | -164630.4 | 0.1408 |
| 5700 | 10.7281 | 56730.1 | 78.6712 | 391695.8 | 141167.4 | | | -164823.7 | 0.0280 |
| 5800 | 10.7105 | 57802.0 | 78.8576 | 399572.3 | 142239.4 | | | -165021.2 | -0.0810 |
| 5900 | 10.6935 | 58872.2 | 79.0406 | 407467.2 | 143309.5 | | | -165222.6 | -0.1865 |
| 6000 | 10.6773 | 59940.7 | 79.2202 | 415380.3 | 144378.1 | | | -165427.5 | -0.2885 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of P, 317.30° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (85) CS_2 (gas); molecular weight, 76.143

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| C | ----- | 0 | ----- | 0 | 25431.4 | 27790.0 | ----- | -274006.7 | ----- |
| 100 | 7.4035 | 703.2 | 47.0115 | 3997.9 | 26134.6 | 28149.1 | -52.6240 | -274872.0 | 589.0061 |
| 200 | 9.4460 | 1546.1 | 52.7705 | 9008.0 | 26977.4 | 28128.9 | -21.8585 | -275606.4 | 288.3344 |
| 298.15 | 10.8692 | 2548.6 | 56.8301 | 14395.3 | 27980.0 | 27980.0 | -11.7603 | -276202.5 | 189.0986 |
| 300 | 10.8901 | 2568.8 | 56.8974 | 14500.5 | 28000.1 | 27976.4 | -11.6342 | -276212.5 | 187.8501 |
| a 400 | 11.8200 | 3707.2 | 60.1660 | 20359.2 | 29138.5 | 26671.0 | -6.5809 | -276693.9 | 137.5060 |
| 500 | 12.4862 | 4924.1 | 62.8788 | 26515.3 | 30355.5 | 25693.2 | -3.7131 | -277073.1 | 107.2518 |
| 600 | 12.9863 | 6198.9 | 65.2016 | 32922.0 | 31630.3 | 24877.2 | -1.8701 | -277372.6 | 87.0573 |
| 700 | 13.3672 | 7517.4 | 67.2333 | 39545.9 | 32948.8 | 24171.8 | -0.5935 | -277611.5 | 72.6186 |
| 800 | 13.6635 | 8869.4 | 69.0383 | 46361.2 | 34300.8 | 23523.2 | 0.3377 | -277803.9 | 61.7811 |
| 900 | 13.8888 | 10247.4 | 70.6610 | 53347.5 | 35678.7 | 22875.5 | 1.3422 | -277960.8 | 53.3467 |
| 1000 | 14.0690 | 11645.6 | 72.1340 | 60488.4 | 37077.0 | 22228.2 | 1.5901 | -278089.9 | 46.5956 |
| 1100 | 14.2133 | 13060.0 | 73.4819 | 67770.1 | 38491.3 | 21581.4 | 2.0255 | -278197.2 | 41.0697 |
| 1200 | 14.3305 | 14487.4 | 74.7238 | 75181.2 | 39918.7 | 20934.1 | 2.3776 | -278287.1 | 36.4631 |
| 1300 | 14.4270 | 15925.4 | 75.8748 | 82711.9 | 41356.8 | 20285.6 | 2.6664 | -278363.2 | 32.5641 |
| 1400 | 14.5076 | 17372.2 | 76.9470 | 90353.6 | 42803.6 | 19635.4 | 2.9062 | -278428.3 | 29.2212 |
| 1500 | 14.5757 | 18826.5 | 77.9503 | 98099.0 | 44257.9 | 18983.4 | 3.1072 | -278484.7 | 26.3234 |
| 1600 | 14.6340 | 20287.1 | 78.8929 | 105941.6 | 45718.4 | 18329.7 | 3.2772 | -278534.3 | 23.7873 |
| 1700 | 14.6845 | 21753.0 | 79.7817 | 113875.8 | 47184.4 | 17674.4 | 3.4219 | -278578.9 | 21.5493 |
| 1800 | 14.7287 | 23223.7 | 80.6223 | 121896.4 | 48655.1 | 17017.6 | 3.5458 | -278619.9 | 19.5596 |
| 1900 | 14.7677 | 24698.6 | 81.4197 | 129998.8 | 50130.0 | 16359.1 | 3.6525 | -278658.7 | 17.7791 |
| 2000 | 14.8024 | 26177.1 | 82.1781 | 138179.0 | 51608.5 | 15698.9 | 3.7447 | -278696.5 | 16.1764 |
| 2100 | 14.8337 | 27659.0 | 82.9010 | 146433.2 | 53090.3 | 15037.1 | 3.8247 | -278734.2 | 14.7261 |
| 2200 | 14.8620 | 29143.8 | 83.5918 | 154758.1 | 54575.1 | 14374.0 | 3.8943 | -278772.8 | 13.4076 |
| 2300 | 14.8879 | 30631.3 | 84.2530 | 163150.6 | 56062.7 | 13709.7 | 3.9550 | -278813.0 | 12.2035 |
| 2400 | 14.9117 | 32121.3 | 84.8871 | 171607.8 | 57552.7 | 13044.4 | 4.0079 | -278855.5 | 11.0995 |
| 2500 | 14.9338 | 33613.6 | 85.4963 | 180127.2 | 59044.9 | 12378.1 | 4.0542 | -278900.7 | 10.0838 |
| 2600 | 14.9543 | 35108.0 | 86.0824 | 188706.3 | 60539.4 | 11717.4 | 4.1013 | -278949.1 | 9.1460 |
| 2700 | 14.9736 | 36604.4 | 86.6472 | 197343.0 | 62035.8 | 11062.8 | 4.1488 | -279001.1 | 8.2775 |
| 2800 | 14.9917 | 38102.7 | 87.1921 | 206035.1 | 63534.0 | 10409.1 | 4.1967 | -279056.9 | 7.4709 |
| 2900 | 15.0088 | 39602.7 | 87.7184 | 214780.8 | 65034.1 | 9755.4 | 4.2450 | -279116.7 | 6.7198 |
| 3000 | 15.0251 | 41104.4 | 88.2275 | 223578.2 | 66535.8 | 9101.7 | 4.2937 | -279180.5 | 6.0186 |
| 3100 | 15.0406 | 42607.7 | 88.7205 | 232425.7 | 68039.1 | 8448.0 | 4.3428 | -279248.4 | 5.3625 |
| 3200 | 15.0554 | 44112.5 | 89.1982 | 241321.8 | 69543.9 | 7794.1 | 4.3923 | -279320.5 | 4.7472 |
| 3300 | 15.0697 | 45618.8 | 89.6617 | 250264.9 | 71050.1 | 7139.7 | 4.4421 | -279396.7 | 4.1691 |
| 3400 | 15.0835 | 47126.4 | 90.1118 | 259253.7 | 72557.8 | 6485.8 | 4.4922 | -279476.8 | 3.6248 |
| 3500 | 15.0968 | 48635.4 | 90.5492 | 268286.8 | 74066.8 | 5832.4 | 4.5426 | -279560.8 | 3.1115 |
| 3600 | 15.1097 | 50145.8 | 90.9747 | 277363.1 | 75577.1 | 5178.5 | 4.5933 | -279648.6 | 2.6265 |
| 3700 | 15.1222 | 51657.4 | 91.3889 | 286481.4 | 77088.7 | 4525.1 | 4.6442 | -279739.9 | 2.1676 |
| 3800 | 15.1344 | 53170.2 | 91.7923 | 295640.5 | 78601.6 | 3871.7 | 4.6952 | -279834.6 | 1.7328 |
| 3900 | 15.1464 | 54684.2 | 92.1856 | 304839.5 | 80115.6 | 3218.3 | 4.7463 | -279932.5 | 1.3200 |
| 4000 | 15.1580 | 56199.5 | 92.5692 | 314077.3 | 81630.8 | 2564.9 | 4.7974 | -280033.5 | 0.9278 |
| 4100 | 15.1694 | 57715.8 | 92.9436 | 323353.1 | 83147.2 | 1911.5 | 4.8485 | -280137.3 | 0.5546 |
| 4200 | 15.1806 | 59233.3 | 93.3093 | 332665.8 | 84664.7 | 1258.1 | 4.8996 | -280243.7 | 0.1990 |
| 4300 | 15.1916 | 60752.0 | 93.6666 | 342014.6 | 86183.3 | 604.7 | 4.9507 | -280352.5 | -0.1402 |
| 4400 | 15.2024 | 62271.7 | 94.0160 | 351398.8 | 87703.0 | 0.0 | 5.0018 | -280463.6 | -0.4641 |
| 4500 | 15.2131 | 63792.4 | 94.3578 | 360817.6 | 89223.8 | 0.0 | 5.0529 | -280576.6 | -0.7737 |
| 4600 | 15.2236 | 65314.3 | 94.6923 | 370270.1 | 90745.6 | 0.0 | 5.1040 | -280691.5 | -1.0700 |
| 4700 | 15.2340 | 66837.1 | 95.0198 | 379755.8 | 92268.5 | 0.0 | 5.1551 | -280808.1 | -1.3538 |
| 4800 | 15.2442 | 68361.1 | 95.3406 | 389273.9 | 93792.4 | 0.0 | 5.2062 | -280926.0 | -1.6258 |
| 4900 | 15.2543 | 69886.0 | 95.6550 | 398823.7 | 95317.4 | 0.0 | 5.2573 | -281045.3 | -1.8869 |
| 5000 | 15.2644 | 71411.9 | 95.9633 | 408404.7 | 96843.3 | 0.0 | 5.3084 | -281165.7 | -2.1377 |
| 5100 | 15.2743 | 72938.9 | 96.2657 | 418016.2 | 98370.2 | 0.0 | 5.3595 | -281287.0 | -2.3787 |
| 5200 | 15.2842 | 74466.8 | 96.5624 | 427657.6 | 99898.2 | 0.0 | 5.4106 | -281409.1 | -2.6105 |
| 5300 | 15.2939 | 75995.7 | 96.8536 | 437328.5 | 101427.1 | 0.0 | 5.4617 | -281531.8 | -2.8337 |
| 5400 | 15.3036 | 77525.6 | 97.1396 | 447028.2 | 102956.9 | 0.0 | 5.5128 | -281655.1 | -3.0487 |
| 5500 | 15.3133 | 79056.4 | 97.4205 | 456756.2 | 104487.8 | 0.0 | 5.5639 | -281778.7 | -3.2560 |
| 5600 | 15.3228 | 80588.2 | 97.6965 | 466512.1 | 106019.6 | 0.0 | 5.6150 | -281902.6 | -3.4560 |
| 5700 | 15.3323 | 82121.0 | 97.9678 | 476295.4 | 107552.3 | 0.0 | 5.6661 | -282026.6 | -3.6491 |
| 5800 | 15.3418 | 83654.7 | 98.2345 | 486105.5 | 109086.0 | 0.0 | 5.7172 | -282150.7 | -3.8355 |
| 5900 | 15.3512 | 85189.3 | 98.4969 | 495942.1 | 110620.7 | 0.0 | 5.7683 | -282274.7 | -4.0158 |
| 6000 | 15.3605 | 86724.9 | 98.7549 | 505804.7 | 112156.3 | 0.0 | 5.8194 | -282398.5 | -4.1901 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(84) Cl (gas); molecular weight, 35.457

| T, °K | C _p ^o , cal/mole °K | H _f ^o -H ₀ ^o , cal/mole | S _f ^o , cal/mole °K | -(F _f ^o -H ₀ ^o), cal/mole | H _f ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 27451.7 | 28548.4 | ----- | 0 | ----- |
| 100 | 4.9680 | 496.8 | 33.9555 | 2898.7 | 27948.5 | 28697.2 | -60.2278 | 0 | 0 |
| 200 | 5.0381 | 995.8 | 37.4119 | 6486.5 | 28447.5 | 28833.4 | -28.8109 | 0 | 0 |
| 298.15 | 5.2194 | 1499.0 | 39.4563 | 10264.9 | 28950.6 | 28950.6 | -18.4207 | 0 | 0 |
| 300 | 5.2228 | 1508.6 | 39.4885 | 10337.9 | 28960.3 | 28952.8 | -18.2898 | 0 | 0 |
| 400 | 5.3699 | 2038.9 | 41.0131 | 14366.3 | 29490.6 | 29068.4 | -13.0075 | 0 | 0 |
| 500 | 5.4361 | 2579.8 | 42.2199 | 18530.1 | 30031.5 | 29182.4 | -9.8254 | 0 | 0 |
| 600 | 5.4451 | 3124.3 | 43.2124 | 22803.2 | 30575.9 | 29292.4 | -7.6958 | 0 | 0 |
| 700 | 5.4238 | 3667.9 | 44.0505 | 27167.4 | 31119.5 | 29396.7 | -6.1690 | 0 | 0 |
| 800 | 5.3895 | 4208.6 | 44.7725 | 31609.4 | 31660.3 | 29494.8 | -5.0199 | 0 | 0 |
| 900 | 5.3514 | 4745.6 | 45.4051 | 36119.0 | 32197.3 | 29586.6 | -4.1234 | 0 | 0 |
| 1000 | 5.3141 | 5278.9 | 45.9670 | 40688.1 | 32730.6 | 29672.6 | -3.4039 | 0 | 0 |
| 1100 | 5.2796 | 5808.6 | 46.4719 | 45310.5 | 33260.2 | 29753.5 | -2.8136 | 0 | 0 |
| 1200 | 5.2485 | 6334.9 | 46.9299 | 49980.9 | 33786.6 | 29829.6 | -2.3204 | 0 | 0 |
| 1300 | 5.2209 | 6858.4 | 47.3489 | 54695.2 | 34310.1 | 29901.6 | -1.9020 | 0 | 0 |
| 1400 | 5.1966 | 7379.2 | 47.7349 | 59449.6 | 34830.9 | 29969.9 | -1.5426 | 0 | 0 |
| 1500 | 5.1752 | 7897.8 | 48.0927 | 64241.2 | 35349.5 | 30035.0 | -1.2303 | 0 | 0 |
| 1600 | 5.1564 | 8414.4 | 48.4261 | 69067.3 | 35866.0 | 30097.1 | -0.9566 | 0 | 0 |
| 1700 | 5.1398 | 8929.2 | 48.7382 | 73925.7 | 36380.8 | 30156.5 | -0.7145 | 0 | 0 |
| 1800 | 5.1252 | 9442.4 | 49.0315 | 78814.3 | 36894.1 | 30213.6 | -0.4989 | 0 | 0 |
| 1900 | 5.1123 | 9954.3 | 49.3083 | 83731.5 | 37405.9 | 30268.5 | -0.3057 | 0 | 0 |
| 2000 | 5.1008 | 10464.9 | 49.5702 | 88675.5 | 37916.6 | 30321.4 | -0.1315 | 0 | 0 |
| 2100 | 5.0906 | 10974.5 | 49.8188 | 93645.0 | 38426.1 | 30372.5 | 0.0264 | 0 | 0 |
| 2200 | 5.0814 | 11483.1 | 50.0554 | 98638.9 | 38934.7 | 30421.9 | 0.1702 | 0 | 0 |
| 2300 | 5.0733 | 11990.8 | 50.2811 | 103655.8 | 39442.4 | 30469.7 | 0.3017 | 0 | 0 |
| 2400 | 5.0659 | 12497.7 | 50.4969 | 108694.7 | 39949.4 | 30516.1 | 0.4224 | 0 | 0 |
| 2500 | 5.0593 | 13004.0 | 50.7035 | 113754.8 | 40455.7 | 30561.0 | 0.5337 | 0 | 0 |
| 2600 | 5.0533 | 13509.6 | 50.9018 | 118835.2 | 40961.3 | 30604.6 | 0.6365 | 0 | 0 |
| 2700 | 5.0479 | 14014.7 | 51.0925 | 123934.9 | 41466.3 | 30647.0 | 0.7318 | 0 | 0 |
| 2800 | 5.0429 | 14519.2 | 51.2759 | 129053.4 | 41970.9 | 30688.2 | 0.8205 | 0 | 0 |
| 2900 | 5.0384 | 15023.3 | 51.4528 | 134189.9 | 42474.9 | 30728.3 | 0.9031 | 0 | 0 |
| 3000 | 5.0343 | 15526.9 | 51.6236 | 139343.8 | 42978.6 | 30767.2 | 0.9804 | 0 | 0 |
| 3100 | 5.0305 | 16030.1 | 51.7886 | 144514.4 | 43481.8 | 30805.2 | 1.0527 | 0 | 0 |
| 3200 | 5.0271 | 16533.0 | 51.9482 | 149701.3 | 43984.7 | 30842.1 | 1.1206 | 0 | 0 |
| 3300 | 5.0239 | 17035.6 | 52.1029 | 154903.9 | 44487.2 | 30878.0 | 1.1845 | 0 | 0 |
| 3400 | 5.0209 | 17537.8 | 52.2528 | 160121.7 | 44989.5 | 30913.0 | 1.2446 | 0 | 0 |
| 3500 | 5.0182 | 18039.8 | 52.3983 | 165354.3 | 45491.4 | 30947.0 | 1.3014 | 0 | 0 |
| 3600 | 5.0157 | 18541.5 | 52.5396 | 170601.3 | 45993.1 | 30980.2 | 1.3551 | 0 | 0 |
| 3700 | 5.0134 | 19042.9 | 52.6770 | 175862.1 | 46494.6 | 31012.4 | 1.4060 | 0 | 0 |
| 3800 | 5.0112 | 19544.1 | 52.8107 | 181136.5 | 46995.8 | 31043.8 | 1.4542 | 0 | 0 |
| 3900 | 5.0092 | 20045.2 | 52.9408 | 186424.2 | 47496.8 | 31074.4 | 1.5000 | 0 | 0 |
| 4000 | 5.0073 | 20546.0 | 53.0676 | 191724.6 | 47997.6 | 31104.1 | 1.5436 | 0 | 0 |
| 4100 | 5.0056 | 21046.6 | 53.1913 | 197037.6 | 48498.3 | 31133.1 | 1.5851 | 0 | 0 |
| 4200 | 5.0039 | 21547.1 | 53.3119 | 202362.7 | 48998.8 | 31161.2 | 1.6246 | 0 | 0 |
| 4300 | 5.0024 | 22047.4 | 53.4296 | 207699.9 | 49499.1 | 31188.5 | 1.6623 | 0 | 0 |
| 4400 | 5.0010 | 22547.6 | 53.5446 | 213048.6 | 49999.3 | 31215.1 | 1.6983 | 0 | 0 |
| 4500 | 4.9996 | 23047.6 | 53.6570 | 218408.7 | 50499.3 | 31240.9 | 1.7328 | 0 | 0 |
| 4600 | 4.9983 | 23547.5 | 53.7668 | 223779.9 | 50999.2 | 31265.9 | 1.7658 | 0 | 0 |
| 4700 | 4.9971 | 24047.3 | 53.8743 | 229162.0 | 51498.9 | 31290.2 | 1.7974 | 0 | 0 |
| 4800 | 4.9960 | 24546.9 | 53.9795 | 234554.7 | 51998.6 | 31313.7 | 1.8277 | 0 | 0 |
| 4900 | 4.9950 | 25046.5 | 54.0825 | 239957.8 | 52498.2 | 31336.5 | 1.8569 | 0 | 0 |
| 5000 | 4.9940 | 25545.9 | 54.1834 | 245371.1 | 52997.6 | 31358.6 | 1.8848 | 0 | 0 |
| 5100 | 4.9930 | 26045.3 | 54.2823 | 250794.4 | 53496.9 | 31380.0 | 1.9117 | 0 | 0 |
| 5200 | 4.9921 | 26544.5 | 54.3792 | 256227.5 | 53996.2 | 31400.6 | 1.9376 | 0 | 0 |
| 5300 | 4.9913 | 27043.7 | 54.4743 | 261670.2 | 54495.4 | 31420.5 | 1.9625 | 0 | 0 |
| 5400 | 4.9905 | 27542.8 | 54.5676 | 267122.3 | 54994.5 | 31439.8 | 1.9865 | 0 | 0 |
| 5500 | 4.9897 | 28041.8 | 54.6592 | 272583.7 | 55493.5 | 31458.3 | 2.0096 | 0 | 0 |
| 5600 | 4.9890 | 28540.7 | 54.7491 | 278054.1 | 55992.4 | 31476.1 | 2.0319 | 0 | 0 |
| 5700 | 4.9883 | 29039.6 | 54.8374 | 283533.4 | 56491.3 | 31493.3 | 2.0535 | 0 | 0 |
| 5800 | 4.9877 | 29538.4 | 54.9241 | 289021.5 | 56990.1 | 31509.7 | 2.0743 | 0 | 0 |
| 5900 | 4.9871 | 30037.1 | 55.0094 | 294518.2 | 57488.8 | 31525.5 | 2.0944 | 0 | 0 |
| 6000 | 4.9865 | 30535.8 | 55.0932 | 300023.3 | 57987.5 | 31540.6 | 2.1139 | 0 | 0 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (85) Cl₂ (gas); molecular weight, 70.914

| T, °K | C _p ^o , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -2193.5 | 0 | ----- | -57096.8 | ----- |
| 100 | 7.0014 | 696.0 | 45.1513 | 3819.2 | -1497.5 | 0 | 0 | -57394.5 | 120.4556 |
| 200 | 7.5760 | 1421.6 | 50.1576 | 8609.9 | -771.9 | 0 | 0 | -57666.9 | 57.6219 |
| 298.15 | 8.1116 | 2193.5 | 53.2905 | 13695.1 | 0 | 0 | 0 | -57901.3 | 36.8413 |
| 300 | 8.1193 | 2208.5 | 53.3407 | 13793.7 | 15.0 | 0 | 0 | -57905.6 | 36.5796 |
| 400 | 8.4379 | 3037.8 | 55.7244 | 19251.9 | 844.4 | 0 | 0 | -58136.9 | 26.0150 |
| 500 | 8.6251 | 3891.7 | 57.6291 | 24922.8 | 1698.3 | 0 | 0 | -58366.8 | 19.6508 |
| 600 | 8.7431 | 4760.6 | 59.2128 | 30767.1 | 2567.1 | 0 | 0 | -58584.8 | 15.3916 |
| 700 | 8.8232 | 5639.1 | 60.5670 | 36757.8 | 3445.6 | 0 | 0 | -58793.4 | 12.3380 |
| 800 | 8.8812 | 6524.5 | 61.7491 | 42874.8 | 4331.0 | 0 | 0 | -58989.5 | 10.0399 |
| 900 | 8.9257 | 7414.9 | 62.7978 | 49103.1 | 5221.4 | 0 | 0 | -59173.2 | 8.2467 |
| 1000 | 8.9615 | 8309.3 | 63.7402 | 55430.8 | 6115.9 | 0 | 0 | -59345.3 | 6.8078 |
| 1100 | 8.9914 | 9207.0 | 64.5957 | 61848.3 | 7013.5 | 0 | 0 | -59506.9 | 5.6272 |
| 1200 | 9.0172 | 10107.5 | 65.3792 | 68347.6 | 7914.0 | 0 | 0 | -59659.2 | 4.6408 |
| 1300 | 9.0401 | 11010.4 | 66.1019 | 74922.1 | 8816.9 | 0 | 0 | -59803.2 | 3.8040 |
| 1400 | 9.0609 | 11915.4 | 66.7726 | 81566.2 | 9722.0 | 0 | 0 | -59939.9 | 3.0851 |
| 1500 | 9.0800 | 12822.5 | 67.3984 | 88275.1 | 10629.0 | 0 | 0 | -60069.9 | 2.4607 |
| 1600 | 9.0980 | 13731.4 | 67.9850 | 95044.6 | 11537.9 | 0 | 0 | -60194.1 | 1.9131 |
| 1700 | 9.1150 | 14642.0 | 68.5371 | 101871.0 | 12448.6 | 0 | 0 | -60313.1 | 1.4290 |
| 1800 | 9.1312 | 15554.4 | 69.0585 | 108751.0 | 13360.9 | 0 | 0 | -60427.2 | 0.9979 |
| 1900 | 9.1469 | 16468.3 | 69.5527 | 115681.8 | 14274.8 | 0 | 0 | -60537.0 | 0.6114 |
| 2000 | 9.1620 | 17383.7 | 70.0222 | 122660.7 | 15190.2 | 0 | 0 | -60642.9 | 0.2630 |
| 2100 | 9.1768 | 18300.7 | 70.4696 | 129685.5 | 16107.2 | 0 | 0 | -60745.1 | -0.0528 |
| 2200 | 9.1912 | 19219.1 | 70.8968 | 136754.0 | 17025.6 | 0 | 0 | -60843.8 | -0.3404 |
| 2300 | 9.2054 | 20138.9 | 71.3057 | 143864.2 | 17945.4 | 0 | 0 | -60939.5 | -0.6034 |
| 2400 | 9.2194 | 21060.1 | 71.6978 | 151014.6 | 18866.7 | 0 | 0 | -61032.1 | -0.8448 |
| 2500 | 9.2331 | 21982.8 | 72.0744 | 158203.3 | 19789.3 | 0 | 0 | -61122.0 | -1.0673 |
| 2600 | 9.2467 | 22906.8 | 72.4368 | 165429.0 | 20713.3 | 0 | 0 | -61209.3 | -1.2730 |
| 2700 | 9.2602 | 23832.1 | 72.7860 | 172690.2 | 21638.6 | 0 | 0 | -61294.0 | -1.4636 |
| 2800 | 9.2735 | 24758.8 | 73.1231 | 179985.8 | 22565.3 | 0 | 0 | -61376.4 | -1.6409 |
| 2900 | 9.2867 | 25686.8 | 73.4487 | 187314.4 | 23493.3 | 0 | 0 | -61456.5 | -1.8062 |
| 3000 | 9.2999 | 26616.1 | 73.7638 | 194675.1 | 24422.7 | 0 | 0 | -61534.5 | -1.9607 |
| 3100 | 9.3129 | 27546.8 | 74.0689 | 202066.9 | 25353.3 | 0 | 0 | -61610.3 | -2.1054 |
| 3200 | 9.3259 | 28478.7 | 74.3648 | 209488.6 | 26285.2 | 0 | 0 | -61684.1 | -2.2412 |
| 3300 | 9.3388 | 29411.9 | 74.6520 | 216939.5 | 27218.5 | 0 | 0 | -61756.0 | -2.3689 |
| 3400 | 9.3517 | 30346.5 | 74.9309 | 224418.7 | 28153.0 | 0 | 0 | -61825.9 | -2.4893 |
| 3500 | 9.3645 | 31282.3 | 75.2022 | 231925.5 | 29088.8 | 0 | 0 | -61894.0 | -2.6029 |
| 3600 | 9.3773 | 32219.4 | 75.4662 | 239458.9 | 30025.9 | 0 | 0 | -61960.3 | -2.7103 |
| 3700 | 9.3901 | 33157.7 | 75.7233 | 247018.5 | 30964.3 | 0 | 0 | -62024.9 | -2.8120 |
| 3800 | 9.4028 | 34097.4 | 75.9739 | 254603.4 | 31903.9 | 0 | 0 | -62087.7 | -2.9085 |
| 3900 | 9.4155 | 35038.3 | 76.2183 | 262213.0 | 32844.8 | 0 | 0 | -62148.8 | -3.0001 |
| 4000 | 9.4281 | 35980.5 | 76.4568 | 269846.8 | 33787.0 | 0 | 0 | -62208.3 | -3.0872 |
| 4100 | 9.4407 | 36923.9 | 76.6898 | 277504.2 | 34730.5 | 0 | 0 | -62266.1 | -3.1701 |
| 4200 | 9.4533 | 37868.6 | 76.9174 | 285184.6 | 35675.2 | 0 | 0 | -62322.4 | -3.2492 |
| 4300 | 9.4659 | 38814.6 | 77.1400 | 292887.5 | 36621.1 | 0 | 0 | -62377.0 | -3.3246 |
| 4400 | 9.4785 | 39761.8 | 77.3578 | 300612.5 | 37568.3 | 0 | 0 | -62430.2 | -3.3967 |
| 4500 | 9.4910 | 40710.3 | 77.5709 | 308358.9 | 38516.8 | 0 | 0 | -62481.7 | -3.4656 |
| 4600 | 9.5036 | 41660.0 | 77.7797 | 316126.5 | 39466.6 | 0 | 0 | -62531.8 | -3.5316 |
| 4700 | 9.5161 | 42611.0 | 77.9842 | 323914.7 | 40417.5 | 0 | 0 | -62580.4 | -3.5949 |
| 4800 | 9.5286 | 43563.2 | 78.1847 | 331723.2 | 41369.8 | 0 | 0 | -62627.4 | -3.6555 |
| 4900 | 9.5411 | 44516.7 | 78.3813 | 339551.6 | 42323.3 | 0 | 0 | -62673.1 | -3.7137 |
| 5000 | 9.5536 | 45471.5 | 78.5742 | 347399.4 | 43278.0 | 0 | 0 | -62717.2 | -3.7696 |
| 5100 | 9.5660 | 46427.4 | 78.7635 | 355266.3 | 44234.0 | 0 | 0 | -62759.9 | -3.8234 |
| 5200 | 9.5785 | 47384.7 | 78.9493 | 363151.9 | 45191.2 | 0 | 0 | -62801.2 | -3.8751 |
| 5300 | 9.5910 | 48343.1 | 79.1319 | 371056.0 | 46149.7 | 0 | 0 | -62841.1 | -3.9249 |
| 5400 | 9.6034 | 49302.9 | 79.3113 | 378978.2 | 47109.4 | 0 | 0 | -62879.5 | -3.9729 |
| 5500 | 9.6158 | 50263.8 | 79.4876 | 386918.2 | 48070.3 | 0 | 0 | -62916.6 | -4.0192 |
| 5600 | 9.6283 | 51226.0 | 79.6610 | 394875.6 | 49032.6 | 0 | 0 | -62952.3 | -4.0639 |
| 5700 | 9.6407 | 52189.5 | 79.8315 | 402850.3 | 49996.0 | 0 | 0 | -62986.5 | -4.1070 |
| 5800 | 9.6531 | 53154.2 | 79.9993 | 410841.9 | 50960.7 | 0 | 0 | -63019.4 | -4.1486 |
| 5900 | 9.6655 | 54120.1 | 80.1644 | 418850.1 | 51926.6 | 0 | 0 | -63051.0 | -4.1889 |
| 6000 | 9.6779 | 55087.3 | 80.3270 | 426874.7 | 52893.8 | 0 | 0 | -63081.2 | -4.2278 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
(86) ClCN (gas); molecular weight, 61.476

| T , °K | C_p^o , cal/mole °K | $H_T^o - H_0^o$, cal/mole | S_T^o , cal/mole °K | $-(F_T^o - H_0^o)$, cal/mole | H_T^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^o)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^o , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 29093.8 | 31477.9 | ----- | -279639.8 | ----- |
| 100 | 7.4680 | 704.7 | 46.5741 | 3952.7 | 29798.5 | 31473.1 | -67.7571 | -280499.0 | 601.8875 |
| 200 | 9.4360 | 1552.3 | 52.3695 | 8921.6 | 30646.2 | 31532.3 | -33.3503 | -281149.7 | 295.0949 |
| 298.15 | 10.7216 | 2547.2 | 56.3995 | 14268.3 | 31641.0 | 31641.0 | -21.9911 | -281635.1 | 193.8829 |
| 300 | 10.7398 | 2567.0 | 56.4658 | 14372.7 | 31660.9 | 31643.2 | -21.8482 | -281643.3 | 192.6099 |
| 400 | 11.5122 | 3682.6 | 59.6700 | 20185.4 | 32776.5 | 31748.5 | -16.0764 | -282052.6 | 141.2834 |
| 500 | 12.0337 | 4861.3 | 62.2978 | 26287.7 | 33955.1 | 31829.9 | -12.6029 | -282409.0 | 110.4452 |
| 600 | 12.4388 | 6085.6 | 64.5289 | 32631.8 | 35179.4 | 31886.1 | -10.2822 | -282723.1 | 89.8617 |
| 700 | 12.7759 | 7346.8 | 66.4724 | 39183.9 | 36440.6 | 31920.3 | -8.6221 | -282999.4 | 75.1438 |
| 800 | 13.0619 | 8639.1 | 68.1976 | 45919.0 | 37732.9 | 31938.3 | -7.3761 | -283241.7 | 64.0951 |
| 900 | 13.3044 | 9957.7 | 69.7504 | 52817.7 | 39051.6 | 31945.4 | -6.4065 | -283453.9 | 55.4948 |
| 1000 | 13.5096 | 11298.7 | 71.1631 | 59864.4 | 40392.5 | 31945.2 | -5.6308 | -283639.9 | 48.6097 |
| 1100 | 13.6830 | 12658.6 | 72.4591 | 67046.4 | 41752.4 | 31939.8 | -4.9962 | -283803.5 | 42.9730 |
| 1200 | 13.8295 | 14034.4 | 73.6561 | 74353.0 | 43128.2 | 31929.3 | -4.4675 | -283947.8 | 38.2731 |
| 1300 | 13.9536 | 15423.7 | 74.7681 | 81774.8 | 44517.6 | 31913.9 | -4.0203 | -284075.7 | 34.2944 |
| 1400 | 14.0590 | 16824.5 | 75.8062 | 89304.1 | 45918.3 | 31893.6 | -3.6372 | -284189.8 | 30.8827 |
| 1500 | 14.1491 | 18235.0 | 76.7793 | 96933.9 | 47328.9 | 31868.7 | -3.3054 | -284292.0 | 27.9247 |
| 1600 | 14.2263 | 19653.9 | 77.6950 | 104658.1 | 48747.7 | 31839.5 | -3.0153 | -284384.1 | 25.3356 |
| 1700 | 14.2929 | 21079.9 | 78.5595 | 112471.2 | 50173.8 | 31806.6 | -2.7596 | -284467.8 | 23.0503 |
| 1800 | 14.3506 | 22512.2 | 79.3781 | 120368.4 | 51606.0 | 31769.9 | -2.5326 | -284544.3 | 21.0184 |
| 1900 | 14.4009 | 23949.8 | 80.1554 | 128345.4 | 53043.7 | 31729.5 | -2.3297 | -284614.7 | 19.2000 |
| 2000 | 14.4448 | 25392.1 | 80.8952 | 136398.3 | 54486.0 | 31685.4 | -2.1474 | -284680.2 | 17.5630 |
| 2100 | 14.4835 | 26838.6 | 81.6009 | 144523.3 | 55932.4 | 31637.9 | -1.9826 | -284741.6 | 16.0815 |
| 2200 | 14.5176 | 28288.7 | 82.2755 | 152717.4 | 57382.5 | 31587.2 | -1.8331 | -284799.6 | 14.7345 |
| 2300 | 14.5478 | 29742.0 | 82.9215 | 160977.5 | 58835.8 | 31533.6 | -1.6968 | -284855.1 | 13.5043 |
| 2400 | 14.5747 | 31198.1 | 83.5412 | 169300.8 | 60292.0 | 31477.1 | -1.5720 | -284908.5 | 12.3764 |
| 2500 | 14.5988 | 32656.8 | 84.1367 | 177684.9 | 61750.7 | 31418.1 | -1.4575 | -284960.6 | 11.3386 |
| 2600 | 14.6203 | 34117.8 | 84.7097 | 186127.4 | 63211.6 | 31356.6 | -1.3520 | -285011.7 | 10.3805 |
| 2700 | 14.6397 | 35580.8 | 85.2618 | 194626.2 | 64674.7 | 31292.7 | -1.2544 | -285062.5 | 9.4931 |
| 2800 | 14.6572 | 37045.7 | 85.7946 | 203179.1 | 66139.5 | 31226.5 | -1.1641 | -285113.2 | 8.6690 |
| 2900 | 14.6731 | 38512.2 | 86.3092 | 211784.5 | 67606.1 | 31158.1 | -1.0801 | -285164.4 | 7.9016 |
| 3000 | 14.6875 | 39980.3 | 86.8069 | 220440.4 | 69074.1 | 31087.4 | -1.0019 | -285216.4 | 7.1852 |
| 3100 | 14.7006 | 41449.7 | 87.2887 | 229145.3 | 70543.5 | 31014.5 | -0.9290 | -285269.5 | 6.5149 |
| 3200 | 14.7126 | 42920.3 | 87.7556 | 237897.7 | 72014.2 | 30939.5 | -0.8607 | -285324.2 | 5.8864 |
| 3300 | 14.7235 | 44392.1 | 88.2085 | 246696.0 | 73486.0 | 30862.3 | -0.7968 | -285380.6 | 5.2959 |
| 3400 | 14.7336 | 45865.0 | 88.6482 | 255538.9 | 74958.9 | 30783.2 | -0.7367 | -285439.1 | 4.7400 |
| 3500 | 14.7428 | 47338.8 | 89.0754 | 264425.2 | 76432.7 | 30702.3 | -0.6803 | -285500.0 | 4.2157 |
| 3600 | 14.7514 | 48813.6 | 89.4909 | 273353.6 | 77907.4 | 30619.4 | -0.6271 | -285563.6 | 3.7205 |
| 3700 | 14.7592 | 50289.1 | 89.8952 | 282323.0 | 79382.9 | 30534.5 | -0.5769 | -285630.1 | 3.2519 |
| 3800 | 14.7665 | 51765.4 | 90.2889 | 291332.3 | 80859.2 | 30447.8 | -0.5295 | -285699.8 | 2.8079 |
| 3900 | 14.7733 | 53242.4 | 90.6725 | 300380.5 | 82336.2 | 30359.1 | -0.4847 | -285772.8 | 2.3865 |
| 4000 | 14.7795 | 54720.0 | 91.0466 | 309466.5 | 83813.9 | 30268.6 | -0.4422 | -285849.5 | 1.9861 |
| 4100 | 14.7854 | 56198.3 | 91.4116 | 318589.5 | 85292.1 | 30176.2 | -0.4020 | -285930.0 | 1.6052 |
| 4200 | 14.7908 | 57677.1 | 91.7680 | 327748.5 | 86770.9 | 30082.5 | -0.3633 | -286014.5 | 1.2422 |
| 4300 | 14.7959 | 59156.4 | 92.1161 | 336942.8 | 88250.3 | 30000.0 | -0.3261 | -286103.2 | 0.8961 |
| 4400 | 14.8006 | 60636.3 | 92.4563 | 346171.5 | 89730.1 | 29918.1 | -0.2904 | -286196.2 | 0.5656 |
| 4500 | 14.8051 | 62116.5 | 92.7890 | 355433.8 | 91210.4 | 29836.4 | -0.2562 | -286293.8 | 0.2496 |
| 4600 | 14.8092 | 63597.3 | 93.1144 | 364729.0 | 92691.1 | 29755.1 | -0.2233 | -286396.0 | -0.0527 |
| 4700 | 14.8131 | 65078.4 | 93.4329 | 374056.5 | 94172.2 | 29674.2 | -0.1918 | -286503.1 | -0.3422 |
| 4800 | 14.8168 | 66559.9 | 93.7449 | 383415.4 | 95653.7 | 29593.7 | -0.1616 | -286615.0 | -0.6198 |
| 4900 | 14.8202 | 68041.7 | 94.0504 | 392805.2 | 97135.6 | 29513.6 | -0.1326 | -286731.9 | -0.8862 |
| 5000 | 14.8235 | 69523.9 | 94.3498 | 402225.3 | 98617.8 | 29433.9 | -0.1048 | -286854.0 | -1.1420 |
| 5100 | 14.8265 | 71006.4 | 94.6434 | 411675.0 | 100100.3 | 29354.6 | -0.0781 | -286981.2 | -1.3879 |
| 5200 | 14.8294 | 72489.2 | 94.9313 | 421153.8 | 101583.1 | 29275.7 | -0.0525 | -287113.7 | -1.6244 |
| 5300 | 14.8322 | 73972.3 | 95.2138 | 430661.1 | 103066.1 | 29197.2 | -0.0278 | -287251.4 | -1.8522 |
| 5400 | 14.8348 | 75455.6 | 95.4911 | 440196.4 | 104549.5 | 29119.1 | -0.0040 | -287394.5 | -2.0715 |
| 5500 | 14.8372 | 76939.2 | 95.7633 | 449759.1 | 106033.1 | 29041.4 | 0.0207 | -287543.0 | -2.2831 |
| 5600 | 14.8395 | 78423.1 | 96.0307 | 459348.9 | 107516.9 | 28964.1 | 0.0468 | -287696.8 | -2.4872 |
| 5700 | 14.8417 | 79907.1 | 96.2934 | 468965.1 | 109001.0 | 28887.2 | 0.0733 | -287856.1 | -2.6842 |
| 5800 | 14.8438 | 81391.4 | 96.5515 | 478607.4 | 110485.3 | 28810.7 | 0.1002 | -288020.6 | -2.8745 |
| 5900 | 14.8458 | 82875.9 | 96.8053 | 488275.3 | 111969.7 | 28734.5 | 0.1274 | -288190.6 | -3.0585 |
| 6000 | 14.8477 | 84360.6 | 97.0548 | 497968.3 | 113454.4 | 28658.6 | 0.1549 | -288365.9 | -3.2365 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(87) ClF (gas); molecular weight, 54.457

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_T^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_T° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -15581.6 | -13430.1 | ----- | -60333.5 | ----- |
| 100 | 6.9610 | 695.2 | 44.2285 | 3727.7 | -14886.5 | -13430.3 | 29.6356 | -60633.7 | 127.7349 |
| 200 | 7.2006 | 1399.6 | 49.1022 | 8420.8 | -14182.0 | -13438.7 | 14.9579 | -60954.1 | 61.3470 |
| 298.15 | 7.6682 | 2129.2 | 52.0639 | 13393.6 | -13452.4 | -13452.4 | 10.1217 | -61261.2 | 39.3724 |
| 300 | 7.6767 | 2143.4 | 52.1113 | 13490.0 | -13438.2 | -13452.7 | 10.0609 | -61266.8 | 39.0955 |
| 400 | 8.0671 | 2931.7 | 54.3765 | 18818.9 | -12649.9 | -13464.1 | 7.6100 | -61588.9 | 27.9142 |
| 500 | 8.3338 | 3752.6 | 56.2072 | 24351.0 | -11829.0 | -13472.8 | 6.1383 | -61801.0 | 21.1757 |
| 600 | 8.5139 | 4595.6 | 57.7436 | 30050.6 | -10986.0 | -13480.0 | 5.1566 | -62027.3 | 16.6659 |
| 700 | 8.6393 | 5453.6 | 59.0660 | 35892.6 | -10128.0 | -13486.4 | 4.4550 | -62252.2 | 13.4332 |
| 800 | 8.7300 | 6322.3 | 60.2258 | 41858.4 | -9259.3 | -13492.5 | 3.9286 | -62419.2 | 11.0011 |
| 900 | 8.7984 | 7198.9 | 61.2582 | 47933.5 | -8382.8 | -13498.5 | 3.5190 | -62591.5 | 9.1040 |
| 1000 | 8.8518 | 8081.5 | 62.1881 | 54106.6 | -7500.2 | -13504.6 | 3.1911 | -62751.5 | 7.5822 |
| 1100 | 8.8950 | 8968.9 | 63.0339 | 60368.3 | -6612.7 | -13511.0 | 2.9228 | -62901.1 | 6.3340 |
| 1200 | 8.9308 | 9860.2 | 63.8094 | 66711.0 | -5721.4 | -13517.7 | 2.6990 | -63042.1 | 5.2915 |
| 1300 | 8.9613 | 10754.9 | 64.5255 | 73128.2 | -4826.8 | -13524.7 | 2.5096 | -63175.5 | 4.4074 |
| 1400 | 8.9880 | 11652.4 | 65.1906 | 79614.4 | -3929.3 | -13532.1 | 2.3472 | -63302.5 | 3.6481 |
| 1500 | 9.0116 | 12552.4 | 65.8115 | 86164.9 | -3029.3 | -13539.9 | 2.2063 | -63423.9 | 2.9887 |
| 1600 | 9.0330 | 13454.6 | 66.3938 | 92775.4 | -2127.0 | -13548.1 | 2.0830 | -63540.3 | 2.4107 |
| 1700 | 9.0526 | 14358.9 | 66.9420 | 99442.5 | -1222.7 | -13556.8 | 1.9741 | -63652.4 | 1.8997 |
| 1800 | 9.0708 | 15265.1 | 67.4600 | 106162.8 | -316.5 | -13565.9 | 1.8772 | -63760.5 | 1.4447 |
| 1900 | 9.0879 | 16173.1 | 67.9509 | 112933.6 | 591.4 | -13575.5 | 1.7905 | -63865.1 | 1.0370 |
| 2000 | 9.1040 | 17082.7 | 68.4174 | 119752.2 | 1501.0 | -13585.5 | 1.7124 | -63966.5 | 0.6694 |
| 2100 | 9.1194 | 17993.8 | 68.8620 | 126616.4 | 2412.2 | -13596.0 | 1.6417 | -64064.8 | 0.3363 |
| 2200 | 9.1342 | 18906.5 | 69.2866 | 133523.9 | 3324.9 | -13606.9 | 1.5774 | -64160.5 | 0.0330 |
| 2300 | 9.1485 | 19820.7 | 69.6929 | 140473.1 | 4239.0 | -13618.4 | 1.5186 | -64253.5 | -0.2443 |
| 2400 | 9.1623 | 20736.2 | 70.0826 | 147462.0 | 5154.6 | -13630.3 | 1.4646 | -64344.2 | -0.4988 |
| 2500 | 9.1758 | 21653.1 | 70.4569 | 154489.1 | 6071.5 | -13642.7 | 1.4150 | -64432.7 | -0.7334 |
| 2600 | 9.1889 | 22571.3 | 70.8170 | 161552.9 | 6989.7 | -13655.6 | 1.3691 | -64519.0 | -0.9501 |
| 2700 | 9.2018 | 23490.9 | 71.1640 | 168652.0 | 7909.2 | -13669.0 | 1.3266 | -64603.3 | -1.1511 |
| 2800 | 9.2144 | 24411.7 | 71.4989 | 175785.3 | 8830.1 | -13682.8 | 1.2870 | -64685.6 | -1.3380 |
| 2900 | 9.2269 | 25333.8 | 71.8225 | 182951.4 | 9752.1 | -13697.2 | 1.2502 | -64766.1 | -1.5122 |
| 3000 | 9.2392 | 26257.1 | 72.1355 | 190149.4 | 10675.4 | -13712.0 | 1.2158 | -64844.9 | -1.6750 |
| 3100 | 9.2513 | 27181.6 | 72.4386 | 197378.2 | 11600.0 | -13727.3 | 1.1835 | -64921.9 | -1.8274 |
| 3200 | 9.2633 | 28107.3 | 72.7325 | 204636.8 | 12525.7 | -13743.1 | 1.1533 | -64997.3 | -1.9705 |
| 3300 | 9.2752 | 29034.2 | 73.0178 | 211924.4 | 13452.6 | -13759.4 | 1.1248 | -65071.0 | -2.1051 |
| 3400 | 9.2869 | 29962.3 | 73.2948 | 219240.1 | 14380.7 | -13776.2 | 1.0980 | -65143.2 | -2.2319 |
| 3500 | 9.2986 | 30891.6 | 73.5642 | 226583.1 | 15310.0 | -13793.5 | 1.0727 | -65213.9 | -2.3516 |
| 3600 | 9.3102 | 31822.1 | 73.8263 | 233952.7 | 16240.4 | -13811.3 | 1.0487 | -65283.1 | -2.4648 |
| 3700 | 9.3217 | 32753.7 | 74.0816 | 241348.2 | 17172.0 | -13829.6 | 1.0260 | -65350.8 | -2.5720 |
| 3800 | 9.3331 | 33686.4 | 74.3303 | 248768.8 | 18104.8 | -13848.4 | 1.0045 | -65417.1 | -2.6736 |
| 3900 | 9.3445 | 34620.3 | 74.5729 | 256214.0 | 19038.6 | -13867.6 | 0.9841 | -65482.0 | -2.7701 |
| 4000 | 9.3559 | 35555.3 | 74.8096 | 263683.2 | 19973.7 | -13887.4 | 0.9647 | -65545.5 | -2.8619 |
| 4100 | 9.3672 | 36491.5 | 75.0408 | 271175.8 | 20909.8 | -13907.6 | 0.9461 | -65607.7 | -2.9493 |
| 4200 | 9.3784 | 37428.7 | 75.2666 | 278691.2 | 21847.1 | -13928.4 | 0.9285 | -65668.5 | -3.0326 |
| 4300 | 9.3896 | 38367.1 | 75.4875 | 286228.9 | 22785.5 | -13949.6 | 0.9116 | -65728.1 | -3.1121 |
| 4400 | 9.4008 | 39306.7 | 75.7034 | 293788.5 | 23725.0 | -13971.4 | 0.8955 | -65786.3 | -3.1880 |
| 4500 | 9.4119 | 40247.3 | 75.9148 | 301369.5 | 24665.7 | -13993.6 | 0.8801 | -65843.2 | -3.2607 |
| 4600 | 9.4230 | 41189.0 | 76.1218 | 308971.3 | 25607.4 | -14016.3 | 0.8653 | -65898.9 | -3.3302 |
| 4700 | 9.4341 | 42131.9 | 76.3246 | 316593.7 | 26550.3 | -14039.6 | 0.8511 | -65953.3 | -3.3969 |
| 4800 | 9.4451 | 43075.9 | 76.5233 | 324236.1 | 27494.2 | -14063.3 | 0.8375 | -66006.4 | -3.4608 |
| 4900 | 9.4562 | 44020.9 | 76.7182 | 331898.2 | 28439.3 | -14087.5 | 0.8244 | -66058.3 | -3.5221 |
| 5000 | 9.4672 | 44967.1 | 76.9093 | 339579.6 | 29385.4 | -14112.2 | 0.8118 | -66109.0 | -3.5811 |
| 5100 | 9.4781 | 45914.4 | 77.0969 | 347280.0 | 30332.7 | -14137.4 | 0.7997 | -66158.4 | -3.6378 |
| 5200 | 9.4891 | 46862.7 | 77.2811 | 354998.9 | 31281.1 | -14163.1 | 0.7881 | -66206.7 | -3.6923 |
| 5300 | 9.5001 | 47812.2 | 77.4619 | 362736.1 | 32230.5 | -14189.3 | 0.7768 | -66253.7 | -3.7448 |
| 5400 | 9.5110 | 48762.7 | 77.6396 | 370491.2 | 33181.1 | -14216.0 | 0.7660 | -66299.6 | -3.7954 |
| 5500 | 9.5219 | 49714.4 | 77.8142 | 378263.9 | 34132.7 | -14243.2 | 0.7555 | -66344.2 | -3.8442 |
| 5600 | 9.5328 | 50667.1 | 77.9859 | 386053.9 | 35085.5 | -14270.9 | 0.7454 | -66387.7 | -3.8913 |
| 5700 | 9.5437 | 51620.9 | 78.1547 | 393861.0 | 36039.3 | -14299.1 | 0.7356 | -66430.0 | -3.9368 |
| 5800 | 9.5546 | 52575.8 | 78.3208 | 401684.8 | 36994.2 | -14327.8 | 0.7261 | -66471.2 | -3.9807 |
| 5900 | 9.5654 | 53531.9 | 78.4842 | 409525.1 | 37950.2 | -14357.0 | 0.7170 | -66511.1 | -4.0232 |
| 6000 | 9.5763 | 54488.9 | 78.6451 | 417381.5 | 38907.3 | -14386.7 | 0.7081 | -66550.0 | -4.0642 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(88) ClF_3 (gas); molecular weight, 92.457

| T, °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -42000.0 | -37738.8 | ----- | -121352.2 | ----- |
| 100 | 8.8723 | 812.4 | 54.4336 | 4631.0 | -41187.6 | -38316.5 | 77.3585 | -122532.3 | 251.2007 |
| 200 | 12.5823 | 1884.8 | 61.7161 | 10458.5 | -40115.2 | -38657.2 | 35.3177 | -123536.4 | 116.8631 |
| 298.15 | 15.2577 | 3262.0 | 67.2833 | 16798.5 | -38738.0 | -38738.0 | 21.3943 | -124263.1 | 72.3052 |
| 300 | 15.2980 | 3290.3 | 67.3778 | 16923.0 | -38709.7 | -38738.0 | 21.2192 | -124274.7 | 71.7435 |
| 400 | 16.8756 | 4906.2 | 72.0157 | 23900.0 | -37033.8 | -38691.9 | 14.1670 | -124809.4 | 49.0645 |
| 500 | 17.7931 | 6643.8 | 75.8893 | 31300.8 | -35356.2 | -38589.4 | 9.9439 | -125209.0 | 35.4054 |
| 600 | 18.3656 | 8454.2 | 79.1883 | 39058.8 | -33545.8 | -38460.6 | 7.1371 | -125517.7 | 26.2734 |
| 700 | 18.7340 | 10310.4 | 82.0490 | 47123.9 | -31687.6 | -38319.1 | 5.1394 | -125763.0 | 19.7360 |
| 800 | 18.9845 | 12197.1 | 84.5679 | 55457.2 | -29802.9 | -38171.3 | 3.6467 | -125962.1 | 14.8243 |
| 900 | 19.1618 | 14104.9 | 86.8148 | 64028.4 | -27895.1 | -38020.9 | 2.4903 | -126126.8 | 10.9985 |
| 1000 | 19.2914 | 16027.9 | 88.8407 | 72812.9 | -25972.1 | -37869.8 | 1.5688 | -126265.0 | 7.9342 |
| 1100 | 19.3889 | 17962.1 | 90.6842 | 81790.5 | -24037.9 | -37719.2 | 0.8179 | -126382.6 | 5.4245 |
| 1200 | 19.4640 | 19904.9 | 92.3746 | 90944.6 | -22095.1 | -37569.9 | 0.1946 | -126483.8 | 3.3313 |
| 1300 | 19.5230 | 21854.4 | 93.9350 | 100261.1 | -20145.6 | -37422.6 | -0.3307 | -126571.7 | 1.5588 |
| 1400 | 19.5702 | 23809.1 | 95.3836 | 109727.9 | -18190.9 | -37277.4 | -0.7792 | -126648.8 | 0.0385 |
| 1500 | 19.6084 | 25768.1 | 96.7351 | 119334.5 | -16231.9 | -37134.8 | -1.1664 | -126716.8 | -1.2798 |
| 1600 | 19.6399 | 27730.6 | 98.0010 | 129072.1 | -14269.4 | -36994.8 | -1.5039 | -126777.4 | -2.4340 |
| 1700 | 19.6661 | 29695.9 | 99.1931 | 138932.4 | -12304.1 | -36857.7 | -1.8006 | -126831.5 | -3.4528 |
| 1800 | 19.6881 | 31663.7 | 100.3178 | 148908.4 | -10336.3 | -36723.5 | -2.0633 | -126880.2 | -4.3588 |
| 1900 | 19.7068 | 33633.4 | 101.3826 | 158994.0 | -8366.6 | -36592.3 | -2.2976 | -126924.3 | -5.1697 |
| 2000 | 19.7228 | 35604.9 | 102.3941 | 169183.2 | -6395.1 | -36464.3 | -2.5077 | -126964.4 | -5.8997 |
| 2100 | 19.7366 | 37577.9 | 103.3567 | 179471.2 | -4422.1 | -36339.4 | -2.6971 | -127000.9 | -6.5605 |
| 2200 | 19.7486 | 39552.2 | 104.2751 | 189853.1 | -2447.8 | -36217.7 | -2.8687 | -127034.4 | -7.1613 |
| 2300 | 19.7591 | 41527.6 | 105.1532 | 200324.8 | -472.4 | -36099.2 | -3.0249 | -127065.2 | -7.7100 |
| 2400 | 19.7683 | 43504.0 | 105.9944 | 210892.5 | 1504.0 | -35984.0 | -3.1676 | -127093.6 | -8.2131 |
| 2500 | 19.7764 | 45481.2 | 106.8015 | 221522.6 | 3481.2 | -35872.0 | -3.2984 | -127119.9 | -8.6761 |
| 2600 | 19.7836 | 47459.2 | 107.5773 | 232241.8 | 5459.2 | -35763.4 | -3.4188 | -127144.2 | -9.1035 |
| 2700 | 19.7900 | 49437.9 | 108.3241 | 243037.1 | 7437.9 | -35658.1 | -3.5300 | -127166.9 | -9.4994 |
| 2800 | 19.7958 | 51417.2 | 109.0439 | 253905.7 | 9417.2 | -35556.1 | -3.6330 | -127188.1 | -9.8670 |
| 2900 | 19.8010 | 53397.0 | 109.7386 | 264845.0 | 11397.0 | -35457.5 | -3.7285 | -127207.8 | -10.2094 |
| 3000 | 19.8057 | 55377.4 | 110.4100 | 275852.6 | 13377.4 | -35362.2 | -3.8175 | -127226.4 | -10.5289 |
| 3100 | 19.8099 | 57358.2 | 111.0595 | 286926.3 | 15358.2 | -35270.4 | -3.9005 | -127243.7 | -10.8279 |
| 3200 | 19.8137 | 59339.3 | 111.6885 | 298063.8 | 17339.3 | -35181.9 | -3.9781 | -127260.1 | -11.1083 |
| 3300 | 19.8172 | 61320.9 | 112.2983 | 309263.3 | 19320.9 | -35096.8 | -4.0508 | -127275.5 | -11.3716 |
| 3400 | 19.8204 | 63302.8 | 112.8899 | 320522.9 | 21302.8 | -35015.1 | -4.1191 | -127290.0 | -11.6195 |
| 3500 | 19.8234 | 65285.0 | 113.4645 | 331840.7 | 23285.0 | -34936.8 | -4.1833 | -127303.8 | -11.8533 |
| 3600 | 19.8260 | 67267.4 | 114.0230 | 343215.3 | 25267.4 | -34861.9 | -4.2438 | -127316.8 | -12.0741 |
| 3700 | 19.8285 | 69250.2 | 114.5662 | 354644.8 | 27250.2 | -34790.4 | -4.3010 | -127329.1 | -12.2830 |
| 3800 | 19.8308 | 71233.1 | 115.0950 | 366128.0 | 29233.1 | -34722.3 | -4.3550 | -127340.9 | -12.4810 |
| 3900 | 19.8329 | 73216.3 | 115.6102 | 377663.4 | 31216.3 | -34657.6 | -4.4061 | -127352.0 | -12.6687 |
| 4000 | 19.8349 | 75199.7 | 116.1123 | 389249.6 | 33199.7 | -34596.4 | -4.4546 | -127362.6 | -12.8472 |
| 4100 | 19.8367 | 77183.3 | 116.6021 | 400885.4 | 35183.3 | -34538.6 | -4.5007 | -127372.7 | -13.0169 |
| 4200 | 19.8384 | 79167.1 | 117.0802 | 412569.7 | 37167.1 | -34484.2 | -4.5445 | -127382.3 | -13.1785 |
| 4300 | 19.8399 | 81151.0 | 117.5470 | 424301.1 | 39151.0 | -34433.3 | -4.5862 | -127391.5 | -13.3327 |
| 4400 | 19.8414 | 83135.0 | 118.0031 | 436078.7 | 41135.0 | -34385.8 | -4.6260 | -127400.3 | -13.4798 |
| 4500 | 19.8428 | 85119.2 | 118.4490 | 447901.4 | 43119.2 | -34341.7 | -4.6639 | -127408.8 | -13.6205 |
| 4600 | 19.8440 | 87103.6 | 118.8852 | 459768.2 | 45103.6 | -34301.0 | -4.7001 | -127416.8 | -13.7550 |
| 4700 | 19.8452 | 89088.0 | 119.3119 | 471678.1 | 47088.1 | -34263.8 | -4.7348 | -127424.6 | -13.8838 |
| 4800 | 19.8464 | 91072.6 | 119.7293 | 483630.3 | 49072.6 | -34230.1 | -4.7679 | -127432.0 | -14.0072 |
| 4900 | 19.8474 | 93057.3 | 120.1390 | 495623.8 | 51057.3 | -34199.7 | -4.7997 | -127439.1 | -14.1256 |
| 5000 | 19.8484 | 95042.1 | 120.5400 | 507657.8 | 53042.1 | -34172.8 | -4.8302 | -127446.0 | -14.2393 |
| 5100 | 19.8494 | 97027.0 | 120.9330 | 519731.5 | 55027.0 | -34149.4 | -4.8595 | -127452.5 | -14.3485 |
| 5200 | 19.8502 | 99012.0 | 121.3185 | 531844.1 | 57012.0 | -34129.4 | -4.8876 | -127458.9 | -14.4536 |
| 5300 | 19.8511 | 100997.1 | 121.6966 | 543995.0 | 58997.1 | -34112.9 | -4.9147 | -127465.0 | -14.5546 |
| 5400 | 19.8519 | 102982.2 | 122.0677 | 556183.2 | 60982.2 | -34099.8 | -4.9407 | -127470.9 | -14.6520 |
| 5500 | 19.8526 | 104967.4 | 122.4319 | 568408.3 | 62967.4 | -34090.1 | -4.9658 | -127476.6 | -14.7458 |
| 5600 | 19.8533 | 106952.7 | 122.7897 | 580669.4 | 64952.7 | -34083.9 | -4.9900 | -127482.1 | -14.8362 |
| 5700 | 19.8540 | 108938.1 | 123.1411 | 592966.0 | 66938.1 | -34081.1 | -5.0133 | -127487.3 | -14.9235 |
| 5800 | 19.8546 | 110923.5 | 123.4864 | 605297.4 | 68923.5 | -34081.8 | -5.0359 | -127492.5 | -15.0078 |
| 5900 | 19.8552 | 112909.0 | 123.8250 | 617663.1 | 70909.0 | -34086.0 | -5.0576 | -127497.4 | -15.0892 |
| 6000 | 19.8558 | 114894.6 | 124.1595 | 630062.4 | 72894.6 | -34093.5 | -5.0787 | -127502.2 | -15.1679 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(89) ClO (gas); molecular weight, 51.457

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| C | ----- | C | ----- | 0 | 22090.8 | 24224.9 | ----- | -63310.0 | ----- |
| 100 | 6.9598 | 695.1 | 46.3727 | 3942.2 | 22785.9 | 24225.3 | -52.2646 | -63639.2 | 134.6952 |
| 200 | 7.1274 | 1356.5 | 51.2281 | 8849.1 | 23487.3 | 24215.9 | -25.7564 | -63594.2 | 65.0040 |
| 298.15 | 7.5432 | 2115.7 | 54.1485 | 14028.6 | 24206.5 | 24206.5 | -17.0875 | -64300.7 | 41.9354 |
| 300 | 7.5514 | 2129.7 | 54.1952 | 14128.9 | 24220.5 | 24206.5 | -16.9780 | -64306.1 | 41.6447 |
| 400 | 7.9464 | 2905.4 | 56.4241 | 19664.2 | 24996.2 | 24212.5 | -12.5654 | -64578.6 | 29.9106 |
| 500 | 8.2345 | 3715.3 | 58.2301 | 25399.7 | 25806.1 | 24229.8 | -9.9229 | -64820.2 | 22.8416 |
| 600 | 8.4363 | 4549.5 | 59.7504 | 31300.8 | 26640.3 | 24252.0 | -8.1571 | -65036.8 | 18.1122 |
| 700 | 8.5797 | 5400.6 | 61.0622 | 37342.9 | 27491.5 | 24274.9 | -6.8946 | -65233.0 | 14.7232 |
| 800 | 8.6650 | 6264.1 | 62.2151 | 43507.9 | 28355.0 | 24296.9 | -5.9469 | -65412.4 | 12.1741 |
| 900 | 8.7650 | 7136.8 | 63.2429 | 49781.8 | 29227.6 | 24317.3 | -5.2091 | -65577.9 | 10.1862 |
| 1000 | 8.8277 | 8016.6 | 64.1697 | 56153.1 | 30107.4 | 24336.0 | -4.6184 | -65731.6 | 8.5920 |
| 1100 | 8.8785 | 8902.0 | 65.0136 | 62612.9 | 30992.8 | 24353.1 | -4.1347 | -65875.5 | 7.2847 |
| 1200 | 8.9208 | 9792.0 | 65.7880 | 69153.5 | 31882.8 | 24368.7 | -3.7314 | -66011.0 | 6.1929 |
| 1300 | 8.9568 | 10685.9 | 66.5035 | 75768.6 | 32776.7 | 24382.8 | -3.3900 | -66139.3 | 5.2673 |
| 1400 | 8.9882 | 11583.2 | 67.1684 | 82452.6 | 33674.0 | 24395.6 | -3.0971 | -66261.5 | 4.4724 |
| 1500 | 9.0161 | 12483.4 | 67.7895 | 89200.8 | 34574.3 | 24406.9 | -2.8432 | -66378.1 | 3.7823 |
| 1600 | 9.0412 | 13386.3 | 68.3722 | 96009.2 | 35477.1 | 24416.9 | -2.6205 | -66489.9 | 3.1773 |
| 1700 | 9.0642 | 14291.6 | 68.9210 | 102874.1 | 36382.4 | 24425.4 | -2.4247 | -66597.4 | 2.6427 |
| 1800 | 9.0856 | 15199.1 | 69.4397 | 109792.4 | 37289.9 | 24432.4 | -2.2502 | -66701.1 | 2.1667 |
| 1900 | 9.1055 | 16108.7 | 69.9315 | 116761.1 | 38199.5 | 24437.8 | -2.0940 | -66801.2 | 1.7402 |
| 2000 | 9.1244 | 17020.2 | 70.3990 | 123777.9 | 39111.0 | 24441.6 | -1.9535 | -66898.1 | 1.3557 |
| 2100 | 9.1424 | 17933.5 | 70.8447 | 130840.2 | 40024.4 | 24443.7 | -1.8263 | -66992.1 | 1.0074 |
| 2200 | 9.1596 | 18848.7 | 71.2704 | 137946.1 | 40939.5 | 24444.0 | -1.7107 | -67083.4 | 0.6903 |
| 2300 | 9.1762 | 19765.4 | 71.6779 | 145093.7 | 41856.3 | 24442.6 | -1.6051 | -67172.3 | 0.4003 |
| 2400 | 9.1523 | 20683.9 | 72.0688 | 152281.2 | 42774.7 | 24435.4 | -1.5083 | -67258.8 | 0.1342 |
| 2500 | 9.2079 | 21603.9 | 72.4443 | 159506.9 | 43694.7 | 24434.4 | -1.4193 | -67343.3 | -0.1109 |
| 2600 | 9.2232 | 22525.4 | 72.8058 | 166769.5 | 44616.3 | 24427.6 | -1.3372 | -67425.9 | -0.3374 |
| 2700 | 9.2381 | 23448.5 | 73.1541 | 174067.7 | 45539.3 | 24419.1 | -1.2612 | -67506.7 | -0.5475 |
| 2800 | 9.2527 | 24373.1 | 73.4904 | 181400.0 | 46463.9 | 24408.8 | -1.1906 | -67585.9 | -0.7427 |
| 2900 | 9.2672 | 25299.1 | 73.8153 | 188765.3 | 47389.9 | 24396.9 | -1.1249 | -67663.6 | -0.9247 |
| 3000 | 9.2813 | 26226.5 | 74.1297 | 196162.7 | 48317.3 | 24383.3 | -1.0636 | -67739.9 | -1.0948 |
| 3100 | 9.2954 | 27155.3 | 74.4343 | 203591.0 | 49246.1 | 24368.1 | -1.0064 | -67815.0 | -1.2541 |
| 3200 | 9.3092 | 28085.5 | 74.7296 | 211049.2 | 50176.4 | 24351.4 | -0.9527 | -67889.1 | -1.4035 |
| 3300 | 9.3229 | 29017.2 | 75.0163 | 218536.6 | 51108.0 | 24333.2 | -0.9023 | -67962.1 | -1.5441 |
| 3400 | 9.3365 | 29950.1 | 75.2948 | 226052.2 | 52040.9 | 24313.7 | -0.8549 | -68034.2 | -1.6766 |
| 3500 | 9.3500 | 30884.4 | 75.5656 | 233595.3 | 52975.3 | 24292.8 | -0.8103 | -68105.5 | -1.8016 |
| 3600 | 9.3633 | 31820.1 | 75.8292 | 241165.1 | 53910.9 | 24270.6 | -0.7682 | -68176.2 | -1.9198 |
| 3700 | 9.3766 | 32757.1 | 76.0860 | 248760.9 | 54847.9 | 24247.3 | -0.7284 | -68246.1 | -2.0317 |
| 3800 | 9.3898 | 33695.4 | 76.3362 | 256382.1 | 55786.2 | 24222.8 | -0.6907 | -68315.5 | -2.1378 |
| 3900 | 9.4029 | 34635.1 | 76.5803 | 264028.0 | 56725.9 | 24197.3 | -0.6550 | -68384.5 | -2.2386 |
| 4000 | 9.4160 | 35576.0 | 76.8185 | 271697.9 | 57666.8 | 24170.8 | -0.6211 | -68453.0 | -2.3344 |
| 4100 | 9.4290 | 36518.3 | 77.0512 | 279391.5 | 58609.1 | 24143.4 | -0.5890 | -68521.1 | -2.4257 |
| 4200 | 9.4419 | 37461.8 | 77.2785 | 287108.0 | 59552.6 | 24115.1 | -0.5583 | -68588.8 | -2.5127 |
| 4300 | 9.4548 | 38406.6 | 77.5008 | 294847.0 | 60497.4 | 24086.0 | -0.5292 | -68656.3 | -2.5957 |
| 4400 | 9.4677 | 39352.8 | 77.7184 | 302608.0 | 61443.6 | 24056.1 | -0.5014 | -68723.5 | -2.6751 |
| 4500 | 9.4805 | 40300.2 | 77.9313 | 310390.5 | 62391.0 | 24025.6 | -0.4748 | -68790.5 | -2.7510 |
| 4600 | 9.4932 | 41248.8 | 78.1398 | 318194.1 | 63339.7 | 23994.4 | -0.4495 | -68857.3 | -2.8236 |
| 4700 | 9.5060 | 42198.8 | 78.3441 | 326018.3 | 64289.6 | 23962.6 | -0.4252 | -68923.9 | -2.8933 |
| 4800 | 9.5187 | 43150.0 | 78.5443 | 333862.8 | 65240.9 | 23930.3 | -0.4020 | -68990.3 | -2.9601 |
| 4900 | 9.5314 | 44102.5 | 78.7407 | 341727.1 | 66193.4 | 23897.5 | -0.3798 | -69056.5 | -3.0242 |
| 5000 | 9.5440 | 45056.3 | 78.9334 | 349610.8 | 67147.1 | 23864.1 | -0.3585 | -69122.6 | -3.0858 |
| 5100 | 9.5566 | 46011.3 | 79.1225 | 357513.6 | 68102.2 | 23830.4 | -0.3381 | -69188.6 | -3.1451 |
| 5200 | 9.5692 | 46967.6 | 79.3082 | 365435.2 | 69058.5 | 23796.2 | -0.3185 | -69254.3 | -3.2021 |
| 5300 | 9.5818 | 47925.2 | 79.4906 | 373375.2 | 70016.0 | 23761.6 | -0.2996 | -69320.0 | -3.2571 |
| 5400 | 9.5944 | 48884.0 | 79.6699 | 381333.2 | 70974.8 | 23726.7 | -0.2815 | -69385.4 | -3.3100 |
| 5500 | 9.6069 | 49844.1 | 79.8460 | 389309.0 | 71934.9 | 23691.5 | -0.2640 | -69450.7 | -3.3611 |
| 5600 | 9.6195 | 50805.4 | 80.0192 | 397302.3 | 72896.2 | 23656.0 | -0.2472 | -69515.8 | -3.4104 |
| 5700 | 9.6320 | 51768.0 | 80.1896 | 405312.8 | 73858.8 | 23620.2 | -0.2311 | -69580.7 | -3.4580 |
| 5800 | 9.6445 | 52731.8 | 80.3572 | 413340.2 | 74822.6 | 23584.2 | -0.2154 | -69645.4 | -3.5040 |
| 5900 | 9.6570 | 53696.9 | 80.5222 | 421384.2 | 75787.7 | 23547.9 | -0.2004 | -69709.8 | -3.5485 |
| 6000 | 9.6694 | 54663.2 | 80.6846 | 429444.5 | 76754.0 | 23511.5 | -0.1859 | -69774.0 | -3.5916 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(90) ClO_2 (gas); molecular weight, 67.457

| T, °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | | 0 | | | | | | | |
| 100 | 8.0818 | 796.7 | 51.7296 | 4376.3 | 22419.5 | 25591.0 | | -120930.5 | |
| 200 | 8.9889 | 1647.0 | 57.5869 | 9870.4 | 23216.2 | 25346.2 | -58.0669 | -121685.5 | 255.6248 |
| 298.15 | 10.0341 | 2580.5 | 61.3706 | 15717.2 | 24066.5 | 25137.8 | -30.4645 | -122449.1 | 122.3253 |
| 300 | 10.0534 | 2599.1 | 61.4327 | 15830.7 | 25000.0 | 25000.0 | -21.4457 | -123063.9 | 78.1793 |
| 400 | 11.0055 | 3653.7 | 64.4601 | 22130.3 | 25018.6 | 24998.1 | -21.3327 | -123074.4 | 77.6230 |
| 500 | 11.7376 | 4792.7 | 66.9987 | 28706.6 | 26073.2 | 24927.9 | -16.7869 | -123585.9 | 55.1655 |
| | | | | | 27212.2 | 24908.8 | -14.0644 | -124008.9 | 41.6393 |
| 600 | 12.2722 | 5994.6 | 69.1885 | 35518.5 | 28414.1 | 24921.0 | -12.2496 | -124364.1 | 32.5931 |
| 700 | 12.6614 | 7242.3 | 71.1111 | 42535.5 | 29661.8 | 24951.5 | -10.9522 | -124667.7 | 26.1144 |
| 800 | 12.9493 | 8523.5 | 72.8215 | 49733.7 | 30943.0 | 24992.4 | -9.9777 | -124931.5 | 21.2442 |
| 900 | 13.1672 | 9829.8 | 74.3599 | 57094.0 | 32249.3 | 25039.4 | -9.2184 | -125164.3 | 17.4488 |
| 1000 | 13.3362 | 11155.3 | 75.7563 | 64600.9 | 33574.9 | 25090.0 | -8.6098 | -125372.5 | 14.4070 |
| 1100 | 13.4703 | 12495.9 | 77.0339 | 72241.3 | 34915.4 | 25142.9 | -8.1109 | -125560.9 | 11.9144 |
| 1200 | 13.5792 | 13848.6 | 78.2108 | 80004.4 | 36268.1 | 25196.8 | -7.6942 | -125732.9 | 9.8342 |
| 1300 | 13.6694 | 15211.1 | 79.3014 | 87880.6 | 37630.7 | 25251.2 | -7.3408 | -125891.5 | 8.0717 |
| 1400 | 13.7456 | 16582.0 | 80.3172 | 95862.1 | 39001.5 | 25305.6 | -7.0373 | -126038.5 | 6.5592 |
| 1500 | 13.8109 | 17959.9 | 81.2679 | 103941.9 | 40379.4 | 25359.2 | -6.7737 | -126175.8 | 5.2468 |
| 1600 | 13.8680 | 19343.9 | 82.1611 | 112113.8 | 41763.4 | 25411.9 | -6.5425 | -126304.7 | 4.0973 |
| 1700 | 13.9185 | 20733.3 | 83.0034 | 120372.4 | 43152.8 | 25463.0 | -6.3381 | -126426.1 | 3.0820 |
| 1800 | 13.9637 | 22127.4 | 83.8002 | 128713.0 | 44546.9 | 25512.3 | -6.1561 | -126541.0 | 2.1787 |
| 1900 | 14.0047 | 23525.9 | 84.5563 | 137131.1 | 45945.4 | 25559.4 | -5.9929 | -126650.1 | 1.3698 |
| 2000 | 14.0423 | 24928.3 | 85.2756 | 145623.0 | 47347.8 | 25604.1 | -5.8458 | -126753.9 | 0.6411 |
| 2100 | 14.0771 | 26334.2 | 85.9616 | 154185.1 | 48753.8 | 25646.0 | -5.7125 | -126853.0 | -0.0187 |
| 2200 | 14.1095 | 27743.6 | 86.6172 | 162814.3 | 50163.1 | 25685.0 | -5.5911 | -126947.9 | -0.6190 |
| 2300 | 14.1399 | 29156.1 | 87.2451 | 171507.6 | 51575.6 | 25721.0 | -5.4801 | -127039.0 | -1.1675 |
| 2400 | 14.1687 | 30571.5 | 87.8475 | 180262.5 | 52991.0 | 25753.8 | -5.3782 | -127126.6 | -1.6706 |
| 2500 | 14.1961 | 31989.8 | 88.4265 | 189076.4 | 54409.3 | 25783.3 | -5.2843 | -127211.1 | -2.1338 |
| 2600 | 14.2223 | 33410.7 | 88.9837 | 197947.0 | 55830.2 | 25809.6 | -5.1976 | -127292.8 | -2.5616 |
| 2700 | 14.2475 | 34834.2 | 89.5210 | 206872.4 | 57253.7 | 25832.6 | -5.1172 | -127372.0 | -2.9580 |
| 2800 | 14.2718 | 36260.2 | 90.0396 | 215850.6 | 58679.7 | 25852.3 | -5.0425 | -127448.9 | -3.3263 |
| 2900 | 14.2953 | 37688.5 | 90.5408 | 224879.8 | 60108.0 | 25868.7 | -4.9729 | -127523.9 | -3.6694 |
| 3000 | 14.3182 | 39119.2 | 91.0258 | 233958.2 | 61538.7 | 25882.0 | -4.9079 | -127597.1 | -3.9898 |
| 3100 | 14.3404 | 40552.1 | 91.4957 | 243084.4 | 62971.7 | 25892.3 | -4.8471 | -127668.9 | -4.2898 |
| 3200 | 14.3622 | 41987.3 | 91.9513 | 252256.9 | 64406.8 | 25899.5 | -4.7900 | -127739.4 | -4.5711 |
| 3300 | 14.3835 | 43424.6 | 92.3936 | 261474.2 | 65844.1 | 25903.8 | -4.7364 | -127808.8 | -4.8355 |
| 3400 | 14.4044 | 44864.0 | 92.8233 | 270735.2 | 67283.5 | 25905.4 | -4.6860 | -127877.4 | -5.0845 |
| 3500 | 14.4249 | 46305.4 | 93.2411 | 280038.5 | 68724.9 | 25904.4 | -4.6384 | -127945.3 | -5.3194 |
| 3600 | 14.4451 | 47748.9 | 93.6478 | 289383.0 | 70168.4 | 25900.8 | -4.5935 | -128012.6 | -5.5414 |
| 3700 | 14.4650 | 49194.4 | 94.0438 | 298767.7 | 71614.0 | 25894.8 | -4.5510 | -128079.6 | -5.7515 |
| 3800 | 14.4847 | 50641.9 | 94.4298 | 308191.5 | 73061.4 | 25886.5 | -4.5107 | -128146.3 | -5.9506 |
| 3900 | 14.5041 | 52091.4 | 94.8063 | 317653.4 | 74510.9 | 25876.1 | -4.4726 | -128213.0 | -6.1396 |
| 4000 | 14.5234 | 53542.8 | 95.1758 | 327152.4 | 75962.3 | 25863.7 | -4.4363 | -128279.6 | -6.3193 |
| 4100 | 14.5424 | 54996.0 | 95.5327 | 336687.8 | 77415.6 | 25849.4 | -4.4019 | -128346.4 | -6.4903 |
| 4200 | 14.5613 | 56451.2 | 95.8833 | 346258.7 | 78870.7 | 25833.3 | -4.3691 | -128413.4 | -6.6532 |
| 4300 | 14.5800 | 57908.3 | 96.2262 | 355864.2 | 80327.8 | 25815.5 | -4.3378 | -128480.6 | -6.8086 |
| 4400 | 14.5986 | 59367.2 | 96.5616 | 365503.7 | 81786.7 | 25796.1 | -4.3080 | -128548.2 | -6.9571 |
| 4500 | 14.6170 | 60828.0 | 96.8899 | 375176.3 | 83247.5 | 25775.2 | -4.2795 | -128616.1 | -7.0990 |
| 4600 | 14.6353 | 62290.6 | 97.2113 | 384881.4 | 84710.1 | 25752.9 | -4.2523 | -128684.5 | -7.2348 |
| 4700 | 14.6536 | 63755.1 | 97.5263 | 394618.3 | 86174.6 | 25729.4 | -4.2263 | -128753.4 | -7.3649 |
| 4800 | 14.6717 | 65221.3 | 97.8350 | 404386.5 | 87640.9 | 25704.6 | -4.2014 | -128822.8 | -7.4897 |
| 4900 | 14.6897 | 66689.4 | 98.1377 | 414185.1 | 89108.9 | 25678.7 | -4.1775 | -128892.7 | -7.6094 |
| 5000 | 14.7076 | 68159.3 | 98.4346 | 424013.8 | 90578.8 | 25651.8 | -4.1546 | -128963.1 | -7.7244 |
| 5100 | 14.7255 | 69630.9 | 98.7260 | 433871.9 | 92050.4 | 25623.8 | -4.1327 | -129034.0 | -7.8350 |
| 5200 | 14.7433 | 71104.4 | 99.0122 | 443758.8 | 93523.9 | 25594.9 | -4.1116 | -129105.5 | -7.9413 |
| 5300 | 14.7610 | 72579.6 | 99.2932 | 453674.1 | 94999.1 | 25565.2 | -4.0913 | -129177.5 | -8.0437 |
| 5400 | 14.7787 | 74056.6 | 99.5692 | 463617.3 | 96476.1 | 25534.6 | -4.0718 | -129250.0 | -8.1424 |
| 5500 | 14.7963 | 75535.3 | 99.8406 | 473587.8 | 97954.8 | 25503.3 | -4.0530 | -129322.9 | -8.2375 |
| 5600 | 14.8138 | 77015.8 | 100.1073 | 483585.3 | 99435.3 | 25471.2 | -4.0349 | -129396.3 | -8.3293 |
| 5700 | 14.8313 | 78498.1 | 100.3697 | 493609.2 | 100917.6 | 25438.5 | -4.0175 | -129470.1 | -8.4179 |
| 5800 | 14.8488 | 79982.1 | 100.6278 | 503659.1 | 102401.6 | 25405.1 | -4.0007 | -129544.3 | -8.5036 |
| 5900 | 14.8662 | 81467.9 | 100.8818 | 513734.6 | 103887.4 | 25371.2 | -3.9845 | -129618.8 | -8.5863 |
| 6000 | 14.8836 | 82955.3 | 101.1318 | 523835.3 | 105374.8 | 25336.7 | -3.9688 | -129693.7 | -8.6664 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(91) Cl₂O (gas); molecular weight, 86.914

| T, °K | C _p , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | | 0 | | 0 | 15381.8 | 18612.7 | | -97470.6 | |
| 100 | 8.3894 | 804.3 | 53.3239 | 4528.1 | 16186.1 | 18374.2 | -42.8922 | -98187.5 | 204.2953 |
| 200 | 9.6908 | 1708.2 | 59.5374 | 10199.3 | 17090.0 | 18204.6 | -22.8926 | -98839.0 | 96.7187 |
| 298.15 | 10.8491 | 2718.2 | 63.6307 | 16253.3 | 18100.0 | 18100.0 | -16.3623 | -99357.9 | 61.0812 |
| 300 | 10.8683 | 2738.3 | 63.6979 | 16371.1 | 18120.1 | 18098.6 | -16.2805 | -99366.8 | 60.6321 |
| 400 | 11.7395 | 3871.3 | 66.9515 | 22909.3 | 19253.2 | 18047.2 | -12.9893 | -99812.3 | 42.4981 |
| 500 | 12.3289 | 5076.7 | 69.6388 | 29742.7 | 20458.6 | 18033.1 | -11.0183 | -100199.3 | 31.5716 |
| 600 | 12.7245 | 6330.7 | 71.9239 | 36823.7 | 21712.5 | 18040.6 | -9.7045 | -100540.5 | 24.2605 |
| 700 | 12.9956 | 7617.5 | 73.9070 | 44117.4 | 22999.3 | 18059.9 | -8.7653 | -100844.7 | 19.0214 |
| 800 | 13.1867 | 8927.1 | 75.6555 | 51597.3 | 24309.0 | 18085.4 | -8.0601 | -101118.7 | 15.0808 |
| 900 | 13.3253 | 10253.1 | 77.2171 | 59242.3 | 25634.9 | 18113.9 | -7.5107 | -101367.9 | 12.0079 |
| 1000 | 13.4286 | 11591.0 | 78.6267 | 67035.7 | 26972.9 | 18143.6 | -7.0706 | -101596.7 | 9.5437 |
| 1100 | 13.5073 | 12938.0 | 79.9104 | 74963.5 | 28319.8 | 18173.4 | -6.7098 | -101808.7 | 7.5232 |
| 1200 | 13.5684 | 14291.9 | 81.0884 | 83014.2 | 29673.7 | 18202.6 | -6.4087 | -102006.7 | 5.8361 |
| 1300 | 13.6169 | 15651.3 | 82.1765 | 91178.2 | 31033.3 | 18230.7 | -6.1535 | -102193.0 | 4.4058 |
| 1400 | 13.6558 | 17015.0 | 83.1871 | 99466.9 | 32396.8 | 18257.4 | -5.9344 | -102369.6 | 3.1776 |
| 1500 | 13.6876 | 18382.2 | 84.1303 | 107813.3 | 33764.0 | 18282.2 | -5.7443 | -102537.8 | 2.1114 |
| 1600 | 13.7139 | 19752.3 | 85.0146 | 116271.0 | 35134.1 | 18304.9 | -5.5777 | -102699.0 | 1.1770 |
| 1700 | 13.7358 | 21124.8 | 85.8467 | 124814.5 | 36506.6 | 18325.3 | -5.4306 | -102854.0 | 0.3513 |
| 1800 | 13.7542 | 22499.3 | 86.6323 | 133438.8 | 37881.2 | 18343.2 | -5.2996 | -103003.9 | -0.3838 |
| 1900 | 13.7700 | 23875.6 | 87.3764 | 142139.6 | 39257.4 | 18358.3 | -5.1824 | -103149.2 | -1.0425 |
| 2000 | 13.7834 | 25253.3 | 88.0831 | 150912.9 | 40635.1 | 18370.6 | -5.0768 | -103290.6 | -1.5361 |
| 2100 | 13.7951 | 26632.2 | 88.7558 | 159755.1 | 42014.0 | 18379.8 | -4.9811 | -103428.6 | -2.1739 |
| 2200 | 13.8052 | 28012.2 | 89.3978 | 168663.0 | 43394.1 | 18385.8 | -4.8942 | -103563.5 | -2.6635 |
| 2300 | 13.8141 | 29393.2 | 90.0117 | 177633.7 | 44775.0 | 18388.7 | -4.8148 | -103695.9 | -3.1110 |
| 2400 | 13.8218 | 30775.0 | 90.5998 | 186664.5 | 46156.8 | 18388.2 | -4.7420 | -103826.1 | -3.5218 |
| 2500 | 13.8287 | 32157.5 | 91.1642 | 195752.9 | 47539.4 | 18384.4 | -4.6750 | -103954.3 | -3.9002 |
| 2600 | 13.8349 | 33540.7 | 91.7067 | 204896.6 | 48922.6 | 18377.3 | -4.6132 | -104080.9 | -4.2499 |
| 2700 | 13.8403 | 34924.5 | 92.2289 | 214093.5 | 50306.3 | 18366.8 | -4.5560 | -104206.0 | -4.5741 |
| 2800 | 13.8452 | 36308.8 | 92.7323 | 223341.7 | 51690.6 | 18352.9 | -4.5029 | -104330.0 | -4.8755 |
| 2900 | 13.8496 | 37693.5 | 93.2182 | 232639.4 | 53075.3 | 18335.7 | -4.4536 | -104453.0 | -5.1565 |
| 3000 | 13.8536 | 39078.7 | 93.6878 | 241984.8 | 54460.5 | 18315.2 | -4.4075 | -104575.3 | -5.4190 |
| 3100 | 13.8572 | 40464.2 | 94.1422 | 251376.5 | 55846.1 | 18291.4 | -4.3645 | -104696.9 | -5.6649 |
| 3200 | 13.8605 | 41850.1 | 94.5822 | 260812.8 | 57231.9 | 18264.4 | -4.3243 | -104818.2 | -5.8957 |
| 3300 | 13.8635 | 43236.3 | 95.0087 | 270292.4 | 58618.1 | 18234.2 | -4.2865 | -104939.1 | -6.1127 |
| 3400 | 13.8662 | 44622.8 | 95.4226 | 279814.1 | 60004.6 | 18200.8 | -4.2510 | -105060.0 | -6.3173 |
| 3500 | 13.8687 | 46009.5 | 95.8246 | 289376.6 | 61391.4 | 18164.5 | -4.2176 | -105180.9 | -6.5103 |
| 3600 | 13.8710 | 47396.5 | 96.2153 | 298978.7 | 62778.4 | 18125.1 | -4.1861 | -105301.8 | -6.6928 |
| 3700 | 13.8731 | 48783.7 | 96.5954 | 308619.3 | 64165.6 | 18082.8 | -4.1564 | -105423.1 | -6.8657 |
| 3800 | 13.8750 | 50171.1 | 96.9654 | 318297.4 | 65553.0 | 18037.6 | -4.1284 | -105544.6 | -7.0297 |
| 3900 | 13.8768 | 51558.7 | 97.3258 | 328012.0 | 66940.6 | 17989.6 | -4.1018 | -105666.6 | -7.1854 |
| 4000 | 13.8785 | 52946.5 | 97.6772 | 337762.3 | 68328.3 | 17938.8 | -4.0766 | -105789.1 | -7.3335 |
| 4100 | 13.8801 | 54334.4 | 98.0199 | 347547.2 | 69716.3 | 17885.3 | -4.0528 | -105912.2 | -7.4746 |
| 4200 | 13.8815 | 55722.5 | 98.3544 | 357366.0 | 71104.3 | 17829.2 | -4.0301 | -106035.9 | -7.6090 |
| 4300 | 13.8829 | 57110.7 | 98.6811 | 367217.8 | 72492.6 | 17770.5 | -4.0086 | -106160.3 | -7.7374 |
| 4400 | 13.8841 | 58499.1 | 99.0002 | 377101.9 | 73880.9 | 17709.3 | -3.9881 | -106285.4 | -7.8601 |
| 4500 | 13.8853 | 59887.6 | 99.3123 | 387017.6 | 75269.4 | 17645.6 | -3.9686 | -106411.4 | -7.9775 |
| 4600 | 13.8864 | 61276.1 | 99.6175 | 396944.2 | 76658.0 | 17579.5 | -3.9500 | -106538.1 | -8.0899 |
| 4700 | 13.8874 | 62664.8 | 99.9161 | 406940.9 | 78046.7 | 17510.9 | -3.9322 | -106665.8 | -8.1977 |
| 4800 | 13.8884 | 64053.6 | 100.2085 | 416947.2 | 79435.4 | 17440.0 | -3.9153 | -106794.3 | -8.3011 |
| 4900 | 13.8893 | 65442.5 | 100.4949 | 426982.4 | 80824.3 | 17366.8 | -3.8991 | -106923.7 | -8.4003 |
| 5000 | 13.8901 | 66831.5 | 100.7755 | 437046.0 | 82213.3 | 17291.3 | -3.8837 | -107054.1 | -8.4958 |
| 5100 | 13.8909 | 68220.5 | 101.0506 | 447137.3 | 83602.3 | 17213.6 | -3.8689 | -107185.3 | -8.5876 |
| 5200 | 13.8917 | 69609.6 | 101.3203 | 457255.9 | 84991.5 | 17133.6 | -3.8547 | -107317.5 | -8.6760 |
| 5300 | 13.8924 | 70998.8 | 101.5849 | 467401.2 | 86380.7 | 17051.5 | -3.8412 | -107450.7 | -8.7611 |
| 5400 | 13.8931 | 72388.1 | 101.8446 | 477572.0 | 87770.0 | 16967.2 | -3.8282 | -107584.8 | -8.8432 |
| 5500 | 13.8937 | 73777.5 | 102.0995 | 487770.7 | 89159.3 | 16880.7 | -3.8157 | -107719.8 | -8.9224 |
| 5600 | 13.8943 | 75166.9 | 102.3499 | 497992.5 | 90548.7 | 16792.2 | -3.8038 | -107855.7 | -8.9989 |
| 5700 | 13.8949 | 76556.3 | 102.5958 | 508239.8 | 91938.1 | 16701.6 | -3.7923 | -107992.6 | -9.0728 |
| 5800 | 13.8954 | 77945.8 | 102.8375 | 518511.5 | 93327.7 | 16608.9 | -3.7813 | -108130.4 | -9.1442 |
| 5900 | 13.8959 | 79335.4 | 103.0750 | 528807.1 | 94717.2 | 16514.2 | -3.7707 | -108269.1 | -9.2133 |
| 6000 | 13.8964 | 80725.0 | 103.3086 | 539126.3 | 96106.8 | 16417.4 | -3.7606 | -108408.6 | -9.2802 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(92) F (gas); molecular weight, 19.00

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 17300.2 | 18355.0 | ----- | 0 | ----- |
| 100 | 5.0681 | 498.5 | 32.1160 | 2713.1 | 17798.7 | 18506.2 | -37.8715 | 0 | 0 |
| 200 | 5.4029 | 1024.4 | 35.7460 | 6125.0 | 18324.5 | 18681.9 | -17.5782 | 0 | 0 |
| 298.15 | 5.4357 | 1558.0 | 37.9170 | 9747.0 | 18858.2 | 18858.2 | -10.8301 | 0 | 0 |
| 300 | 5.4358 | 1568.0 | 37.9506 | 9817.2 | 18868.2 | 18861.3 | -10.7448 | 0 | 0 |
| 400 | 5.3615 | 2108.2 | 39.5050 | 13693.8 | 19408.4 | 19016.4 | -7.2967 | 0 | 0 |
| 500 | 5.2823 | 2640.3 | 40.6927 | 17706.1 | 19940.4 | 19145.7 | -5.2120 | 0 | 0 |
| 600 | 5.2183 | 3165.1 | 41.6498 | 21824.8 | 20465.3 | 19254.9 | -3.8135 | 0 | 0 |
| 700 | 5.1696 | 3684.4 | 42.4504 | 26030.9 | 20984.6 | 19349.1 | -2.8092 | 0 | 0 |
| 800 | 5.1327 | 4199.5 | 43.1382 | 30311.1 | 21499.6 | 19432.0 | -2.0525 | 0 | 0 |
| 900 | 5.1046 | 4711.3 | 43.7410 | 34655.7 | 22011.4 | 19506.4 | -1.4616 | 0 | 0 |
| 1000 | 5.0829 | 5220.6 | 44.2777 | 39057.1 | 22520.8 | 19574.2 | -0.9872 | 0 | 0 |
| 1100 | 5.0658 | 5728.0 | 44.7613 | 43509.4 | 23028.2 | 19636.7 | -0.5977 | 0 | 0 |
| 1200 | 5.0521 | 6233.9 | 45.2015 | 48007.9 | 23534.0 | 19694.8 | -0.2721 | 0 | 0 |
| 1300 | 5.0411 | 6738.5 | 45.6054 | 52548.5 | 24038.7 | 19749.2 | 0.0042 | 0 | 0 |
| 1400 | 5.0321 | 7242.1 | 45.9786 | 57128.0 | 24542.3 | 19800.5 | 0.2416 | 0 | 0 |
| 1500 | 5.0246 | 7745.0 | 46.3250 | 61743.4 | 25045.2 | 19849.0 | 0.4479 | 0 | 0 |
| 1600 | 5.0184 | 8247.1 | 46.6496 | 66392.3 | 25547.3 | 19895.2 | 0.6289 | 0 | 0 |
| 1700 | 5.0131 | 8748.7 | 46.9537 | 71072.6 | 26048.9 | 19939.1 | 0.7889 | 0 | 0 |
| 1800 | 5.0086 | 9249.8 | 47.2401 | 75782.5 | 26549.9 | 19981.0 | 0.9315 | 0 | 0 |
| 1900 | 5.0048 | 9750.4 | 47.5108 | 80520.1 | 27050.6 | 20021.1 | 1.0593 | 0 | 0 |
| 2000 | 5.0014 | 10250.7 | 47.7674 | 85284.2 | 27550.9 | 20059.5 | 1.1745 | 0 | 0 |
| 2100 | 4.9985 | 10750.7 | 48.0114 | 90073.2 | 28050.9 | 20096.3 | 1.2790 | 0 | 0 |
| 2200 | 4.9960 | 11250.4 | 48.2439 | 94886.1 | 28550.6 | 20131.6 | 1.3741 | 0 | 0 |
| 2300 | 4.9937 | 11749.9 | 48.4659 | 99721.6 | 29050.1 | 20165.4 | 1.4612 | 0 | 0 |
| 2400 | 4.9918 | 12249.2 | 48.6784 | 104578.9 | 29549.4 | 20197.9 | 1.5411 | 0 | 0 |
| 2500 | 4.9900 | 12748.3 | 48.8821 | 109457.0 | 30048.5 | 20228.9 | 1.6147 | 0 | 0 |
| 2600 | 4.9884 | 13247.2 | 49.0778 | 114355.1 | 30547.4 | 20258.7 | 1.6827 | 0 | 0 |
| 2700 | 4.9870 | 13746.0 | 49.2660 | 119272.3 | 31046.2 | 20287.3 | 1.7459 | 0 | 0 |
| 2800 | 4.9858 | 14244.6 | 49.4474 | 124208.1 | 31544.8 | 20314.6 | 1.8045 | 0 | 0 |
| 2900 | 4.9846 | 14743.1 | 49.6223 | 129161.6 | 32043.3 | 20340.7 | 1.8592 | 0 | 0 |
| 3000 | 4.9836 | 15241.5 | 49.7913 | 134132.3 | 32541.7 | 20365.6 | 1.9104 | 0 | 0 |
| 3100 | 4.9826 | 15739.8 | 49.9547 | 139119.7 | 33040.0 | 20389.4 | 1.9583 | 0 | 0 |
| 3200 | 4.9818 | 16238.1 | 50.1129 | 144123.1 | 33538.3 | 20412.1 | 2.0032 | 0 | 0 |
| 3300 | 4.9810 | 16736.2 | 50.2661 | 149142.1 | 34036.4 | 20433.6 | 2.0455 | 0 | 0 |
| 3400 | 4.9803 | 17234.3 | 50.4148 | 154176.2 | 34534.5 | 20454.0 | 2.0853 | 0 | 0 |
| 3500 | 4.9796 | 17732.3 | 50.5592 | 159224.9 | 35032.4 | 20473.3 | 2.1229 | 0 | 0 |
| 3600 | 4.9790 | 18230.2 | 50.6995 | 164287.9 | 35530.4 | 20491.6 | 2.1584 | 0 | 0 |
| 3700 | 4.9784 | 18728.1 | 50.8359 | 169364.6 | 36028.2 | 20508.8 | 2.1920 | 0 | 0 |
| 3800 | 4.9779 | 19225.9 | 50.9686 | 174454.9 | 36526.1 | 20524.9 | 2.2239 | 0 | 0 |
| 3900 | 4.9774 | 19723.6 | 51.0979 | 179558.3 | 37023.8 | 20540.0 | 2.2542 | 0 | 0 |
| 4000 | 4.9770 | 20221.4 | 51.2239 | 184674.4 | 37521.6 | 20554.0 | 2.2830 | 0 | 0 |
| 4100 | 4.9766 | 20719.0 | 51.3468 | 189802.9 | 38019.2 | 20567.0 | 2.3104 | 0 | 0 |
| 4200 | 4.9762 | 21216.7 | 51.4667 | 194943.6 | 38516.9 | 20579.0 | 2.3365 | 0 | 0 |
| 4300 | 4.9758 | 21714.3 | 51.5836 | 200096.2 | 39014.5 | 20589.9 | 2.3614 | 0 | 0 |
| 4400 | 4.9755 | 22211.9 | 51.6982 | 205260.3 | 39512.0 | 20599.8 | 2.3852 | 0 | 0 |
| 4500 | 4.9752 | 22709.4 | 51.8100 | 210435.8 | 40009.6 | 20608.7 | 2.4079 | 0 | 0 |
| 4600 | 4.9749 | 23206.9 | 51.9194 | 215622.2 | 40507.1 | 20616.6 | 2.4297 | 0 | 0 |
| 4700 | 4.9746 | 23704.4 | 52.0264 | 220819.6 | 41004.6 | 20623.5 | 2.4505 | 0 | 0 |
| 4800 | 4.9744 | 24201.8 | 52.1311 | 226027.4 | 41502.0 | 20629.4 | 2.4705 | 0 | 0 |
| 4900 | 4.9741 | 24699.2 | 52.2337 | 231245.7 | 41999.4 | 20634.3 | 2.4897 | 0 | 0 |
| 5000 | 4.9739 | 25196.6 | 52.3341 | 236474.1 | 42496.8 | 20638.2 | 2.5081 | 0 | 0 |
| 5100 | 4.9737 | 25694.0 | 52.4326 | 241712.5 | 42994.2 | 20641.1 | 2.5258 | 0 | 0 |
| 5200 | 4.9735 | 26191.4 | 52.5292 | 246960.6 | 43491.6 | 20643.0 | 2.5428 | 0 | 0 |
| 5300 | 4.9733 | 26688.7 | 52.6240 | 252218.2 | 43988.9 | 20643.9 | 2.5592 | 0 | 0 |
| 5400 | 4.9731 | 27186.0 | 52.7169 | 257485.3 | 44486.2 | 20643.8 | 2.5749 | 0 | 0 |
| 5500 | 4.9729 | 27683.3 | 52.8082 | 262761.6 | 44983.5 | 20642.7 | 2.5901 | 0 | 0 |
| 5600 | 4.9727 | 28180.6 | 52.8978 | 268046.9 | 45480.8 | 20640.7 | 2.6048 | 0 | 0 |
| 5700 | 4.9726 | 28677.9 | 52.9850 | 273341.1 | 45978.1 | 20637.7 | 2.6189 | 0 | 0 |
| 5800 | 4.9724 | 29175.1 | 53.0723 | 278644.0 | 46475.3 | 20633.6 | 2.6325 | 0 | 0 |
| 5900 | 4.9723 | 29672.4 | 53.1573 | 283955.5 | 46972.5 | 20628.7 | 2.6457 | 0 | 0 |
| 6000 | 4.9722 | 30169.6 | 53.2408 | 289275.4 | 47469.8 | 20622.7 | 2.6584 | 0 | 0 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(93) F₂ (gas); molecular weight, 38.00

| T, °K | C _p ^o , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -2109.7 | 0 | ----- | -36710.1 | ----- |
| 100 | 6.9587 | 694.8 | 40.6957 | 3374.7 | -1414.9 | 0 | 0 | -37012.3 | 75.7429 |
| 200 | 7.0970 | 1395.0 | 45.5437 | 7713.8 | -714.7 | 0 | 0 | -37363.8 | 35.1565 |
| 298.15 | 7.4869 | 2109.7 | 48.4460 | 12534.5 | 0 | 0 | 0 | -37716.3 | 21.6601 |
| 300 | 7.4949 | 2123.6 | 48.4924 | 12424.2 | 13.9 | 0 | 0 | -37722.6 | 21.4896 |
| 400 | 7.8941 | 2893.7 | 50.7051 | 17388.4 | 784.0 | 0 | 0 | -38032.7 | 14.5934 |
| 500 | 8.1985 | 3699.1 | 52.5011 | 22551.4 | 1589.4 | 0 | 0 | -38291.5 | 10.4241 |
| 600 | 8.4184 | 4530.6 | 54.0164 | 27879.3 | 2420.9 | 0 | 0 | -38509.8 | 7.6270 |
| 700 | 8.5788 | 5380.8 | 55.3268 | 33347.9 | 3271.1 | 0 | 0 | -38698.1 | 5.6184 |
| 800 | 8.6990 | 6245.0 | 56.4805 | 38939.4 | 4155.3 | 0 | 0 | -38864.0 | 4.1051 |
| 900 | 8.7923 | 7119.7 | 57.5107 | 44639.9 | 5010.0 | 0 | 0 | -39012.9 | 2.9232 |
| 1000 | 8.8670 | 8002.8 | 58.4411 | 50438.3 | 5893.1 | 0 | 0 | -39148.4 | 1.9743 |
| 1100 | 8.9287 | 8892.7 | 59.2892 | 56325.4 | 6783.0 | 0 | 0 | -39273.3 | 1.1953 |
| 1200 | 8.9811 | 9788.3 | 60.0684 | 62293.8 | 7678.6 | 0 | 0 | -39389.5 | 0.5442 |
| 1300 | 9.0266 | 10688.7 | 60.7891 | 68337.1 | 8579.0 | 0 | 0 | -39498.4 | -0.0084 |
| 1400 | 9.0669 | 11593.4 | 61.4595 | 74449.9 | 9483.7 | 0 | 0 | -39601.0 | -0.4833 |
| 1500 | 9.1034 | 12502.0 | 62.0864 | 80627.6 | 10392.3 | 0 | 0 | -39698.1 | -0.8959 |
| 1600 | 9.1368 | 13414.0 | 62.6750 | 86865.9 | 11304.3 | 0 | 0 | -39790.3 | -1.2578 |
| 1700 | 9.1679 | 14329.2 | 63.2298 | 93161.5 | 12219.5 | 0 | 0 | -39878.2 | -1.5778 |
| 1800 | 9.1971 | 15247.5 | 63.7547 | 99510.9 | 13137.8 | 0 | 0 | -39962.1 | -1.8629 |
| 1900 | 9.2248 | 16168.6 | 64.2527 | 105911.5 | 14058.9 | 0 | 0 | -40042.3 | -2.1185 |
| 2000 | 9.2512 | 17092.4 | 64.7265 | 112360.6 | 14982.7 | 0 | 0 | -40119.1 | -2.3490 |
| 2100 | 9.2767 | 18018.8 | 65.1785 | 118856.1 | 15909.1 | 0 | 0 | -40192.7 | -2.5580 |
| 2200 | 9.3013 | 18947.7 | 65.6106 | 125395.7 | 16838.0 | 0 | 0 | -40263.2 | -2.7483 |
| 2300 | 9.3252 | 19879.1 | 66.0246 | 131977.6 | 17769.4 | 0 | 0 | -40330.9 | -2.9223 |
| 2400 | 9.3485 | 20812.8 | 66.4220 | 138600.1 | 18703.1 | 0 | 0 | -40395.7 | -3.0821 |
| 2500 | 9.3713 | 21748.7 | 66.8041 | 145261.5 | 19639.1 | 0 | 0 | -40457.9 | -3.2294 |
| 2600 | 9.3937 | 22687.0 | 67.1721 | 151960.4 | 20577.3 | 0 | 0 | -40517.5 | -3.3655 |
| 2700 | 9.4157 | 23627.5 | 67.5270 | 158695.5 | 21517.8 | 0 | 0 | -40574.5 | -3.4917 |
| 2800 | 9.4374 | 24570.1 | 67.8698 | 165465.4 | 22460.4 | 0 | 0 | -40629.2 | -3.6091 |
| 2900 | 9.4589 | 25514.9 | 68.2014 | 172269.1 | 23405.3 | 0 | 0 | -40681.4 | -3.7185 |
| 3000 | 9.4800 | 26461.9 | 68.5224 | 179105.3 | 24352.2 | 0 | 0 | -40731.3 | -3.8207 |
| 3100 | 9.5010 | 27411.0 | 68.8336 | 185973.2 | 25301.3 | 0 | 0 | -40778.8 | -3.9165 |
| 3200 | 9.5218 | 28362.1 | 69.1356 | 192871.7 | 26252.4 | 0 | 0 | -40824.1 | -4.0064 |
| 3300 | 9.5425 | 29315.3 | 69.4289 | 199800.0 | 27205.6 | 0 | 0 | -40867.2 | -4.0909 |
| 3400 | 9.5630 | 30270.6 | 69.7141 | 206757.3 | 28160.9 | 0 | 0 | -40908.0 | -4.1706 |
| 3500 | 9.5834 | 31227.9 | 69.9916 | 213742.6 | 29118.2 | 0 | 0 | -40946.7 | -4.2457 |
| 3600 | 9.6036 | 32187.3 | 70.2618 | 220755.3 | 30077.6 | 0 | 0 | -40983.2 | -4.3168 |
| 3700 | 9.6238 | 33148.6 | 70.5252 | 227794.7 | 31038.9 | 0 | 0 | -41017.6 | -4.3840 |
| 3800 | 9.6438 | 34112.0 | 70.7821 | 234860.2 | 32002.3 | 0 | 0 | -41049.8 | -4.4478 |
| 3900 | 9.6638 | 35077.4 | 71.0329 | 241951.0 | 32967.7 | 0 | 0 | -41080.0 | -4.5084 |
| 4000 | 9.6837 | 36044.8 | 71.2778 | 249066.5 | 33935.1 | 0 | 0 | -41108.0 | -4.5660 |
| 4100 | 9.7036 | 37014.1 | 71.5172 | 256206.3 | 34904.4 | 0 | 0 | -41134.0 | -4.6207 |
| 4200 | 9.7234 | 37985.5 | 71.7513 | 263369.8 | 35875.8 | 0 | 0 | -41158.0 | -4.6730 |
| 4300 | 9.7431 | 38958.8 | 71.9803 | 270556.4 | 36849.1 | 0 | 0 | -41179.8 | -4.7228 |
| 4400 | 9.7628 | 39934.1 | 72.2045 | 277765.7 | 37824.4 | 0 | 0 | -41199.7 | -4.7704 |
| 4500 | 9.7824 | 40911.4 | 72.4241 | 284997.2 | 38801.7 | 0 | 0 | -41217.5 | -4.8158 |
| 4600 | 9.8020 | 41890.6 | 72.6393 | 292250.4 | 39780.9 | 0 | 0 | -41233.3 | -4.8594 |
| 4700 | 9.8216 | 42871.8 | 72.8504 | 299524.9 | 40762.1 | 0 | 0 | -41247.0 | -4.9011 |
| 4800 | 9.8411 | 43854.9 | 73.0573 | 306820.3 | 41745.2 | 0 | 0 | -41258.8 | -4.9410 |
| 4900 | 9.8606 | 44840.0 | 73.2605 | 314136.2 | 42730.3 | 0 | 0 | -41268.6 | -4.9794 |
| 5000 | 9.8800 | 45827.0 | 73.4599 | 321472.3 | 43717.3 | 0 | 0 | -41276.3 | -5.0162 |
| 5100 | 9.8994 | 46816.0 | 73.6557 | 328828.1 | 44706.3 | 0 | 0 | -41282.1 | -5.0515 |
| 5200 | 9.9188 | 47806.9 | 73.8481 | 336203.3 | 45697.2 | 0 | 0 | -41285.9 | -5.0856 |
| 5300 | 9.9382 | 48799.7 | 74.0372 | 343597.6 | 46690.1 | 0 | 0 | -41287.7 | -5.1183 |
| 5400 | 9.9576 | 49794.5 | 74.2232 | 351010.7 | 47684.8 | 0 | 0 | -41287.6 | -5.1498 |
| 5500 | 9.9769 | 50791.3 | 74.4061 | 358442.1 | 48681.6 | 0 | 0 | -41285.5 | -5.1802 |
| 5600 | 9.9962 | 51789.9 | 74.5860 | 365891.8 | 49680.2 | 0 | 0 | -41281.4 | -5.2095 |
| 5700 | 10.0155 | 52790.5 | 74.7631 | 373359.3 | 50680.8 | 0 | 0 | -41275.3 | -5.2378 |
| 5800 | 10.0348 | 53793.0 | 74.9375 | 380844.3 | 51683.3 | 0 | 0 | -41267.3 | -5.2650 |
| 5900 | 10.0541 | 54797.5 | 75.1092 | 388346.7 | 52687.8 | 0 | 0 | -41257.3 | -5.2914 |
| 6000 | 10.0733 | 55803.8 | 75.2783 | 395866.1 | 53694.1 | 0 | 0 | -41245.4 | -5.3169 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(94) H (gas); molecular weight, 1.008

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 50616.5 | 51628.4 | ----- | 0 | ----- |
| 100 | 4.9681 | 496.8 | 21.9650 | 1699.7 | 51113.3 | 51745.7 | -110.9494 | 0 | 0 |
| 200 | 4.9681 | 993.6 | 25.4087 | 4088.1 | 51610.1 | 51941.2 | -54.3196 | 0 | 0 |
| 298.15 | 4.9681 | 1481.3 | 27.3924 | 6685.8 | 52097.7 | 52097.7 | -35.6106 | 0 | 0 |
| 300 | 4.9681 | 1490.4 | 27.4231 | 6736.5 | 52106.9 | 52100.6 | -35.3752 | 0 | 0 |
| 400 | 4.9681 | 1987.3 | 28.8523 | 9553.7 | 52603.8 | 52250.1 | -25.8747 | 0 | 0 |
| 500 | 4.9681 | 2484.1 | 29.9609 | 12496.4 | 53100.6 | 52397.6 | -20.1578 | 0 | 0 |
| 600 | 4.9681 | 2980.9 | 30.8667 | 15539.2 | 53597.4 | 52544.4 | -16.3357 | 0 | 0 |
| 700 | 4.9681 | 3477.7 | 31.6326 | 18665.1 | 54094.2 | 52690.1 | -13.5982 | 0 | 0 |
| 800 | 4.9681 | 3974.5 | 32.2960 | 21862.3 | 54591.0 | 52834.2 | -11.5392 | 0 | 0 |
| 900 | 4.9681 | 4471.3 | 32.8812 | 25121.7 | 55087.8 | 52975.4 | -9.9334 | 0 | 0 |
| 1000 | 4.9681 | 4968.1 | 33.4046 | 28436.5 | 55584.6 | 53113.2 | -8.6453 | 0 | 0 |
| 1100 | 4.9681 | 5465.0 | 33.8781 | 31801.0 | 56081.5 | 53246.8 | -7.5889 | 0 | 0 |
| 1200 | 4.9681 | 5961.8 | 34.3104 | 35210.7 | 56578.3 | 53375.8 | -6.7063 | 0 | 0 |
| 1300 | 4.9681 | 6458.6 | 34.7081 | 38661.9 | 57075.1 | 53499.7 | -5.9576 | 0 | 0 |
| 1400 | 4.9681 | 6955.4 | 35.0762 | 42151.3 | 57571.9 | 53618.5 | -5.3147 | 0 | 0 |
| 1500 | 4.9681 | 7452.2 | 35.4190 | 45676.3 | 58068.7 | 53731.7 | -4.7561 | 0 | 0 |
| 1600 | 4.9681 | 7949.0 | 35.7397 | 49234.4 | 58565.5 | 53839.8 | -4.2663 | 0 | 0 |
| 1700 | 4.9681 | 8445.9 | 36.0408 | 52823.6 | 59062.4 | 53943.1 | -3.8332 | 0 | 0 |
| 1800 | 4.9681 | 8942.7 | 36.3246 | 56442.0 | 59559.2 | 54041.8 | -3.4477 | 0 | 0 |
| 1900 | 4.9681 | 9439.5 | 36.5934 | 60088.0 | 60056.0 | 54135.5 | -3.1020 | 0 | 0 |
| 2000 | 4.9681 | 9936.3 | 36.8483 | 63760.2 | 60552.8 | 54224.8 | -2.7905 | 0 | 0 |
| 2100 | 4.9681 | 10433.1 | 37.0907 | 67457.3 | 61049.6 | 54309.7 | -2.5081 | 0 | 0 |
| 2200 | 4.9681 | 10929.9 | 37.3216 | 71178.0 | 61546.4 | 54390.8 | -2.2511 | 0 | 0 |
| 2300 | 4.9681 | 11426.7 | 37.5426 | 74921.3 | 62043.2 | 54467.9 | -2.0158 | 0 | 0 |
| 2400 | 4.9681 | 11923.5 | 37.7541 | 78686.2 | 62540.1 | 54541.6 | -1.8002 | 0 | 0 |
| 2500 | 4.9681 | 12420.4 | 37.9569 | 82471.8 | 63036.9 | 54611.8 | -1.6014 | 0 | 0 |
| 2600 | 4.9681 | 12917.2 | 38.1517 | 86277.3 | 63533.7 | 54678.7 | -1.4177 | 0 | 0 |
| 2700 | 4.9681 | 13414.0 | 38.3392 | 90101.9 | 64030.5 | 54742.6 | -1.2473 | 0 | 0 |
| 2800 | 4.9681 | 13910.8 | 38.5199 | 93944.9 | 64527.3 | 54803.4 | -1.0891 | 0 | 0 |
| 2900 | 4.9681 | 14407.6 | 38.6942 | 97805.7 | 65024.1 | 54861.5 | -0.9415 | 0 | 0 |
| 3000 | 4.9681 | 14904.4 | 38.8627 | 101683.6 | 65520.9 | 54916.6 | -0.8035 | 0 | 0 |
| 3100 | 4.9681 | 15401.3 | 39.0256 | 105578.0 | 66017.8 | 54968.9 | -0.6744 | 0 | 0 |
| 3200 | 4.9681 | 15898.1 | 39.1833 | 109488.5 | 66514.6 | 55018.5 | -0.5533 | 0 | 0 |
| 3300 | 4.9681 | 16394.9 | 39.3362 | 113414.5 | 67011.4 | 55066.1 | -0.4394 | 0 | 0 |
| 3400 | 4.9681 | 16891.7 | 39.4845 | 117355.6 | 67508.2 | 55110.5 | -0.3321 | 0 | 0 |
| 3500 | 4.9681 | 17388.5 | 39.6285 | 121311.3 | 68005.0 | 55152.0 | -0.2309 | 0 | 0 |
| 3600 | 4.9681 | 17885.3 | 39.7685 | 125281.2 | 68501.8 | 55191.9 | -0.1351 | 0 | 0 |
| 3700 | 4.9681 | 18382.2 | 39.9046 | 129264.8 | 68998.7 | 55229.5 | -0.0445 | 0 | 0 |
| 3800 | 4.9681 | 18879.0 | 40.0371 | 133262.0 | 69495.5 | 55263.7 | 0.0414 | 0 | 0 |
| 3900 | 4.9681 | 19375.8 | 40.1661 | 137272.1 | 69992.3 | 55297.0 | 0.1227 | 0 | 0 |
| 4000 | 4.9681 | 19872.6 | 40.2919 | 141295.1 | 70489.1 | 55327.5 | 0.2004 | 0 | 0 |
| 4100 | 4.9681 | 20369.4 | 40.4146 | 145330.4 | 70985.9 | 55356.4 | 0.2739 | 0 | 0 |
| 4200 | 4.9681 | 20866.2 | 40.5343 | 149377.9 | 71482.7 | 55382.7 | 0.3445 | 0 | 0 |
| 4300 | 4.9681 | 21363.0 | 40.6512 | 153437.2 | 71979.5 | 55407.1 | 0.4115 | 0 | 0 |
| 4400 | 4.9681 | 21859.9 | 40.7654 | 157508.1 | 72476.4 | 55429.0 | 0.4754 | 0 | 0 |
| 4500 | 4.9681 | 22356.7 | 40.8771 | 161590.2 | 72973.2 | 55449.6 | 0.5366 | 0 | 0 |
| 4600 | 4.9681 | 22853.5 | 40.9863 | 165683.4 | 73470.0 | 55467.8 | 0.5951 | 0 | 0 |
| 4700 | 4.9681 | 23350.3 | 41.0931 | 169787.4 | 73966.8 | 55484.0 | 0.6512 | 0 | 0 |
| 4800 | 4.9681 | 23847.1 | 41.1977 | 173901.9 | 74463.6 | 55497.8 | 0.7050 | 0 | 0 |
| 4900 | 4.9682 | 24343.9 | 41.3002 | 178026.8 | 74960.4 | 55509.8 | 0.7565 | 0 | 0 |
| 5000 | 4.9682 | 24840.7 | 41.4005 | 182161.9 | 75457.2 | 55520.4 | 0.8060 | 0 | 0 |
| 5100 | 4.9682 | 25337.6 | 41.4989 | 186306.9 | 75954.1 | 55528.9 | 0.8536 | 0 | 0 |
| 5200 | 4.9682 | 25834.4 | 41.5954 | 190461.6 | 76450.9 | 55535.6 | 0.8993 | 0 | 0 |
| 5300 | 4.9682 | 26331.2 | 41.6900 | 194625.9 | 76947.7 | 55540.2 | 0.9433 | 0 | 0 |
| 5400 | 4.9682 | 26828.0 | 41.7829 | 198799.6 | 77444.5 | 55543.1 | 0.9859 | 0 | 0 |
| 5500 | 4.9682 | 27324.8 | 41.8740 | 202982.4 | 77941.3 | 55544.0 | 1.0266 | 0 | 0 |
| 5600 | 4.9682 | 27821.6 | 41.9636 | 207174.3 | 78438.1 | 55543.5 | 1.0661 | 0 | 0 |
| 5700 | 4.9682 | 28318.5 | 42.0515 | 211375.1 | 78935.0 | 55541.4 | 1.1041 | 0 | 0 |
| 5800 | 4.9682 | 28815.3 | 42.1379 | 215584.6 | 79431.8 | 55537.5 | 1.1407 | 0 | 0 |
| 5900 | 4.9682 | 29312.1 | 42.2228 | 219802.6 | 79928.6 | 55531.6 | 1.1763 | 0 | 0 |
| 6000 | 4.9682 | 29808.9 | 42.3063 | 224029.1 | 80425.4 | 55524.4 | 1.2104 | 0 | 0 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(95) H₂ (gas); molecular weight, 2.016

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -2023.8 | 0 | ----- | -103256.8 | ----- |
| 100 | 5.3934 | 758.9 | 24.3d77 | 1679.8 | -1264.9 | 0 | 0 | -103491.5 | 221.8988 |
| 200 | 6.5182 | 1361.7 | 28.5212 | 4342.5 | -662.1 | 0 | 0 | -103882.3 | 108.6393 |
| 298.15 | 6.8918 | 2023.8 | 31.2079 | 7280.8 | 0 | 0 | 0 | -104195.5 | 71.2212 |
| 300 | 6.8938 | 2036.5 | 31.2517 | 7339.0 | 12.7 | 0 | 0 | -104201.1 | 70.7505 |
| 400 | 6.9753 | 2731.1 | 33.2508 | 10569.2 | 707.3 | 0 | 0 | -104500.2 | 51.7494 |
| 500 | 6.9932 | 3429.7 | 34.8088 | 13974.7 | 1405.9 | 0 | 0 | -104795.2 | 40.3156 |
| 600 | 7.0091 | 4129.7 | 36.0847 | 17521.1 | 2105.9 | 0 | 0 | -105088.9 | 32.6715 |
| 700 | 7.0369 | 4831.9 | 37.1677 | 21185.5 | 2808.1 | 0 | 0 | -105380.3 | 27.1963 |
| 800 | 7.0806 | 5537.5 | 38.1097 | 24950.3 | 3513.7 | 0 | 0 | -105668.4 | 23.0784 |
| 900 | 7.1422 | 6248.6 | 38.9463 | 28803.1 | 4224.8 | 0 | 0 | -105950.9 | 19.8668 |
| 1000 | 7.2197 | 6966.7 | 39.7015 | 32734.7 | 4942.9 | 0 | 0 | -106226.4 | 17.2905 |
| 1100 | 7.3091 | 7693.1 | 40.3950 | 36741.4 | 5669.3 | 0 | 0 | -106493.6 | 15.1778 |
| 1200 | 7.4065 | 8428.8 | 41.0349 | 40813.2 | 6405.0 | 0 | 0 | -106751.6 | 13.4126 |
| 1300 | 7.5118 | 9174.6 | 41.6311 | 44945.9 | 7150.8 | 0 | 0 | -106999.4 | 11.9153 |
| 1400 | 7.6172 | 9930.7 | 42.1935 | 49140.2 | 7906.9 | 0 | 0 | -107237.0 | 10.6295 |
| 1500 | 7.7205 | 10697.8 | 42.7221 | 53385.4 | 8674.0 | 0 | 0 | -107463.4 | 9.5122 |
| 1600 | 7.8219 | 11475.2 | 43.2229 | 57681.4 | 9451.4 | 0 | 0 | -107679.6 | 8.5325 |
| 1700 | 7.9192 | 12262.4 | 43.6998 | 62027.4 | 10238.6 | 0 | 0 | -107886.1 | 7.6665 |
| 1800 | 8.0146 | 13058.4 | 44.1349 | 66420.4 | 11034.6 | 0 | 0 | -108083.7 | 6.8953 |
| 1900 | 8.1080 | 13864.7 | 44.5901 | 70856.5 | 11840.9 | 0 | 0 | -108271.1 | 6.2039 |
| 2000 | 8.1955 | 14679.9 | 45.0095 | 75339.0 | 12656.1 | 0 | 0 | -108449.5 | 5.5810 |
| 2100 | 8.2769 | 15503.6 | 45.4109 | 79859.2 | 13479.8 | 0 | 0 | -108619.4 | 5.0162 |
| 2200 | 8.3544 | 16335.0 | 45.7984 | 84421.5 | 14311.2 | 0 | 0 | -108781.7 | 4.5021 |
| 2300 | 8.4280 | 17174.4 | 46.1700 | 89016.6 | 15150.6 | 0 | 0 | -108935.9 | 4.0317 |
| 2400 | 8.4975 | 18020.8 | 46.5317 | 93655.3 | 15997.0 | 0 | 0 | -109083.1 | 3.6004 |
| 2500 | 8.5651 | 18874.0 | 46.8795 | 98324.7 | 16850.2 | 0 | 0 | -109223.5 | 3.2027 |
| 2600 | 8.6297 | 19733.8 | 47.2173 | 103031.1 | 17710.0 | 0 | 0 | -109357.3 | 2.8354 |
| 2700 | 8.6903 | 20599.6 | 47.5432 | 107767.0 | 18575.8 | 0 | 0 | -109485.2 | 2.4946 |
| 2800 | 8.7479 | 21471.6 | 47.8612 | 112539.6 | 19447.8 | 0 | 0 | -109606.8 | 2.1781 |
| 2900 | 8.8036 | 22349.1 | 48.1692 | 117341.5 | 20325.3 | 0 | 0 | -109722.9 | 1.8830 |
| 3000 | 8.8592 | 23232.5 | 48.4673 | 122169.4 | 21208.7 | 0 | 0 | -109833.2 | 1.6069 |
| 3100 | 8.9148 | 24121.5 | 48.7594 | 127032.7 | 22097.7 | 0 | 0 | -109937.9 | 1.3488 |
| 3200 | 8.9685 | 25015.9 | 49.0436 | 131923.5 | 22992.1 | 0 | 0 | -110037.0 | 1.1066 |
| 3300 | 9.0222 | 25914.4 | 49.3198 | 136841.0 | 23890.6 | 0 | 0 | -110132.2 | 0.8787 |
| 3400 | 9.0738 | 26819.3 | 49.5901 | 141787.0 | 24795.5 | 0 | 0 | -110220.9 | 0.6641 |
| 3500 | 9.1235 | 27729.8 | 49.8544 | 146760.5 | 25706.0 | 0 | 0 | -110304.0 | 0.4617 |
| 3600 | 9.1692 | 28643.7 | 50.1107 | 151755.0 | 26619.9 | 0 | 0 | -110383.7 | 0.2701 |
| 3700 | 9.2149 | 29562.2 | 50.3631 | 156781.4 | 27538.4 | 0 | 0 | -110458.9 | 0.0891 |
| 3800 | 9.2567 | 30487.3 | 50.6095 | 161829.0 | 28463.5 | 0 | 0 | -110527.5 | -0.0827 |
| 3900 | 9.3004 | 31414.3 | 50.8520 | 166908.4 | 29390.5 | 0 | 0 | -110594.0 | -0.2454 |
| 4000 | 9.3421 | 32347.0 | 51.0865 | 171998.9 | 30323.2 | 0 | 0 | -110655.0 | -0.4007 |
| 4100 | 9.3858 | 33282.8 | 51.3190 | 177125.1 | 31259.0 | 0 | 0 | -110712.8 | -0.5479 |
| 4200 | 9.4276 | 34224.0 | 51.5436 | 182259.0 | 32200.2 | 0 | 0 | -110765.3 | -0.6889 |
| 4300 | 9.4713 | 35168.7 | 51.7661 | 187425.7 | 33144.9 | 0 | 0 | -110814.2 | -0.8229 |
| 4400 | 9.5110 | 36118.6 | 51.9847 | 192614.2 | 34094.8 | 0 | 0 | -110857.9 | -0.9509 |
| 4500 | 9.5528 | 37070.9 | 52.1994 | 197826.2 | 35047.1 | 0 | 0 | -110899.2 | -1.0731 |
| 4600 | 9.5945 | 38028.2 | 52.4100 | 203057.8 | 36004.4 | 0 | 0 | -110935.6 | -1.1902 |
| 4700 | 9.6342 | 38989.4 | 52.6167 | 208309.0 | 36965.6 | 0 | 0 | -110968.0 | -1.3024 |
| 4800 | 9.6720 | 39955.4 | 52.8194 | 213577.7 | 37931.6 | 0 | 0 | -110995.7 | -1.4100 |
| 4900 | 9.7117 | 40925.1 | 53.0201 | 218873.4 | 38901.3 | 0 | 0 | -111019.6 | -1.5130 |
| 5000 | 9.7495 | 41897.4 | 53.2168 | 224186.8 | 39873.6 | 0 | 0 | -111040.9 | -1.6120 |
| 5100 | 9.7853 | 42874.2 | 53.4096 | 229514.8 | 40850.4 | 0 | 0 | -111057.7 | -1.7073 |
| 5200 | 9.8230 | 43854.4 | 53.6004 | 234867.6 | 41830.6 | 0 | 0 | -111071.2 | -1.7987 |
| 5300 | 9.8588 | 44838.9 | 53.7892 | 240243.7 | 42815.1 | 0 | 0 | -111080.3 | -1.8865 |
| 5400 | 9.8946 | 45826.5 | 53.9720 | 245622.2 | 43802.7 | 0 | 0 | -111086.3 | -1.9717 |
| 5500 | 9.9303 | 46818.4 | 54.1548 | 251033.2 | 44794.6 | 0 | 0 | -111088.1 | -2.0533 |
| 5600 | 9.9661 | 47813.2 | 54.3337 | 256455.4 | 45789.4 | 0 | 0 | -111086.9 | -2.1322 |
| 5700 | 9.9999 | 48810.8 | 54.5105 | 261899.3 | 46787.0 | 0 | 0 | -111082.9 | -2.2082 |
| 5800 | 10.0337 | 49812.4 | 54.6854 | 267363.1 | 47788.6 | 0 | 0 | -111075.0 | -2.2814 |
| 5900 | 10.0675 | 50817.8 | 54.8563 | 272834.5 | 48794.0 | 0 | 0 | -111063.2 | -2.3526 |
| 6000 | 10.1012 | 51825.8 | 55.0272 | 278337.6 | 49802.0 | 0 | 0 | -111048.8 | -2.4208 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(96) HBO₂ (gas); molecular weight, 43.828

| T, °K | C _p ^o , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| C | ----- | 0 | ----- | C | -138278.3 | -134900.0 | ----- | -438282.2 | ----- |
| 1CC | 7.9840 | 795.3 | 47.7873 | 3983.4 | -137483.0 | -135183.8 | 294.1438 | -439563.5 | 945.2513 |
| 2CC | 8.8164 | 1626.7 | 53.5173 | 9076.8 | -136651.6 | -135429.5 | 146.3332 | -440841.8 | 464.3904 |
| 298.15 | 10.0539 | 2554.3 | 57.2738 | 14521.9 | -135724.0 | -135724.0 | 97.5736 | -441935.1 | 305.6388 |
| 300 | 10.1180 | 2573.0 | 57.3363 | 14627.9 | -135705.3 | -135729.6 | 96.9598 | -441954.2 | 303.6411 |
| 400 | 11.3657 | 3648.2 | 60.4205 | 20520.2 | -134630.1 | -136038.3 | 72.2150 | -442908.6 | 223.0734 |
| 500 | 12.4662 | 4841.2 | 63.0783 | 26698.0 | -133437.2 | -136334.7 | 57.3348 | -443730.4 | 174.6342 |
| 600 | 13.4022 | 6135.9 | 65.4362 | 33125.9 | -132142.4 | -136606.2 | 47.3940 | -444442.1 | 142.2851 |
| 700 | 14.1887 | 7516.6 | 67.5631 | 39777.6 | -130761.7 | -136854.6 | 40.2798 | -445062.8 | 119.1437 |
| 800 | 14.8513 | 8969.5 | 69.5022 | 46632.3 | -129308.8 | -137083.1 | 34.9345 | -445607.8 | 101.7648 |
| 900 | 15.4138 | 10483.5 | 71.2848 | 53672.8 | -127794.8 | -137299.7 | 30.7707 | -446089.6 | 88.2322 |
| 1000 | 15.8556 | 12049.6 | 72.9344 | 60884.8 | -126228.7 | -137507.4 | 27.4345 | -446517.6 | 77.3951 |
| 1100 | 16.3111 | 13660.4 | 74.4694 | 68255.9 | -124617.9 | -137710.7 | 24.7005 | -446899.7 | 68.5203 |
| 1200 | 16.6716 | 15310.0 | 75.9045 | 75775.4 | -122968.3 | -137913.0 | 22.4190 | -447242.1 | 61.1186 |
| 1300 | 16.9857 | 16993.2 | 77.2516 | 83433.8 | -121285.1 | -138114.7 | 20.4857 | -447550.2 | 54.8511 |
| 1400 | 17.2603 | 18705.8 | 78.5206 | 91223.1 | -119572.5 | -138315.5 | 18.8258 | -447828.3 | 49.4754 |
| 1500 | 17.5013 | 20444.2 | 79.7195 | 99135.6 | -117834.2 | -138515.5 | 17.3854 | -448080.3 | 44.8137 |
| 1600 | 17.7134 | 22205.1 | 80.8563 | 107165.0 | -116073.2 | -138715.0 | 16.1234 | -448309.2 | 40.7325 |
| 1700 | 17.9007 | 23986.0 | 81.9355 | 115305.0 | -114292.3 | -138914.6 | 15.0081 | -448518.0 | 37.1297 |
| 1800 | 18.0664 | 25784.5 | 82.9635 | 123550.4 | -112493.8 | -139115.0 | 14.0153 | -448708.9 | 33.9258 |
| 1900 | 18.2136 | 27598.7 | 83.9447 | 131896.2 | -110675.6 | -139317.9 | 13.1258 | -448884.0 | 31.0580 |
| 2000 | 18.3447 | 29426.7 | 84.8823 | 140337.9 | -108851.6 | -139523.2 | 12.3239 | -449045.2 | 28.4760 |
| 2100 | 18.4618 | 31267.2 | 85.7803 | 148871.4 | -107011.2 | -139731.7 | 11.5974 | -449194.0 | 26.1391 |
| 2200 | 18.5667 | 33118.7 | 86.6416 | 157492.7 | -105159.6 | -139943.5 | 10.9358 | -449331.7 | 24.0139 |
| 2300 | 18.6610 | 34980.2 | 87.4690 | 166198.5 | -103298.2 | -140159.3 | 10.3312 | -449459.7 | 22.0730 |
| 2400 | 18.7459 | 36850.6 | 88.2650 | 174985.5 | -101427.8 | -140379.3 | 9.7572 | -449579.1 | 20.2934 |
| 2500 | 18.8225 | 38729.1 | 89.0315 | 183850.6 | -99549.3 | -140594.9 | 9.2261 | -449690.7 | 18.6556 |
| 2600 | 18.8920 | 40614.8 | 89.7715 | 192791.0 | -97663.5 | -140811.7 | 8.7350 | -449795.6 | 17.1435 |
| 2700 | 18.9550 | 42517.2 | 90.4857 | 201804.0 | -95771.1 | -140940.0 | 8.2796 | -449894.4 | 15.7431 |
| 2800 | 19.0124 | 44435.7 | 91.1761 | 210887.3 | -93872.7 | -140664.5 | 7.8559 | -449988.0 | 14.4425 |
| 2900 | 19.0647 | 46309.6 | 91.8442 | 220038.5 | -91968.8 | -140383.3 | 7.4610 | -450077.1 | 13.2313 |
| 3000 | 19.1126 | 48218.5 | 92.4913 | 229255.4 | -90059.9 | -140108.8 | 7.0917 | -450162.2 | 12.1006 |
| 3100 | 19.1565 | 50131.9 | 93.1187 | 238536.1 | -88146.4 | -140734.2 | 6.7459 | -450243.9 | 11.0427 |
| 3200 | 19.1967 | 52049.6 | 93.7276 | 247878.6 | -86228.7 | -140588.7 | 6.4208 | -450322.7 | 10.0507 |
| 3300 | 19.2338 | 53971.2 | 94.3188 | 257281.0 | -84307.2 | -140332.7 | 6.1153 | -450399.2 | 9.1187 |
| 3400 | 19.2680 | 55896.3 | 94.8935 | 266741.8 | -82382.0 | -140080.5 | 5.8271 | -450473.6 | 8.2413 |
| 3500 | 19.2996 | 57824.7 | 95.4525 | 276259.2 | -80453.6 | -140832.0 | 5.5548 | -450546.6 | 7.4140 |
| 3600 | 19.3288 | 59756.1 | 95.9966 | 285831.8 | -78522.2 | -140586.1 | 5.2975 | -450618.4 | 6.6325 |
| 3700 | 19.3559 | 61690.4 | 96.5266 | 295458.1 | -76588.0 | -140343.4 | 5.0535 | -450689.5 | 5.8931 |
| 3800 | 19.3810 | 63627.2 | 97.0431 | 305136.7 | -74651.1 | -140105.0 | 4.8220 | -450760.0 | 5.1925 |
| 3900 | 19.4044 | 65566.5 | 97.5465 | 314866.3 | -72711.8 | -140368.6 | 4.6017 | -450830.4 | 4.5278 |
| 4000 | 19.4262 | 67508.1 | 98.0384 | 324645.6 | -70770.3 | -140636.1 | 4.3924 | -450900.9 | 3.8961 |
| 4100 | 19.4466 | 69451.7 | 98.5184 | 334473.6 | -68826.6 | -140906.3 | 4.1927 | -450971.8 | 3.2952 |
| 4200 | 19.4656 | 71397.3 | 98.9872 | 344348.9 | -66881.0 | -150180.2 | 4.0025 | -451043.4 | 2.7229 |
| 4300 | 19.4834 | 73344.8 | 99.4455 | 354270.6 | -64933.5 | -150457.0 | 3.8204 | -451115.8 | 2.1770 |
| 4400 | 19.5000 | 75294.0 | 99.8936 | 364237.7 | -62984.3 | -150737.5 | 3.6466 | -451189.2 | 1.6559 |
| 4500 | 19.5157 | 77244.8 | 100.3320 | 374249.0 | -61033.6 | -151020.2 | 3.4801 | -451263.9 | 1.1579 |
| 4600 | 19.5303 | 79197.1 | 100.7611 | 384303.8 | -59081.2 | -151306.6 | 3.3204 | -451340.1 | 0.6814 |
| 4700 | 19.5441 | 81150.8 | 101.1812 | 394400.9 | -57127.5 | -151595.9 | 3.1672 | -451417.9 | 0.2252 |
| 4800 | 19.5571 | 83105.9 | 101.5928 | 404539.7 | -55172.4 | -151888.8 | 3.0203 | -451497.5 | -0.2122 |
| 4900 | 19.5694 | 85062.2 | 101.9962 | 414719.2 | -53216.1 | -152184.5 | 2.8790 | -451579.0 | -0.6317 |
| 5000 | 19.5810 | 87019.7 | 102.3917 | 424938.7 | -51258.6 | -152482.6 | 2.7430 | -451662.5 | -1.0346 |
| 5100 | 19.5919 | 88978.4 | 102.7796 | 435197.3 | -49299.9 | -152784.0 | 2.6124 | -451748.3 | -1.4217 |
| 5200 | 19.6022 | 90938.1 | 103.1601 | 445494.4 | -47340.2 | -153088.1 | 2.4863 | -451836.3 | -1.7940 |
| 5300 | 19.6120 | 92898.8 | 103.5336 | 455829.1 | -45375.5 | -153395.3 | 2.3646 | -451926.8 | -2.1523 |
| 5400 | 19.6212 | 94860.5 | 103.9002 | 466200.9 | -43417.9 | -153705.2 | 2.2476 | -452019.9 | -2.4974 |
| 5500 | 19.6300 | 96823.0 | 104.2604 | 476608.9 | -41455.3 | -154018.2 | 2.1342 | -452115.6 | -2.8301 |
| 5600 | 19.6383 | 98786.5 | 104.6141 | 487052.7 | -39491.9 | -154333.6 | 2.0249 | -452214.0 | -3.1509 |
| 5700 | 19.6462 | 100750.7 | 104.9618 | 497531.6 | -37527.6 | -154651.5 | 1.9192 | -452315.2 | -3.4605 |
| 5800 | 19.6538 | 102715.7 | 105.3035 | 508044.9 | -35562.6 | -154972.3 | 1.8167 | -452419.4 | -3.7596 |
| 5900 | 19.6609 | 104681.4 | 105.6396 | 518592.1 | -33596.9 | -155295.9 | 1.7178 | -452526.5 | -4.0485 |
| 6000 | 19.6677 | 106647.9 | 105.9701 | 529172.6 | -31630.5 | -155621.9 | 1.6216 | -452636.7 | -4.3279 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(97) H_3BO_3 (gas); molecular weight, 61.844

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_T^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_T° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -241912.9 | -235473.3 | ----- | -701098.9 | ----- |
| 100 | 10.0304 | 858.5 | 52.2279 | 4364.3 | -241054.4 | -236799.7 | 507.3318 | -703838.1 | 1507.0701 |
| 200 | 13.3830 | 2026.0 | 60.1884 | 10011.7 | -239886.8 | -237659.9 | 248.2145 | -706331.3 | 736.9004 |
| 298.15 | 16.9017 | 3512.9 | 66.1901 | 16221.7 | -238400.0 | -238400.0 | 162.6069 | -708363.2 | 482.4955 |
| 300 | 16.9662 | 3544.2 | 66.2949 | 16344.3 | -238368.7 | -238412.2 | 161.5288 | -708397.7 | 479.2936 |
| 400 | 20.1849 | 5406.5 | 71.6303 | 23245.6 | -236506.3 | -238983.4 | 118.0591 | -710076.6 | 350.1393 |
| 500 | 22.7851 | 7560.2 | 76.4252 | 30652.4 | -234352.7 | -239383.3 | 91.9238 | -711441.9 | 272.4780 |
| 600 | 24.8325 | 9945.1 | 80.7677 | 38515.6 | -231967.8 | -239642.3 | 74.4762 | -712563.4 | 220.6123 |
| 700 | 26.4724 | 12513.1 | 84.7232 | 46793.1 | -229399.7 | -239794.5 | 62.0027 | -713494.1 | 183.5116 |
| 800 | 27.8227 | 15229.9 | 88.3489 | 55449.2 | -226682.9 | -239863.4 | 52.6430 | -714271.1 | 155.6527 |
| 900 | 28.9604 | 18070.6 | 91.6935 | 64453.5 | -223842.2 | -239871.6 | 45.3626 | -714920.8 | 133.9629 |
| 1000 | 29.9330 | 21016.5 | 94.7964 | 73779.9 | -220896.3 | -239831.3 | 39.5389 | -715462.9 | 116.5965 |
| 1100 | 30.7719 | 24052.8 | 97.6896 | 83405.8 | -217860.1 | -239755.1 | 34.7744 | -715912.8 | 102.3778 |
| 1200 | 31.4990 | 27167.2 | 100.3990 | 93311.7 | -214745.7 | -239652.4 | 30.8058 | -716283.2 | 90.5220 |
| 1300 | 32.1315 | 30349.4 | 102.9459 | 103480.2 | -211563.4 | -239529.2 | 27.4497 | -716584.7 | 80.4855 |
| 1400 | 32.6832 | 33590.8 | 105.3477 | 113896.0 | -208322.1 | -239389.4 | 24.5735 | -716826.2 | 71.8796 |
| 1500 | 33.1657 | 36883.8 | 107.6194 | 124545.4 | -205029.1 | -239237.3 | 22.0832 | -717015.5 | 64.4188 |
| 1600 | 33.5887 | 40222.0 | 109.7737 | 135416.0 | -201690.9 | -239075.4 | 19.9059 | -717159.0 | 57.8891 |
| 1700 | 33.9607 | 43599.8 | 111.8214 | 146496.6 | -198313.0 | -238906.6 | 17.9857 | -717262.5 | 52.1267 |
| 1800 | 34.2888 | 47012.6 | 113.7720 | 157777.0 | -194900.2 | -238733.2 | 16.2801 | -717330.6 | 47.0039 |
| 1900 | 34.5790 | 50456.3 | 115.6339 | 169248.0 | -191456.5 | -238560.0 | 14.7553 | -717367.7 | 42.4200 |
| 2000 | 34.8365 | 53927.3 | 117.4142 | 180901.1 | -187985.5 | -238387.5 | 13.3835 | -717377.3 | 38.2943 |
| 2100 | 35.0658 | 57422.7 | 119.1195 | 192728.4 | -184490.2 | -238217.6 | 12.1437 | -717362.5 | 34.5616 |
| 2200 | 35.2705 | 60939.7 | 120.7556 | 204722.7 | -180973.2 | -238050.9 | 11.0169 | -717326.3 | 31.1683 |
| 2300 | 35.4538 | 64476.1 | 122.3276 | 216877.4 | -177436.8 | -237889.5 | 9.9897 | -717270.9 | 28.0703 |
| 2400 | 35.6184 | 68029.8 | 123.8400 | 229186.2 | -173883.0 | -237733.6 | 9.0292 | -717198.6 | 25.2308 |
| 2500 | 35.7668 | 71599.2 | 125.2971 | 241643.5 | -170313.7 | -237581.1 | 8.1443 | -717111.2 | 22.6187 |
| 2600 | 35.9008 | 75182.7 | 126.7025 | 254243.9 | -166730.2 | -242790.4 | 7.3276 | -717010.5 | 20.2078 |
| 2700 | 36.0222 | 78778.9 | 128.0598 | 266982.4 | -163133.9 | -242649.6 | 6.5722 | -716897.9 | 17.9758 |
| 2800 | 36.1325 | 82386.8 | 129.3718 | 279854.4 | -159526.1 | -242514.2 | 5.8707 | -716775.0 | 15.9037 |
| 2900 | 36.2329 | 86005.1 | 130.6415 | 292855.4 | -155907.7 | -242383.9 | 5.2182 | -716642.8 | 13.9747 |
| 3000 | 36.3245 | 89633.1 | 131.8715 | 305981.3 | -152279.8 | -242260.0 | 4.6097 | -716502.6 | 12.1747 |
| 3100 | 36.4084 | 93269.8 | 133.0635 | 319228.4 | -148643.1 | -242142.9 | 4.0406 | -716355.5 | 10.4912 |
| 3200 | 36.4853 | 96914.5 | 134.2211 | 332593.0 | -144998.3 | -242032.8 | 3.5070 | -716202.3 | 8.9132 |
| 3300 | 36.5559 | 100566.6 | 135.3449 | 346071.5 | -141346.2 | -241927.9 | 3.0065 | -716043.9 | 7.4312 |
| 3400 | 36.6210 | 104225.5 | 136.4372 | 359660.9 | -137687.3 | -241832.1 | 2.5353 | -715881.1 | 6.0367 |
| 3500 | 36.6810 | 107890.7 | 137.4996 | 373358.0 | -134022.2 | -241744.7 | 2.0910 | -715714.6 | 4.7221 |
| 3600 | 36.7365 | 111561.6 | 138.5337 | 387159.9 | -130351.3 | -241662.4 | 1.6722 | -715545.2 | 3.4809 |
| 3700 | 36.7879 | 115237.8 | 139.5410 | 401063.8 | -126675.0 | -241587.3 | 1.2756 | -715373.3 | 2.3071 |
| 3800 | 36.8356 | 118919.0 | 140.5227 | 415067.2 | -122993.8 | -241522.6 | 0.9003 | -715199.7 | 1.1953 |
| 3900 | 36.8799 | 122604.8 | 141.4801 | 429167.5 | -119308.0 | -241461.5 | 0.5436 | -715024.7 | 0.1407 |
| 4000 | 36.9212 | 126294.9 | 142.4143 | 443362.5 | -115617.9 | -241409.5 | 0.2059 | -714848.9 | -0.8608 |
| 4100 | 36.9596 | 129989.0 | 143.3265 | 457649.7 | -111923.9 | -241363.0 | -0.1162 | -714672.8 | -1.8133 |
| 4200 | 36.9955 | 133686.8 | 144.2176 | 472027.0 | -108226.1 | -241325.4 | -0.4218 | -714496.6 | -2.7201 |
| 4300 | 37.0291 | 137388.0 | 145.0885 | 486492.5 | -104524.9 | -241294.1 | -0.7140 | -714320.8 | -3.5846 |
| 4400 | 37.0605 | 141092.5 | 145.9401 | 501044.1 | -100820.4 | -241271.5 | -0.9927 | -714145.8 | -4.4096 |
| 4500 | 37.0900 | 144800.0 | 146.7733 | 515679.9 | -97112.8 | -241253.6 | -1.2591 | -713971.7 | -5.1978 |
| 4600 | 37.1176 | 148510.4 | 147.5888 | 530398.2 | -93402.4 | -241244.1 | -1.5139 | -713799.0 | -5.9514 |
| 4700 | 37.1436 | 152223.5 | 148.3874 | 545197.1 | -89689.3 | -241241.6 | -1.7579 | -713627.9 | -6.6729 |
| 4800 | 37.1681 | 155939.1 | 149.1696 | 560075.1 | -85973.7 | -241247.3 | -1.9914 | -713458.5 | -7.3641 |
| 4900 | 37.1911 | 159657.1 | 149.9363 | 575030.5 | -82255.8 | -241259.7 | -2.2157 | -713291.2 | -8.0269 |
| 5000 | 37.2129 | 163377.3 | 150.6878 | 590061.9 | -78535.6 | -241277.2 | -2.4311 | -713126.1 | -8.6631 |
| 5100 | 37.2334 | 167099.6 | 151.4249 | 605167.6 | -74813.2 | -241302.5 | -2.6375 | -712963.5 | -9.2742 |
| 5200 | 37.2528 | 170823.9 | 152.1481 | 620346.4 | -71088.9 | -241334.0 | -2.8366 | -712803.4 | -9.8617 |
| 5300 | 37.2711 | 174550.2 | 152.8575 | 635596.8 | -67362.7 | -241373.1 | -3.0284 | -712646.0 | -10.4268 |
| 5400 | 37.2885 | 178278.1 | 153.5548 | 650917.5 | -63634.7 | -241418.2 | -3.2121 | -712491.5 | -10.9709 |
| 5500 | 37.3050 | 182007.8 | 154.2391 | 666307.3 | -59905.0 | -241470.7 | -3.3902 | -712340.1 | -11.4951 |
| 5600 | 37.3206 | 185739.1 | 154.9114 | 681765.0 | -56173.8 | -241528.8 | -3.5614 | -712191.7 | -12.0005 |
| 5700 | 37.3354 | 189471.9 | 155.5721 | 697289.2 | -52440.9 | -241592.3 | -3.7267 | -712046.6 | -12.4881 |
| 5800 | 37.3495 | 193206.2 | 156.2216 | 712879.0 | -48706.7 | -241663.0 | -3.8867 | -711904.9 | -12.9587 |
| 5900 | 37.3630 | 196941.8 | 156.8602 | 728533.2 | -44971.1 | -241740.5 | -4.0407 | -711766.5 | -13.4133 |
| 6000 | 37.3757 | 200678.7 | 157.4882 | 744250.7 | -41234.1 | -241823.1 | -4.1905 | -711631.7 | -13.8527 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(98) $(\text{HBO}_2)_3$ (gas); molecular weight, 131.484

| T, °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_T^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_T° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -547635.0 | -537500.0 | ----- | -1447646.5 | ----- |
| 100 | 12.3189 | 910.6 | 60.1207 | 5101.5 | -546724.4 | -539826.7 | 1157.6843 | -1452965.8 | 3111.0067 |
| 200 | 23.1482 | 2678.3 | 71.9397 | 11709.6 | -544956.7 | -541290.3 | 567.1504 | -1457527.2 | 1521.3219 |
| 298.15 | 32.8080 | 5440.5 | 83.0481 | 19320.2 | -542194.5 | -542194.5 | 372.2895 | -1460827.6 | 996.4851 |
| 300 | 32.9696 | 5501.4 | 83.2515 | 19474.1 | -542133.6 | -542206.4 | 369.8379 | -1460880.0 | 989.8819 |
| 400 | 40.4772 | 9193.6 | 93.8216 | 28335.0 | -538441.4 | -542665.8 | 271.0473 | -1463276.8 | 723.6225 |
| 500 | 45.8341 | 13524.7 | 103.4640 | 38207.2 | -534110.3 | -542802.9 | 211.7406 | -1464990.0 | 563.6389 |
| 600 | 49.6336 | 18308.6 | 112.1755 | 48996.7 | -529326.4 | -542717.8 | 172.2015 | -1466225.4 | 456.8749 |
| 700 | 52.4052 | 23417.4 | 120.0452 | 60614.3 | -524217.6 | -542496.2 | 143.9677 | -1467120.7 | 380.5592 |
| 800 | 54.5096 | 28767.6 | 127.1863 | 72981.5 | -518867.4 | -542190.3 | 122.8015 | -1467764.5 | 323.2923 |
| 900 | 56.1704 | 34304.6 | 133.7061 | 86030.8 | -513330.4 | -541845.2 | 106.3501 | -1468214.7 | 278.7347 |
| 1000 | 57.5225 | 39991.4 | 139.6965 | 99705.0 | -507643.6 | -541479.5 | 93.1978 | -1468510.2 | 243.0796 |
| 1100 | 58.6487 | 45801.6 | 145.2333 | 113955.0 | -501833.4 | -541111.7 | 82.4433 | -1468678.8 | 213.9025 |
| 1200 | 59.6020 | 51715.4 | 150.3784 | 128738.7 | -495919.6 | -540753.5 | 73.4875 | -1468741.0 | 189.5864 |
| 1300 | 60.4183 | 57717.5 | 155.1822 | 144019.4 | -489917.6 | -540406.2 | 65.9151 | -1468712.8 | 169.0110 |
| 1400 | 61.1230 | 63795.4 | 159.6861 | 159765.1 | -483839.6 | -540068.6 | 59.4270 | -1468607.1 | 151.3758 |
| 1500 | 61.7354 | 69939.0 | 163.9245 | 175947.7 | -477696.0 | -539740.1 | 53.8085 | -1468434.3 | 136.0934 |
| 1600 | 62.2704 | 76139.9 | 167.9263 | 192542.1 | -471495.1 | -539420.5 | 48.8958 | -1468203.2 | 122.7231 |
| 1700 | 62.7398 | 82390.9 | 171.7158 | 209525.9 | -465244.1 | -539110.9 | 44.5629 | -1467921.1 | 110.9278 |
| 1800 | 63.1535 | 88686.0 | 175.3138 | 226878.9 | -458949.0 | -538812.6 | 40.7138 | -1467594.3 | 100.4453 |
| 1900 | 63.5193 | 95020.0 | 178.7384 | 244582.9 | -452615.0 | -538529.7 | 37.2718 | -1467228.2 | 91.0685 |
| 2000 | 63.8441 | 101388.5 | 182.0049 | 262621.3 | -446246.5 | -538261.3 | 34.1753 | -1466827.3 | 82.6315 |
| 2100 | 64.1333 | 107787.6 | 185.1270 | 280979.1 | -439847.4 | -538009.0 | 31.3753 | -1466395.8 | 75.0002 |
| 2200 | 64.3918 | 114214.1 | 188.1166 | 299642.3 | -433420.9 | -537772.4 | 28.8304 | -1465937.2 | 68.0648 |
| 2300 | 64.6235 | 120665.1 | 190.9841 | 318598.3 | -426969.9 | -537553.3 | 26.5090 | -1465454.6 | 61.7345 |
| 2400 | 64.8319 | 127138.1 | 193.7389 | 337835.3 | -420496.9 | -537340.7 | 24.3252 | -1464950.8 | 55.9337 |
| 2500 | 65.0198 | 133630.8 | 196.3894 | 357342.6 | -414004.2 | -537220.9 | 22.3101 | -1464428.5 | 50.5988 |
| 2600 | 65.1897 | 140141.4 | 198.9429 | 377110.0 | -407493.6 | -537048.1 | 20.4503 | -1463889.8 | 45.6761 |
| 2700 | 65.3438 | 146668.2 | 201.4061 | 397128.2 | -400966.7 | -536883.5 | 18.7292 | -1463336.7 | 41.1197 |
| 2800 | 65.4839 | 153209.7 | 203.7851 | 417388.4 | -394425.3 | -536728.8 | 17.1307 | -1462771.4 | 36.8904 |
| 2900 | 65.6115 | 159764.6 | 206.0852 | 437882.5 | -387870.4 | -536583.9 | 15.6434 | -1462195.4 | 32.9543 |
| 3000 | 65.7281 | 166331.7 | 208.3116 | 458603.0 | -381303.3 | -536450.0 | 14.2555 | -1461610.2 | 29.2820 |
| 3100 | 65.8349 | 172909.9 | 210.4685 | 479542.6 | -374725.1 | -536327.4 | 12.9578 | -1461017.5 | 25.8481 |
| 3200 | 65.9329 | 179498.4 | 212.5603 | 500694.5 | -368136.6 | -536216.5 | 11.7405 | -1460418.7 | 22.6301 |
| 3300 | 66.0230 | 186096.2 | 214.5905 | 522052.5 | -361538.8 | -536115.3 | 10.5984 | -1459814.8 | 19.6084 |
| 3400 | 66.1061 | 192702.7 | 216.5628 | 543610.7 | -354932.2 | -536027.7 | 9.5230 | -1459207.1 | 16.7656 |
| 3500 | 66.1827 | 199317.2 | 218.4802 | 565363.3 | -348317.8 | -535952.9 | 8.5088 | -1458596.7 | 14.0864 |
| 3600 | 66.2536 | 205939.1 | 220.3456 | 587305.0 | -341695.9 | -535887.5 | 7.5520 | -1457984.6 | 11.5571 |
| 3700 | 66.3193 | 212567.8 | 222.1618 | 609430.8 | -335067.3 | -535833.4 | 6.6467 | -1457371.7 | 9.1655 |
| 3800 | 66.3803 | 219202.8 | 223.9312 | 631735.8 | -328432.2 | -535793.8 | 5.7891 | -1456759.0 | 6.9007 |
| 3900 | 66.4370 | 225843.7 | 225.6562 | 654215.5 | -321791.3 | -535761.7 | 4.9748 | -1456147.1 | 4.7530 |
| 4000 | 66.4898 | 232490.1 | 227.3389 | 676865.6 | -315144.9 | -535742.5 | 4.2023 | -1455536.9 | 2.7135 |
| 4100 | 66.5391 | 239141.6 | 228.9814 | 699682.0 | -308493.4 | -535732.4 | 3.4667 | -1454929.1 | 0.7743 |
| 4200 | 66.5851 | 245797.8 | 230.5853 | 722660.6 | -301837.2 | -535734.7 | 2.7671 | -1454324.3 | -1.0718 |
| 4300 | 66.6281 | 252458.5 | 232.1526 | 745797.8 | -295176.5 | -535746.8 | 2.0990 | -1453723.2 | -2.8313 |
| 4400 | 66.6684 | 259123.4 | 233.6848 | 769090.0 | -288511.6 | -535771.0 | 1.4619 | -1453126.2 | -4.5101 |
| 4500 | 66.7062 | 265792.1 | 235.1835 | 792533.7 | -281842.9 | -535802.9 | 0.8530 | -1452534.0 | -6.1136 |
| 4600 | 66.7417 | 272464.5 | 236.6500 | 816125.6 | -275170.5 | -535846.4 | 0.2702 | -1451947.0 | -7.6468 |
| 4700 | 66.7751 | 279140.4 | 238.0858 | 839862.6 | -268494.6 | -535899.9 | -0.2880 | -1451365.7 | -9.1142 |
| 4800 | 66.8065 | 285819.5 | 239.4919 | 863741.8 | -261815.5 | -535964.4 | -0.8226 | -1450790.5 | -10.5198 |
| 4900 | 66.8361 | 292501.6 | 240.8697 | 887760.1 | -255133.4 | -536038.5 | -1.3353 | -1450221.9 | -11.8676 |
| 5000 | 66.8640 | 299186.7 | 242.2203 | 911914.8 | -248448.3 | -536120.4 | -1.8281 | -1449660.1 | -13.1609 |
| 5100 | 66.8904 | 305874.4 | 243.5446 | 936203.2 | -241760.6 | -536212.7 | -2.3008 | -1449105.5 | -14.4031 |
| 5200 | 66.9153 | 312564.7 | 244.8438 | 960622.9 | -235070.3 | -536313.8 | -2.7563 | -1448558.6 | -15.5970 |
| 5300 | 66.9389 | 319257.4 | 246.1186 | 985171.2 | -228377.6 | -536425.0 | -3.1948 | -1448019.5 | -16.7454 |
| 5400 | 66.9613 | 325952.5 | 247.3701 | 1009845.8 | -221682.5 | -536544.6 | -3.6160 | -1447488.6 | -17.8509 |
| 5500 | 66.9825 | 332649.7 | 248.5989 | 1034644.5 | -214985.3 | -536674.0 | -4.0231 | -1446966.1 | -18.9158 |
| 5600 | 67.0026 | 339348.9 | 249.8060 | 1059564.9 | -208286.1 | -536811.3 | -4.4151 | -1446452.4 | -19.9423 |
| 5700 | 67.0217 | 346050.1 | 250.9921 | 1084605.0 | -201584.9 | -536956.3 | -4.7932 | -1445947.6 | -20.9325 |
| 5800 | 67.0398 | 352753.2 | 252.1579 | 1109762.6 | -194881.8 | -537110.6 | -5.1594 | -1445451.9 | -21.8881 |
| 5900 | 67.0571 | 359458.1 | 253.3041 | 1135035.9 | -188176.9 | -537274.0 | -5.5122 | -1444965.7 | -22.8111 |
| 6000 | 67.0735 | 366164.6 | 254.4312 | 1160422.8 | -181470.4 | -537444.6 | -5.8543 | -1444489.0 | -23.7030 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of B, 2313° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(99) HCN (gas); molecular weight, 27.027

| T, °K | C_p^0 , cal/mole °K | $H_T^0 - H_0^0$, cal/mole | S_T^0 , cal/mole °K | $-(F_T^0 - H_0^0)$, cal/mole | H_T^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| 0 | ----- | C | ----- | C | 28982.1 | 31281.4 | ----- | -302916.3 | ----- |
| 1CC | 6.9707 | 694.3 | 40.0328 | 3309.0 | 29676.4 | 31234.7 | -66.3968 | -303785.9 | 653.9694 |
| 2CC | 7.5808 | 1414.0 | 44.9974 | 7585.5 | 30396.1 | 31227.3 | -32.2640 | -304562.4 | 321.6899 |
| 298.15 | 8.5701 | 2207.4 | 48.2117 | 12167.0 | 31189.5 | 31189.5 | -21.0366 | -305233.7 | 212.0274 |
| 3CC | 8.5871 | 2223.2 | 48.2646 | 12256.2 | 31205.4 | 31188.9 | -20.8958 | -305245.5 | 210.6477 |
| 4CC | 9.3760 | 3123.4 | 50.8491 | 17216.2 | 32105.6 | 31146.1 | -15.2194 | -305836.6 | 155.0077 |
| 5CC | 9.9737 | 4092.1 | 53.0080 | 22411.9 | 33074.2 | 31095.2 | -11.8184 | -306359.0 | 121.5621 |
| 6CC | 10.4699 | 5114.9 | 54.8714 | 27808.0 | 34097.0 | 31034.2 | -9.5552 | -306827.0 | 99.2286 |
| 7CC | 10.9094 | 6184.2 | 56.5185 | 33379.1 | 35166.3 | 30964.8 | -7.9422 | -307248.4 | 83.2528 |
| 8CC | 11.3089 | 7255.4 | 58.0022 | 39106.3 | 36277.5 | 30891.6 | -6.7351 | -307627.8 | 71.2553 |
| 9CC | 11.6735 | 8444.8 | 59.3555 | 44975.2 | 37426.9 | 30819.1 | -5.7985 | -307969.0 | 61.9129 |
| 10CC | 12.0050 | 9829.0 | 60.6029 | 50973.9 | 38611.1 | 30750.3 | -5.0508 | -308275.4 | 54.4311 |
| 11CC | 12.3046 | 10844.8 | 61.7614 | 57092.8 | 39826.9 | 30686.3 | -4.4406 | -308550.2 | 48.3038 |
| 1200 | 12.5740 | 12088.9 | 62.8438 | 63323.7 | 41071.1 | 30626.7 | -3.9331 | -308796.6 | 43.1934 |
| 13CC | 12.8153 | 13358.6 | 63.8600 | 69659.4 | 42340.7 | 30570.2 | -3.5043 | -309017.6 | 38.8660 |
| 14CC | 13.0311 | 14651.1 | 64.8177 | 76093.7 | 43633.3 | 30516.1 | -3.1378 | -309215.8 | 35.1542 |
| 1500 | 13.2239 | 15964.1 | 65.7235 | 82621.2 | 44946.2 | 30463.5 | -2.8204 | -309393.9 | 31.9354 |
| 16CC | 13.3563 | 17295.2 | 66.5826 | 89236.8 | 46277.4 | 30412.4 | -2.5432 | -309554.0 | 29.1174 |
| 17CC | 13.5505 | 18642.7 | 67.3994 | 95936.3 | 47624.9 | 30362.6 | -2.2990 | -309698.2 | 26.6297 |
| 1800 | 13.6888 | 20004.8 | 68.1775 | 102715.5 | 48986.9 | 30313.9 | -2.0823 | -309828.4 | 24.4174 |
| 1900 | 13.8132 | 21380.0 | 68.9214 | 109570.7 | 50362.2 | 30264.9 | -1.8887 | -309946.3 | 22.4373 |
| 2000 | 13.9252 | 22767.0 | 69.6325 | 116498.7 | 51749.2 | 30215.7 | -1.7149 | -310053.3 | 20.6544 |
| 21CC | 14.0265 | 24164.7 | 70.3148 | 123496.3 | 53146.8 | 30166.0 | -1.5578 | -310150.7 | 19.0409 |
| 2200 | 14.1183 | 25572.0 | 70.9694 | 130560.7 | 54554.1 | 30116.0 | -1.4153 | -310239.7 | 17.5736 |
| 2300 | 14.2017 | 26988.1 | 71.5985 | 137689.3 | 55970.2 | 30065.4 | -1.2851 | -310321.5 | 16.2335 |
| 2400 | 14.2777 | 28412.1 | 72.2045 | 144879.7 | 57394.2 | 30014.2 | -1.1664 | -310396.9 | 15.0047 |
| 2500 | 14.3473 | 29843.4 | 72.7892 | 152129.6 | 58825.5 | 29962.5 | -1.0571 | -310466.9 | 13.8741 |
| 26CC | 14.4110 | 31281.4 | 73.3532 | 159436.9 | 60262.5 | 29910.1 | -0.9565 | -310532.3 | 12.8301 |
| 2700 | 14.4696 | 32725.4 | 73.8982 | 166799.6 | 61707.6 | 29857.0 | -0.8634 | -310593.7 | 11.8633 |
| 2800 | 14.5236 | 34175.1 | 74.4254 | 174215.9 | 63157.3 | 29803.0 | -0.7772 | -310651.9 | 10.9654 |
| 2900 | 14.5734 | 35630.0 | 74.9359 | 181684.1 | 64612.2 | 29748.2 | -0.6971 | -310707.5 | 10.1292 |
| 3000 | 14.6195 | 37089.7 | 75.4308 | 189202.6 | 66071.8 | 29692.2 | -0.6223 | -310761.0 | 9.3487 |
| 31CC | 14.6623 | 38553.8 | 75.9108 | 196769.8 | 67535.9 | 29634.8 | -0.5527 | -310813.1 | 8.6184 |
| 3200 | 14.7021 | 40022.1 | 76.3770 | 204384.3 | 69004.2 | 29576.0 | -0.4875 | -310864.0 | 7.9336 |
| 3300 | 14.7390 | 41494.1 | 76.8300 | 212044.7 | 70476.3 | 29516.5 | -0.4263 | -310914.5 | 7.2902 |
| 3400 | 14.7735 | 42969.8 | 77.2705 | 219745.9 | 71951.9 | 29455.0 | -0.3689 | -310964.8 | 6.6846 |
| 3500 | 14.8056 | 44448.8 | 77.6992 | 227498.4 | 73430.9 | 29391.9 | -0.3149 | -311015.4 | 6.1134 |
| 36CC | 14.8356 | 45930.8 | 78.1167 | 235289.3 | 74913.0 | 29327.9 | -0.2638 | -311066.8 | 5.5739 |
| 3700 | 14.8636 | 47415.8 | 78.5236 | 243121.4 | 76397.9 | 29262.5 | -0.2158 | -311119.2 | 5.0635 |
| 3800 | 14.8899 | 48903.5 | 78.9203 | 250993.7 | 77885.6 | 29194.4 | -0.1704 | -311173.1 | 4.5799 |
| 3900 | 14.9144 | 50393.7 | 79.3074 | 258905.2 | 79375.9 | 29125.9 | -0.1276 | -311228.7 | 4.1210 |
| 4000 | 14.9273 | 51886.3 | 79.6853 | 266854.9 | 80868.5 | 29055.1 | -0.0866 | -311286.4 | 3.6850 |
| 41CC | 14.9588 | 53381.1 | 80.0544 | 274841.9 | 82363.3 | 28985.0 | ----- | -311346.5 | 3.2701 |
| 4200 | 14.9788 | 54878.0 | 80.4151 | 282865.5 | 83860.2 | 28915.0 | ----- | -311409.2 | 2.8750 |
| 4300 | 14.9975 | 56376.9 | 80.7678 | 290924.7 | 85359.0 | 28845.0 | ----- | -311474.9 | 2.4981 |
| 4400 | 15.0150 | 57877.5 | 81.1128 | 299018.8 | 86859.6 | 28775.0 | ----- | -311543.8 | 2.1383 |
| 4500 | 15.0313 | 59379.8 | 81.4504 | 307147.0 | 88361.9 | 28705.0 | ----- | -311616.1 | 1.7944 |
| 46CC | 15.0464 | 60883.7 | 81.7805 | 315308.6 | 89865.8 | 28635.0 | ----- | -311692.1 | 1.4654 |
| 4700 | 15.0604 | 62389.1 | 82.1047 | 323503.0 | 91371.2 | 28565.0 | ----- | -311771.9 | 1.1502 |
| 4800 | 15.0734 | 63895.8 | 82.4215 | 331729.3 | 92877.9 | 28495.0 | ----- | -311855.8 | 0.8482 |
| 4900 | 15.0854 | 65403.7 | 82.7328 | 339987.1 | 94385.8 | 28425.0 | ----- | -311943.9 | 0.5584 |
| 5000 | 15.0964 | 66912.8 | 83.0377 | 348275.7 | 95894.9 | 28355.0 | ----- | -312036.5 | 0.2801 |
| 51CC | 15.1064 | 68422.9 | 83.3368 | 356594.5 | 97405.1 | 28285.0 | ----- | -312133.5 | 0.0126 |
| 5200 | 15.1155 | 69934.0 | 83.6302 | 364942.9 | 98916.2 | 28215.0 | ----- | -312235.2 | -0.2446 |
| 5300 | 15.1236 | 71446.0 | 83.9182 | 373320.3 | 100428.1 | 28145.0 | ----- | -312341.8 | -0.4923 |
| 5400 | 15.1309 | 72958.7 | 84.2005 | 381726.3 | 101940.9 | 28075.0 | ----- | -312453.2 | -0.7308 |
| 5500 | 15.1373 | 74472.2 | 84.4786 | 390160.3 | 103454.3 | 28005.0 | ----- | -312569.6 | -0.9668 |
| 56CC | 15.1429 | 75986.2 | 84.7514 | 398621.9 | 104968.3 | 27935.0 | ----- | -312691.2 | -1.1826 |
| 5700 | 15.1476 | 77500.7 | 85.0195 | 407110.5 | 106482.8 | 27865.0 | ----- | -312817.7 | -1.3967 |
| 5800 | 15.1514 | 79015.7 | 85.2830 | 415625.6 | 107997.8 | 27795.0 | ----- | -312949.8 | -1.6035 |
| 5900 | 15.1545 | 80531.0 | 85.5420 | 424166.9 | 109513.1 | 27725.0 | ----- | -313087.0 | -1.8034 |
| 6000 | 15.1567 | 82046.5 | 85.7967 | 432733.9 | 111028.7 | 27655.0 | ----- | -313229.6 | -1.9968 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(100) HCO (gas); molecular weight, 29.019

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| C | ----- | C | ----- | 0 | -5611.5 | -3311.0 | ----- | -283915.7 | ----- |
| 100 | 7.5451 | 754.5 | 44.9204 | 3697.1 | -4816.6 | -3257.1 | 9.6969 | -284715.4 | 613.0815 |
| 200 | 7.9595 | 1551.1 | 50.4375 | 8496.4 | -4020.4 | -3188.0 | 6.1778 | -285476.0 | 301.6496 |
| 250 | 8.2643 | 2387.4 | 53.6735 | 13615.3 | -3224.1 | -3224.1 | 5.0281 | -286179.4 | 198.8493 |
| 300 | 8.2713 | 2402.7 | 53.7246 | 13714.7 | -3208.8 | -3225.4 | 5.0133 | -286192.2 | 197.5557 |
| 400 | 8.7035 | 3250.7 | 56.1611 | 19213.8 | -2360.8 | -3326.8 | 4.4182 | -286856.7 | 145.3799 |
| 500 | 9.1642 | 4144.9 | 58.1546 | 24932.4 | -1466.6 | -3466.4 | 4.0479 | -287467.1 | 114.0039 |
| 600 | 9.6598 | 5087.3 | 59.8714 | 30835.5 | -524.2 | -3628.8 | 3.7900 | -288025.1 | 93.0435 |
| 700 | 10.1079 | 6076.0 | 61.3546 | 36900.2 | 464.5 | -3804.3 | 3.5968 | -288534.2 | 78.0439 |
| 800 | 10.5186 | 7107.6 | 62.7715 | 43109.6 | 1496.1 | -3984.2 | 3.4450 | -288998.5 | 66.7751 |
| 900 | 10.8880 | 8178.3 | 64.0322 | 49450.7 | 2566.6 | -4162.9 | 3.3216 | -289422.6 | 57.9969 |
| 1000 | 11.2161 | 9263.5 | 65.1967 | 55912.8 | 3672.4 | -4337.0 | 3.2186 | -289811.1 | 50.9645 |
| 1100 | 11.5050 | 10420.2 | 66.2795 | 62487.3 | 4808.7 | -4505.8 | 3.1307 | -290168.1 | 45.2033 |
| 1200 | 11.7581 | 11583.7 | 67.2917 | 69166.4 | 5972.2 | -4670.2 | 3.0548 | -290497.6 | 40.3966 |
| 1300 | 11.9793 | 12770.8 | 68.2418 | 75943.5 | 7159.3 | -4832.0 | 2.9883 | -290803.1 | 36.3249 |
| 1400 | 12.1723 | 13978.6 | 69.1368 | 82812.9 | 8367.1 | -4992.5 | 2.9291 | -291087.8 | 32.8313 |
| 1500 | 12.3410 | 15240.4 | 69.9825 | 89769.3 | 9592.9 | -5153.1 | 2.8764 | -291354.4 | 29.8007 |
| 1600 | 12.4886 | 16446.1 | 70.7837 | 96807.9 | 10834.6 | -5314.1 | 2.8289 | -291605.4 | 27.1466 |
| 1700 | 12.6191 | 17701.5 | 71.5448 | 103924.7 | 12090.0 | -5476.1 | 2.7856 | -291842.8 | 24.8027 |
| 1800 | 12.7319 | 18969.2 | 72.2694 | 111115.7 | 13357.7 | -5639.6 | 2.7459 | -292068.6 | 22.7176 |
| 1900 | 12.8324 | 20247.5 | 72.9605 | 118377.4 | 14636.0 | -5806.1 | 2.7094 | -292284.3 | 20.8506 |
| 2000 | 12.9213 | 21535.3 | 73.6210 | 125706.7 | 15923.8 | -5975.9 | 2.6754 | -292491.4 | 19.1691 |
| 2100 | 13.0002 | 22831.4 | 74.2534 | 133100.7 | 17219.9 | -6149.3 | 2.6439 | -292691.2 | 17.6467 |
| 2200 | 13.0706 | 24135.0 | 74.8598 | 140556.6 | 18523.5 | -6326.0 | 2.6143 | -292884.8 | 16.2617 |
| 2300 | 13.1334 | 25445.3 | 75.4422 | 148071.8 | 19833.8 | -6506.7 | 2.5868 | -293073.1 | 14.9963 |
| 2400 | 13.1897 | 26761.5 | 76.0024 | 155644.3 | 21150.0 | -6691.3 | 2.5605 | -293257.0 | 13.8357 |
| 2500 | 13.2404 | 28083.0 | 76.5419 | 163271.6 | 22471.5 | -6879.8 | 2.5358 | -293437.4 | 12.7672 |
| 2600 | 13.2861 | 29409.4 | 77.0621 | 170952.0 | 23797.9 | -7072.2 | 2.5123 | -293614.9 | 11.7803 |
| 2700 | 13.3274 | 30740.1 | 77.5642 | 178683.4 | 25128.6 | -7268.5 | 2.4901 | -293790.1 | 10.8660 |
| 2800 | 13.3648 | 32074.7 | 78.0497 | 186464.3 | 26463.2 | -7469.1 | 2.4687 | -293963.6 | 10.0165 |
| 2900 | 13.3985 | 33413.0 | 78.5192 | 194292.9 | 27801.5 | -7673.6 | 2.4483 | -294135.8 | 9.2251 |
| 3000 | 13.4200 | 34754.4 | 78.9740 | 202167.6 | 29142.9 | -7882.5 | 2.4289 | -294307.1 | 8.4860 |
| 3100 | 13.4584 | 36098.9 | 79.4145 | 210087.2 | 30487.4 | -8095.7 | 2.4101 | -294477.9 | 7.7943 |
| 3200 | 13.4844 | 37446.0 | 79.8426 | 218050.2 | 31834.5 | -8313.3 | 2.3920 | -294648.6 | 7.1453 |
| 3300 | 13.5082 | 38795.7 | 80.2575 | 226055.3 | 33184.2 | -8534.4 | 2.3746 | -294819.3 | 6.5354 |
| 3400 | 13.5202 | 40147.6 | 80.6615 | 234101.4 | 34536.1 | -8760.3 | 2.3578 | -294990.6 | 5.9610 |
| 3500 | 13.5504 | 41501.7 | 81.0540 | 242187.2 | 35890.2 | -8990.5 | 2.3414 | -295162.1 | 5.4191 |
| 3600 | 13.5691 | 42857.6 | 81.4360 | 250311.8 | 37246.1 | -9224.1 | 2.3257 | -295334.5 | 4.9070 |
| 3700 | 13.5865 | 44215.4 | 81.8080 | 258474.1 | 38603.9 | -9461.6 | 2.3103 | -295507.8 | 4.4223 |
| 3800 | 13.6025 | 45574.5 | 82.1705 | 266673.1 | 39963.4 | -9704.1 | 2.2955 | -295682.2 | 3.9628 |
| 3900 | 13.6174 | 46935.5 | 82.5240 | 274907.9 | 41324.4 | -9949.2 | 2.2808 | -295857.7 | 3.5267 |
| 4000 | 13.6213 | 48298.3 | 82.8690 | 283177.6 | 42686.8 | -10198.7 | 2.2669 | -296034.4 | 3.1121 |
| 4100 | 13.6442 | 49662.1 | 83.2057 | 291481.4 | 44050.6 | -10451.1 | 2.2535 | -296212.4 | 2.7175 |
| 4200 | 13.6562 | 51027.2 | 83.5347 | 299818.5 | 45415.7 | -10707.4 | 2.2406 | -296391.7 | 2.3415 |
| 4300 | 13.6675 | 52393.3 | 83.8561 | 308188.1 | 46781.8 | -10967.6 | 2.2281 | -296572.5 | 1.9827 |
| 4400 | 13.6780 | 53760.6 | 84.1705 | 316589.5 | 48149.1 | -11231.7 | 2.2160 | -296754.7 | 1.6400 |
| 4500 | 13.6879 | 55128.9 | 84.4780 | 325022.0 | 49517.4 | -11499.7 | 2.2043 | -296938.3 | 1.3124 |
| 4600 | 13.6972 | 56498.2 | 84.7785 | 333484.9 | 50886.7 | -11771.7 | 2.1930 | -297123.5 | 0.9988 |
| 4700 | 13.7059 | 57868.4 | 85.0736 | 341977.5 | 52256.9 | -12047.7 | 2.1821 | -297310.1 | 0.6984 |
| 4800 | 13.7141 | 59239.4 | 85.3622 | 350499.4 | 53627.9 | -12327.7 | 2.1716 | -297498.2 | 0.4103 |
| 4900 | 13.7218 | 60611.2 | 85.6451 | 359049.8 | 54999.7 | -12611.7 | 2.1614 | -297687.8 | 0.1338 |
| 5000 | 13.7291 | 61983.7 | 85.9224 | 367628.2 | 56372.2 | -12899.7 | 2.1516 | -297878.8 | -0.1318 |
| 5100 | 13.7360 | 63357.0 | 86.1942 | 376234.1 | 57745.5 | -13191.7 | 2.1421 | -298071.3 | -0.3872 |
| 5200 | 13.7424 | 64730.9 | 86.4611 | 384866.9 | 59119.4 | -13487.7 | 2.1330 | -298265.2 | -0.6329 |
| 5300 | 13.7486 | 66105.4 | 86.7225 | 393526.1 | 60493.9 | -13787.7 | 2.1242 | -298460.4 | -0.8695 |
| 5400 | 13.7544 | 67480.6 | 86.9800 | 402211.3 | 61869.1 | -14091.7 | 2.1157 | -298657.1 | -1.0975 |
| 5500 | 13.7599 | 68856.3 | 87.2324 | 410922.0 | 63244.8 | -14399.7 | 2.1074 | -298855.1 | -1.3173 |
| 5600 | 13.7651 | 70232.6 | 87.4804 | 419657.7 | 64621.1 | -14711.7 | 2.0993 | -299054.5 | -1.5294 |
| 5700 | 13.7701 | 71609.3 | 87.7241 | 428417.9 | 65997.8 | -15027.7 | 2.0915 | -299255.1 | -1.7343 |
| 5800 | 13.7748 | 72986.6 | 87.9636 | 437202.3 | 67375.1 | -15347.7 | 2.0840 | -299457.0 | -1.9321 |
| 5900 | 13.7793 | 74364.3 | 88.1991 | 446010.5 | 68752.8 | -15671.7 | 2.0767 | -299660.1 | -2.1234 |
| 6000 | 13.7835 | 75742.4 | 88.4307 | 454842.0 | 70130.9 | -16000.0 | 2.0696 | -299864.4 | -2.3085 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (101) HCl (gas); molecular weight, 36.465

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -24128.0 | -22019.3 | ----- | -102196.1 | ----- |
| 100 | 6.9592 | 685.6 | 37.0416 | 3018.5 | -23442.3 | -22061.2 | 48.7088 | -102504.1 | 219.8861 |
| 200 | 6.9610 | 1381.6 | 41.8658 | 6991.5 | -22746.4 | -22029.4 | 24.6235 | -102804.0 | 107.7541 |
| 298.15 | 6.9639 | 2065.0 | 44.6457 | 11246.1 | -22063.0 | -22063.0 | 16.6956 | -103111.4 | 70.7268 |
| 300 | 6.9639 | 2077.9 | 44.6887 | 11328.8 | -22050.1 | -22064.0 | 16.5957 | -103117.4 | 70.2608 |
| 400 | 6.9730 | 2774.6 | 46.6931 | 15902.6 | -21353.4 | -22129.2 | 12.5722 | -103447.7 | 51.4544 |
| 500 | 7.0038 | 3473.2 | 48.2518 | 20652.7 | -20654.8 | -22206.9 | 10.1504 | -103786.9 | 40.1336 |
| 600 | 7.0687 | 4176.5 | 49.5340 | 25543.9 | -19951.5 | -22288.0 | 8.5300 | -104124.8 | 32.5615 |
| 700 | 7.1669 | 4888.0 | 50.6306 | 30553.4 | -19239.9 | -22366.8 | 7.3682 | -104453.7 | 27.1354 |
| 800 | 7.2888 | 5610.7 | 51.5954 | 35665.6 | -18517.3 | -22439.6 | 6.4940 | -104768.6 | 23.0552 |
| 900 | 7.4230 | 6346.2 | 52.4615 | 40869.2 | -17781.8 | -22504.9 | 5.8120 | -105066.9 | 19.8688 |
| 1000 | 7.5601 | 7095.4 | 53.2507 | 46155.4 | -17032.6 | -22562.0 | 5.2650 | -105347.8 | 17.3142 |
| 1100 | 7.6937 | 7858.1 | 53.9776 | 51517.2 | -16269.9 | -22611.3 | 4.8162 | -105611.6 | 15.2187 |
| 1200 | 7.8200 | 8633.9 | 54.6525 | 56949.1 | -15494.1 | -22653.6 | 4.4415 | -105859.0 | 13.4682 |
| 1300 | 7.9372 | 9421.8 | 55.2831 | 62446.3 | -14706.2 | -22690.0 | 4.1239 | -106091.3 | 11.9836 |
| 1400 | 8.0447 | 10221.0 | 55.8753 | 68004.5 | -13907.0 | -22721.4 | 3.8511 | -106309.8 | 10.7084 |
| 1500 | 8.1425 | 11030.4 | 56.4338 | 73620.2 | -13097.5 | -22749.1 | 3.6145 | -106515.7 | 9.6010 |
| 1600 | 8.2314 | 11849.2 | 56.9621 | 79290.2 | -12278.8 | -22773.5 | 3.4074 | -106710.4 | 8.6302 |
| 1700 | 8.3120 | 12676.4 | 57.4636 | 85011.7 | -11451.5 | -22795.1 | 3.2243 | -106894.7 | 7.7721 |
| 1800 | 8.3850 | 13511.3 | 57.9408 | 90782.2 | -10616.6 | -22814.4 | 3.0615 | -107069.9 | 7.0081 |
| 1900 | 8.4514 | 14353.2 | 58.3960 | 96599.2 | -9774.8 | -22832.6 | 2.9157 | -107236.7 | 6.3234 |
| 2000 | 8.5118 | 15201.4 | 58.8310 | 102460.7 | -8926.6 | -22849.7 | 2.7842 | -107395.9 | 5.7062 |
| 2100 | 8.5669 | 16055.4 | 59.2477 | 108364.8 | -8072.6 | -22866.1 | 2.6653 | -107548.3 | 5.1470 |
| 2200 | 8.6174 | 16914.6 | 59.6474 | 114309.7 | -7213.3 | -22881.7 | 2.5570 | -107694.5 | 4.6379 |
| 2300 | 8.6637 | 17778.7 | 60.0315 | 120293.7 | -6349.3 | -22897.3 | 2.4585 | -107834.9 | 4.1725 |
| 2400 | 8.7065 | 18647.3 | 60.4011 | 126315.5 | -5480.7 | -22912.5 | 2.3675 | -107970.2 | 3.7453 |
| 2500 | 8.7460 | 19519.9 | 60.7574 | 132373.5 | -4608.1 | -22927.8 | 2.2841 | -108100.6 | 3.3518 |
| 2600 | 8.7827 | 20396.4 | 61.1011 | 138466.5 | -3731.6 | -22943.3 | 2.2069 | -108226.6 | 2.9881 |
| 2700 | 8.8168 | 21276.4 | 61.4332 | 144593.4 | -2851.6 | -22958.8 | 2.1355 | -108348.4 | 2.6510 |
| 2800 | 8.8487 | 22159.7 | 61.7545 | 150752.8 | -1968.3 | -22974.9 | 2.0691 | -108466.5 | 2.3376 |
| 2900 | 8.8787 | 23046.0 | 62.0655 | 156943.9 | -1081.9 | -22991.3 | 2.0072 | -108581.0 | 2.0456 |
| 3000 | 8.9068 | 23935.3 | 62.3670 | 163165.6 | -192.6 | -23008.3 | 1.9496 | -108692.2 | 1.7727 |
| 3100 | 8.9333 | 24827.3 | 62.6595 | 169417.0 | 699.4 | -23026.1 | 1.8954 | -108800.2 | 1.5171 |
| 3200 | 8.9585 | 25721.9 | 62.9435 | 175697.2 | 1594.0 | -23044.7 | 1.8446 | -108905.3 | 1.2773 |
| 3300 | 8.9823 | 26619.0 | 63.2195 | 182005.4 | 2491.0 | -23063.5 | 1.7970 | -109007.6 | 1.0518 |
| 3400 | 9.0050 | 27518.4 | 63.4880 | 188340.9 | 3390.4 | -23083.9 | 1.7520 | -109107.3 | 0.8394 |
| 3500 | 9.0266 | 28420.0 | 63.7494 | 194702.8 | 4292.0 | -23105.4 | 1.7095 | -109204.5 | 0.6390 |
| 3600 | 9.0473 | 29323.7 | 64.0039 | 201090.5 | 5195.7 | -23127.2 | 1.6696 | -109299.3 | 0.4495 |
| 3700 | 9.0672 | 30229.4 | 64.2521 | 207503.4 | 6101.4 | -23149.9 | 1.6315 | -109391.8 | 0.2701 |
| 3800 | 9.0862 | 31137.1 | 64.4942 | 213940.7 | 7009.1 | -23174.6 | 1.5956 | -109482.2 | 0.1000 |
| 3900 | 9.1046 | 32046.6 | 64.7304 | 220402.0 | 7918.6 | -23199.1 | 1.5612 | -109570.5 | -0.0615 |
| 4000 | 9.1223 | 32958.0 | 64.9611 | 226886.6 | 8830.0 | -23225.1 | 1.5288 | -109656.8 | -0.2151 |
| 4100 | 9.1395 | 33871.1 | 65.1866 | 233394.1 | 9743.1 | -23251.6 | 1.4977 | -109741.1 | -0.3613 |
| 4200 | 9.1561 | 34785.8 | 65.4071 | 239923.8 | 10657.9 | -23279.8 | 1.4684 | -109823.6 | -0.5006 |
| 4300 | 9.1722 | 35702.3 | 65.6227 | 246475.3 | 11574.3 | -23308.7 | 1.4402 | -109904.5 | -0.6335 |
| 4400 | 9.1879 | 36620.3 | 65.8337 | 253048.2 | 12492.3 | -23339.3 | 1.4133 | -109983.3 | -0.7605 |
| 4500 | 9.2031 | 37539.8 | 66.0404 | 259641.9 | 13411.8 | -23370.1 | 1.3874 | -110060.6 | -0.8820 |
| 4600 | 9.2180 | 38460.9 | 66.2428 | 266256.1 | 14332.9 | -23402.6 | 1.3627 | -110136.3 | -0.9982 |
| 4700 | 9.2325 | 39383.4 | 66.4412 | 272890.3 | 15255.4 | -23436.1 | 1.3390 | -110210.3 | -1.1096 |
| 4800 | 9.2467 | 40307.4 | 66.6357 | 279544.2 | 16179.4 | -23471.3 | 1.3164 | -110282.8 | -1.2164 |
| 4900 | 9.2606 | 41232.7 | 66.8266 | 286217.4 | 17104.8 | -23507.5 | 1.2945 | -110353.8 | -1.3189 |
| 5000 | 9.2742 | 42159.5 | 67.0138 | 292909.4 | 18031.5 | -23544.3 | 1.2735 | -110423.3 | -1.4173 |
| 5100 | 9.2876 | 43087.6 | 67.1976 | 299620.0 | 18959.6 | -23582.6 | 1.2533 | -110491.4 | -1.5120 |
| 5200 | 9.3007 | 44017.0 | 67.3780 | 306348.8 | 19889.0 | -23621.9 | 1.2338 | -110558.1 | -1.6031 |
| 5300 | 9.3136 | 44947.7 | 67.5553 | 313095.5 | 20819.7 | -23662.6 | 1.2150 | -110623.3 | -1.6908 |
| 5400 | 9.3263 | 45879.7 | 67.7295 | 319859.8 | 21751.7 | -23704.3 | 1.1971 | -110687.2 | -1.7753 |
| 5500 | 9.3388 | 46813.0 | 67.9008 | 326641.3 | 22685.0 | -23747.5 | 1.1795 | -110749.8 | -1.8567 |
| 5600 | 9.3512 | 47747.5 | 68.0692 | 333439.8 | 23619.5 | -23791.5 | 1.1627 | -110811.0 | -1.9355 |
| 5700 | 9.3633 | 48683.2 | 68.2348 | 340255.1 | 24555.2 | -23836.3 | 1.1464 | -110871.0 | -2.0112 |
| 5800 | 9.3753 | 49620.1 | 68.3977 | 347086.7 | 25492.2 | -23882.5 | 1.1305 | -110929.7 | -2.0845 |
| 5900 | 9.3872 | 50558.3 | 68.5581 | 353934.5 | 26430.3 | -23930.0 | 1.1153 | -110987.1 | -2.1554 |
| 6000 | 9.3989 | 51497.6 | 68.7160 | 360798.2 | 27369.6 | -23978.3 | 1.1004 | -111043.3 | -2.2239 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(102) HF (gas); molecular weight, 20.008

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -66855.3 | -64788.6 | ----- | -134772.0 | ----- |
| 100 | 6.9627 | 675.7 | 33.9034 | 2714.7 | -66179.6 | -64839.8 | 141.9980 | -135091.7 | 290.8188 |
| 200 | 6.9622 | 1371.9 | 38.7290 | 6373.9 | -65483.4 | -64795.0 | 71.1721 | -135418.1 | 143.0699 |
| 298.15 | 6.9645 | 2055.3 | 41.5092 | 10320.7 | -64800.0 | -64800.0 | 47.8650 | -135755.9 | 94.3057 |
| 300 | 6.9645 | 2068.2 | 41.5523 | 10397.5 | -64787.1 | -64800.4 | 47.5720 | -135762.3 | 93.6921 |
| 400 | 6.9675 | 2764.8 | 43.5563 | 14657.7 | -64090.5 | -64836.2 | 35.7681 | -136102.6 | 68.9394 |
| 500 | 6.9731 | 3461.8 | 45.1115 | 19094.0 | -63393.5 | -64891.2 | 28.6809 | -136434.6 | 54.0507 |
| 600 | 6.9869 | 4159.7 | 46.3839 | 23670.7 | -62695.6 | -64959.0 | 23.9516 | -136758.4 | 44.1008 |
| 700 | 7.0158 | 4859.7 | 47.4629 | 28364.4 | -61995.6 | -65035.3 | 20.5696 | -137074.5 | 36.9770 |
| 800 | 7.0635 | 5563.5 | 48.4026 | 33158.6 | -61291.8 | -65116.3 | 18.0301 | -137382.5 | 31.6219 |
| 900 | 7.1300 | 6273.0 | 49.2383 | 38041.4 | -60582.3 | -65199.7 | 16.0526 | -137681.6 | 27.4476 |
| 1000 | 7.2119 | 6990.0 | 49.9936 | 43003.6 | -59865.3 | -65283.4 | 14.4685 | -137970.7 | 24.1010 |
| 1100 | 7.3050 | 7715.7 | 50.6853 | 48038.0 | -59139.6 | -65365.7 | 13.1706 | -138249.2 | 21.3572 |
| 1200 | 7.4048 | 8451.2 | 51.3251 | 53139.0 | -58404.1 | -65445.9 | 12.0878 | -138516.4 | 19.0662 |
| 1300 | 7.5074 | 9196.8 | 51.9219 | 58301.6 | -57658.5 | -65523.4 | 11.1705 | -138772.3 | 17.1239 |
| 1400 | 7.6100 | 9952.7 | 52.4820 | 63522.1 | -56902.6 | -65597.9 | 10.3830 | -139016.9 | 15.4562 |
| 1500 | 7.7103 | 10718.7 | 53.0105 | 68797.0 | -56136.6 | -65669.7 | 9.7001 | -139250.5 | 14.0083 |
| 1600 | 7.8071 | 11494.6 | 53.5112 | 74123.3 | -55360.7 | -65738.5 | 9.1019 | -139473.5 | 12.7393 |
| 1700 | 7.8935 | 12280.0 | 53.9873 | 79498.4 | -54575.3 | -65804.4 | 8.5735 | -139686.5 | 11.6178 |
| 1800 | 7.9871 | 13074.4 | 54.4413 | 84920.0 | -53780.9 | -65867.2 | 8.1033 | -139890.0 | 10.6195 |
| 1900 | 8.0697 | 13877.2 | 54.8754 | 90386.0 | -52978.1 | -65928.0 | 7.6823 | -140084.6 | 9.7250 |
| 2000 | 8.1473 | 14688.1 | 55.2913 | 95894.5 | -52167.2 | -65986.6 | 7.3028 | -140270.9 | 8.9188 |
| 2100 | 8.2202 | 15506.5 | 55.6906 | 101443.7 | -51348.7 | -66043.2 | 6.9594 | -140449.3 | 8.1885 |
| 2200 | 8.2886 | 16332.0 | 56.0746 | 107032.1 | -50523.3 | -66097.9 | 6.6468 | -140620.3 | 7.5237 |
| 2300 | 8.3527 | 17164.1 | 56.4445 | 112658.2 | -49691.2 | -66151.2 | 6.3614 | -140784.5 | 6.9160 |
| 2400 | 8.4130 | 18002.4 | 56.8012 | 118320.5 | -48852.9 | -66202.9 | 6.0992 | -140942.3 | 6.3583 |
| 2500 | 8.4697 | 18846.6 | 57.1458 | 124018.0 | -48008.7 | -66253.3 | 5.8580 | -141094.0 | 5.8447 |
| 2600 | 8.5232 | 19696.3 | 57.4791 | 129749.3 | -47159.0 | -66302.7 | 5.6351 | -141240.1 | 5.3701 |
| 2700 | 8.5736 | 20551.1 | 57.8017 | 135513.5 | -46304.2 | -66351.0 | 5.4287 | -141380.8 | 4.9302 |
| 2800 | 8.6214 | 21410.9 | 58.1144 | 141309.4 | -45444.4 | -66398.5 | 5.2368 | -141516.5 | 4.5213 |
| 2900 | 8.6667 | 22275.3 | 58.4177 | 147136.0 | -44580.0 | -66445.2 | 5.0580 | -141647.4 | 4.1402 |
| 3000 | 8.7098 | 23144.2 | 58.7123 | 152992.6 | -43711.1 | -66491.5 | 4.8912 | -141773.8 | 3.7843 |
| 3100 | 8.7509 | 24017.2 | 58.9985 | 158878.2 | -42838.1 | -66537.5 | 4.7348 | -141895.9 | 3.4510 |
| 3200 | 8.7903 | 24894.3 | 59.2770 | 164792.0 | -41961.0 | -66583.3 | 4.5882 | -142013.8 | 3.1383 |
| 3300 | 8.8280 | 25775.2 | 59.5481 | 170733.4 | -41080.1 | -66628.2 | 4.4503 | -142127.9 | 2.8442 |
| 3400 | 8.8643 | 26659.9 | 59.8121 | 176701.4 | -40195.4 | -66673.6 | 4.3205 | -142238.1 | 2.5673 |
| 3500 | 8.8994 | 27548.1 | 60.0696 | 182695.6 | -39307.2 | -66719.4 | 4.1980 | -142344.7 | 2.3060 |
| 3600 | 8.9334 | 28439.7 | 60.3208 | 188715.1 | -38415.6 | -66764.3 | 4.0823 | -142447.8 | 2.0590 |
| 3700 | 8.9664 | 29334.7 | 60.5660 | 194759.5 | -37520.6 | -66809.3 | 3.9727 | -142547.5 | 1.8252 |
| 3800 | 8.9985 | 30232.9 | 60.8056 | 200828.1 | -36622.4 | -66855.2 | 3.8688 | -142643.9 | 1.6036 |
| 3900 | 9.0299 | 31134.4 | 61.0397 | 206920.5 | -35720.9 | -66900.1 | 3.7700 | -142737.0 | 1.3932 |
| 4000 | 9.0608 | 32038.9 | 61.2687 | 213035.9 | -34816.4 | -66945.5 | 3.6765 | -142827.0 | 1.1931 |
| 4100 | 9.0911 | 32946.5 | 61.4928 | 219174.0 | -33908.8 | -66990.5 | 3.5871 | -142913.9 | 1.0028 |
| 4200 | 9.1211 | 33857.1 | 61.7122 | 225334.3 | -32998.2 | -67036.2 | 3.5023 | -142997.8 | 0.8213 |
| 4300 | 9.1508 | 34770.7 | 61.9272 | 231516.3 | -32084.6 | -67081.6 | 3.4211 | -143078.6 | 0.6482 |
| 4400 | 9.1803 | 35687.3 | 62.1379 | 237719.6 | -31168.0 | -67127.6 | 3.3436 | -143156.4 | 0.4829 |
| 4500 | 9.2098 | 36606.8 | 62.3446 | 243943.8 | -30248.5 | -67172.9 | 3.2694 | -143231.3 | 0.3249 |
| 4600 | 9.2394 | 37529.2 | 62.5473 | 250188.4 | -29326.1 | -67218.7 | 3.1984 | -143303.1 | 0.1736 |
| 4700 | 9.2691 | 38454.6 | 62.7463 | 256453.1 | -28400.7 | -67264.5 | 3.1304 | -143372.0 | 0.0287 |
| 4800 | 9.2992 | 39383.0 | 62.9418 | 262737.6 | -27472.3 | -67310.6 | 3.0653 | -143437.9 | -0.1102 |
| 4900 | 9.3297 | 40314.5 | 63.1338 | 269041.4 | -26540.8 | -67356.6 | 3.0027 | -143500.7 | -0.2435 |
| 5000 | 9.3607 | 41249.0 | 63.3226 | 275364.2 | -25606.3 | -67401.8 | 2.9426 | -143560.4 | -0.3715 |
| 5100 | 9.3925 | 42186.7 | 63.5083 | 281705.8 | -24668.6 | -67447.0 | 2.8848 | -143616.9 | -0.4946 |
| 5200 | 9.4252 | 43127.5 | 63.6910 | 288065.8 | -23727.8 | -67491.6 | 2.8292 | -143670.2 | -0.6129 |
| 5300 | 9.4589 | 44071.7 | 63.8709 | 294443.9 | -22783.6 | -67536.1 | 2.7755 | -143720.2 | -0.7269 |
| 5400 | 9.4938 | 45019.4 | 64.0480 | 300839.9 | -21835.9 | -67579.7 | 2.7241 | -143766.7 | -0.8366 |
| 5500 | 9.5301 | 45970.5 | 64.2225 | 307253.4 | -20884.8 | -67622.8 | 2.6743 | -143809.6 | -0.9424 |
| 5600 | 9.5680 | 46925.4 | 64.3946 | 313684.3 | -19929.9 | -67664.7 | 2.6263 | -143848.8 | -1.0445 |
| 5700 | 9.6077 | 47884.2 | 64.5643 | 320132.2 | -18971.1 | -67705.0 | 2.5800 | -143884.1 | -1.1430 |
| 5800 | 9.6494 | 48847.0 | 64.7317 | 326597.1 | -18008.3 | -67744.2 | 2.5351 | -143915.4 | -1.2381 |
| 5900 | 9.6934 | 49814.1 | 64.8971 | 333078.5 | -17041.2 | -67782.0 | 2.4920 | -143942.3 | -1.3300 |
| 6000 | 9.7399 | 50785.8 | 65.0604 | 339576.4 | -16069.5 | -67817.6 | 2.4499 | -143964.7 | -1.4189 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(103) H_2O (gas); molecular weight, 18.016

| T, °K | C_p^0 , cal/mole °K | $H_T^0 - H_0^0$, cal/mole | S_T^0 , cal/mole °K | $-(F_T^0 - H_0^0)$, cal/mole | H_T^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -60164.7 | -57103.5 | ----- | -219346.8 | ----- |
| 100 | 7.9606 | 786.1 | 36.3959 | 2853.4 | -59378.5 | -57423.1 | 123.5929 | -220081.8 | 472.2236 |
| 200 | 7.9694 | 1582.5 | 41.9157 | 6800.6 | -58582.1 | -57577.4 | 60.7914 | -220836.4 | 231.4202 |
| 298.15 | 8.0256 | 2366.8 | 45.1054 | 11081.4 | -57797.9 | -57797.9 | 40.0471 | -221550.1 | 151.8705 |
| 300 | 8.0276 | 2381.6 | 45.1550 | 11164.9 | -57783.0 | -57802.3 | 39.7856 | -221563.3 | 150.8691 |
| 400 | 8.1864 | 3191.5 | 47.4839 | 15802.0 | -56973.1 | -58042.1 | 29.2388 | -222264.9 | 110.4607 |
| 500 | 8.4161 | 4021.3 | 49.3344 | 20645.9 | -56143.4 | -58276.5 | 22.8848 | -222939.3 | 86.1395 |
| 600 | 8.6779 | 4875.8 | 50.8917 | 25659.2 | -55288.9 | -58499.6 | 18.6320 | -223584.8 | 69.8769 |
| 700 | 8.9571 | 5757.4 | 52.2502 | 30817.7 | -54407.3 | -58709.1 | 15.5827 | -224200.6 | 58.2277 |
| 800 | 9.2496 | 6667.7 | 53.4652 | 36104.5 | -53497.0 | -58903.3 | 13.2879 | -224786.2 | 49.4673 |
| 900 | 9.5518 | 7607.7 | 54.5720 | 41507.1 | -52557.0 | -59081.4 | 11.4976 | -225340.8 | 42.6363 |
| 1000 | 9.8577 | 8578.1 | 55.5942 | 47016.1 | -51586.5 | -59242.9 | 10.0613 | -225864.2 | 37.1583 |
| 1100 | 10.1610 | 9579.1 | 56.5480 | 52623.7 | -50585.6 | -59387.8 | 8.8826 | -226356.5 | 32.6663 |
| 1200 | 10.4560 | 10610.1 | 57.4449 | 58323.8 | -49554.6 | -59516.7 | 7.8984 | -226818.4 | 28.9149 |
| 1300 | 10.7384 | 11669.9 | 58.2931 | 64111.1 | -48494.8 | -59631.0 | 7.0640 | -227251.0 | 25.7345 |
| 1400 | 11.0056 | 12757.2 | 59.0987 | 69981.0 | -47407.4 | -59731.8 | 6.3469 | -227655.8 | 23.0033 |
| 1500 | 11.2560 | 13870.5 | 59.8667 | 75929.5 | -46294.2 | -59821.1 | 5.7250 | -228034.5 | 20.6322 |
| 1600 | 11.4894 | 15007.9 | 60.6007 | 81953.2 | -45156.8 | -59899.5 | 5.1801 | -228388.9 | 18.5542 |
| 1700 | 11.7060 | 16167.8 | 61.3038 | 88048.7 | -43996.9 | -59968.2 | 4.6986 | -228720.6 | 16.7179 |
| 1800 | 11.9065 | 17348.5 | 61.9786 | 94213.0 | -42816.1 | -60027.9 | 4.2701 | -229031.4 | 15.0833 |
| 1900 | 12.0919 | 18548.6 | 62.6274 | 100443.5 | -41616.1 | -60081.3 | 3.8865 | -229322.8 | 13.6189 |
| 2000 | 12.2633 | 19766.4 | 63.2521 | 106737.7 | -40398.2 | -60128.6 | 3.5405 | -229596.4 | 12.2992 |
| 2100 | 12.4219 | 21000.8 | 63.8543 | 113093.2 | -39163.9 | -60170.7 | 3.2277 | -229853.4 | 11.1039 |
| 2200 | 12.5689 | 22250.4 | 64.4356 | 119507.8 | -37914.2 | -60208.1 | 2.9428 | -230095.2 | 10.0161 |
| 2300 | 12.7053 | 23514.2 | 64.9973 | 125979.6 | -36650.4 | -60242.0 | 2.6830 | -230323.0 | 9.0218 |
| 2400 | 12.8321 | 24791.2 | 65.5408 | 132506.7 | -35373.5 | -60272.4 | 2.4441 | -230537.7 | 8.1095 |
| 2500 | 12.9503 | 26080.4 | 66.0670 | 139087.2 | -34084.3 | -60300.2 | 2.2246 | -230740.4 | 7.2695 |
| 2600 | 13.0607 | 27381.0 | 66.5771 | 145719.6 | -32783.7 | -60325.7 | 2.0217 | -230931.9 | 6.4934 |
| 2700 | 13.1642 | 28692.3 | 67.0720 | 152402.1 | -31472.4 | -60349.1 | 1.8341 | -231113.1 | 5.7742 |
| 2800 | 13.2614 | 30013.6 | 67.5525 | 159133.5 | -30151.1 | -60371.3 | 1.6594 | -231284.6 | 5.1058 |
| 2900 | 13.3530 | 31344.4 | 68.0195 | 165912.2 | -28820.3 | -60391.9 | 1.4969 | -231447.1 | 4.4832 |
| 3000 | 13.4395 | 32684.0 | 68.4737 | 172737.0 | -27480.6 | -60412.0 | 1.3455 | -231601.2 | 3.9016 |
| 3100 | 13.5214 | 34032.1 | 68.9157 | 179606.5 | -26132.5 | -60431.6 | 1.2033 | -231747.4 | 3.3572 |
| 3200 | 13.5993 | 35388.2 | 69.3462 | 186519.7 | -24776.5 | -60451.0 | 1.0701 | -231886.4 | 2.8465 |
| 3300 | 13.6734 | 36751.9 | 69.7658 | 193475.4 | -23412.8 | -60468.9 | 0.9451 | -232018.4 | 2.3664 |
| 3400 | 13.7442 | 38122.8 | 70.1751 | 200472.5 | -22041.9 | -60488.2 | 0.8272 | -232144.0 | 1.9144 |
| 3500 | 13.8120 | 39500.6 | 70.5745 | 207510.1 | -20664.1 | -60508.2 | 0.7161 | -232263.5 | 1.4880 |
| 3600 | 13.8771 | 40885.1 | 70.9645 | 214587.1 | -19279.6 | -60526.9 | 0.6113 | -232377.2 | 1.0850 |
| 3700 | 13.9398 | 42276.0 | 71.3456 | 221702.7 | -17888.7 | -60545.6 | 0.5118 | -232485.5 | 0.7037 |
| 3800 | 14.0002 | 43673.0 | 71.7181 | 228856.0 | -16491.7 | -60566.6 | 0.4178 | -232588.6 | 0.3422 |
| 3900 | 14.0587 | 45075.9 | 72.0826 | 236046.1 | -15088.7 | -60585.5 | 0.3281 | -232686.8 | -0.0008 |
| 4000 | 14.1153 | 46484.6 | 72.4392 | 243272.2 | -13680.0 | -60605.8 | 0.2436 | -232780.4 | -0.3268 |
| 4100 | 14.1703 | 47898.9 | 72.7884 | 250533.7 | -12265.7 | -60625.2 | 0.1625 | -232869.4 | -0.6371 |
| 4200 | 14.2239 | 49318.7 | 73.1306 | 257829.7 | -10846.0 | -60646.1 | 0.0860 | -232954.2 | -0.9327 |
| 4300 | 14.2761 | 50743.7 | 73.4659 | 265159.5 | -9421.0 | -60666.8 | 0.0126 | -233034.8 | -1.2146 |
| 4400 | 14.3271 | 52173.8 | 73.7946 | 272522.6 | -7990.9 | -60688.9 | -0.0576 | -233111.4 | -1.4838 |
| 4500 | 14.3770 | 53609.0 | 74.1172 | 279918.3 | -6555.6 | -60709.7 | -0.1247 | -233184.2 | -1.7412 |
| 4600 | 14.4260 | 55049.2 | 74.4337 | 287345.9 | -5115.5 | -60731.8 | -0.1889 | -233253.2 | -1.9874 |
| 4700 | 14.4741 | 56494.2 | 74.7445 | 294804.8 | -3670.5 | -60754.3 | -0.2503 | -233318.6 | -2.2232 |
| 4800 | 14.5213 | 57944.0 | 75.0497 | 302294.6 | -2220.7 | -60777.9 | -0.3090 | -233380.5 | -2.4493 |
| 4900 | 14.5679 | 59398.5 | 75.3496 | 309814.6 | -766.2 | -60801.8 | -0.3656 | -233438.8 | -2.6661 |
| 5000 | 14.6139 | 60857.5 | 75.6444 | 317364.3 | 692.9 | -60824.7 | -0.4199 | -233493.8 | -2.8744 |
| 5100 | 14.6592 | 62321.2 | 75.9342 | 324943.3 | 2156.5 | -60848.7 | -0.4719 | -233545.4 | -3.0745 |
| 5200 | 14.7041 | 63789.4 | 76.2193 | 332551.0 | 3624.7 | -60872.6 | -0.5222 | -233593.7 | -3.2670 |
| 5300 | 14.7485 | 65262.0 | 76.4998 | 340187.0 | 5097.3 | -60897.3 | -0.5707 | -233638.7 | -3.4522 |
| 5400 | 14.7926 | 66739.1 | 76.7759 | 347850.8 | 6574.4 | -60921.7 | -0.6169 | -233680.4 | -3.6307 |
| 5500 | 14.8362 | 68220.5 | 77.0477 | 355542.0 | 8053.8 | -60946.9 | -0.6619 | -233718.9 | -3.8026 |
| 5600 | 14.8796 | 69706.3 | 77.3155 | 363260.2 | 9541.6 | -60971.7 | -0.7050 | -233754.3 | -3.9685 |
| 5700 | 14.9227 | 71196.4 | 77.5792 | 371005.0 | 11031.8 | -60995.8 | -0.7469 | -233786.4 | -4.1285 |
| 5800 | 14.9656 | 72690.8 | 77.8391 | 378775.9 | 12526.2 | -61020.5 | -0.7873 | -233815.3 | -4.2831 |
| 5900 | 15.0083 | 74189.5 | 78.0953 | 386572.7 | 14024.9 | -61045.5 | -0.8261 | -233841.0 | -4.4324 |
| 6000 | 15.0509 | 75692.5 | 78.3479 | 394394.9 | 15527.8 | -61069.7 | -0.8641 | -233863.5 | -4.5768 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(104) HS (gas); molecular weight, 33.074

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 34066.2 | 36131.8 | ----- | -81400.0 | ----- |
| 100 | 7.1695 | 654.5 | 38.4421 | 3189.7 | 34720.7 | 36242.1 | -74.1327 | -81741.5 | 174.7802 |
| 200 | 7.7697 | 1408.3 | 43.6419 | 7320.1 | 35474.5 | 36301.9 | -34.4926 | -82021.8 | 85.3421 |
| 298.15 | 7.7271 | 2171.4 | 46.7445 | 11765.4 | 36237.7 | 36237.7 | -21.4418 | -82300.9 | 55.7941 |
| 300 | 7.7242 | 2185.7 | 46.7923 | 11852.0 | 36252.0 | 36235.6 | -21.2783 | -82306.3 | 55.4221 |
| 400 | 7.5635 | 2949.9 | 48.9917 | 16646.8 | 37016.1 | 35554.0 | -14.7022 | -82600.0 | 40.4087 |
| 500 | 7.4703 | 3700.8 | 50.6678 | 21633.1 | 37767.0 | 35017.8 | -10.8427 | -82895.2 | 31.3680 |
| 600 | 7.4632 | 4446.9 | 52.0280 | 26769.9 | 38513.1 | 34557.0 | -8.3079 | -83184.6 | 25.3195 |
| 700 | 7.5211 | 5195.6 | 53.1821 | 32031.9 | 39261.9 | 34154.8 | -6.5200 | -83462.7 | 20.9842 |
| 800 | 7.6181 | 5952.4 | 54.1925 | 37401.6 | 40018.6 | 33788.4 | -5.1939 | -83726.6 | 17.7221 |
| 900 | 7.7338 | 6719.9 | 55.0963 | 42866.8 | 40786.1 | 33431.0 | -4.1735 | -83974.8 | 15.1771 |
| 1000 | 7.8546 | 7499.3 | 55.9174 | 48418.1 | 41565.5 | 33081.9 | -3.3657 | -84207.4 | 13.1353 |
| 1100 | 7.9728 | 8290.7 | 56.6716 | 54048.1 | 42356.9 | 32740.7 | -2.7119 | -84425.1 | 11.4602 |
| 1200 | 8.0843 | 9093.6 | 57.3701 | 59750.6 | 43159.8 | 32406.4 | -2.1725 | -84629.3 | 10.0608 |
| 1300 | 8.1872 | 9907.3 | 58.0214 | 65520.5 | 43973.5 | 32077.8 | -1.7207 | -84821.0 | 8.8739 |
| 1400 | 8.2812 | 10730.8 | 58.6316 | 71353.5 | 44797.0 | 31753.8 | -1.3376 | -85001.7 | 7.8543 |
| 1500 | 8.3665 | 11563.2 | 59.2059 | 77245.6 | 45629.4 | 31433.3 | -1.0088 | -85172.7 | 6.9689 |
| 1600 | 8.4437 | 12403.8 | 59.7484 | 83193.6 | 46470.0 | 31115.8 | -0.7238 | -85335.2 | 6.1926 |
| 1700 | 8.5137 | 13251.7 | 60.2624 | 89194.4 | 47317.9 | 30800.7 | -0.4751 | -85490.3 | 5.5063 |
| 1800 | 8.5771 | 14106.3 | 60.7509 | 95245.3 | 48172.5 | 30487.9 | -0.2562 | -85639.1 | 4.8953 |
| 1900 | 8.6347 | 14967.0 | 61.2162 | 101343.8 | 49033.2 | 30176.0 | -0.0623 | -85782.3 | 4.3476 |
| 2000 | 8.6873 | 15833.1 | 61.6605 | 107487.8 | 49899.3 | 29865.1 | 0.1103 | -85921.1 | 3.8538 |
| 2100 | 8.7355 | 16704.3 | 62.0855 | 113675.3 | 50770.5 | 29555.0 | 0.2649 | -86055.8 | 3.4064 |
| 2200 | 8.7797 | 17580.1 | 62.4929 | 119904.3 | 51646.3 | 29245.8 | 0.4039 | -86187.2 | 2.9990 |
| 2300 | 8.8205 | 18460.1 | 62.8841 | 126173.3 | 52526.3 | 28936.7 | 0.5297 | -86316.0 | 2.6265 |
| 2400 | 8.8582 | 19344.1 | 63.2603 | 132480.6 | 53410.3 | 28628.1 | 0.6435 | -86442.4 | 2.2845 |
| 2500 | 8.8934 | 20231.6 | 63.6226 | 138824.9 | 54297.9 | 28319.6 | 0.7473 | -86567.0 | 1.9695 |
| 2600 | 8.9261 | 21122.7 | 63.9721 | 145204.8 | 55188.9 | 28011.1 | 0.8421 | -86689.9 | 1.6782 |
| 2700 | 8.9568 | 22016.8 | 64.3095 | 151618.9 | 56083.0 | 27702.6 | 0.9279 | -86811.7 | 1.4082 |
| 2800 | 8.9857 | 22913.9 | 64.6358 | 158066.3 | 56980.1 | 27404.1 | 1.0047 | -86932.3 | 1.1570 |
| 2900 | 9.0129 | 23813.9 | 64.9516 | 164545.8 | 57880.1 | 27115.6 | 1.0725 | -87052.1 | 0.9229 |
| 3000 | 9.0386 | 24716.5 | 65.2576 | 171056.3 | 58782.7 | 26837.1 | 1.1313 | -87171.2 | 0.7041 |
| 3100 | 9.0631 | 25621.5 | 65.5544 | 177597.0 | 59687.8 | 26568.6 | 1.1811 | -87289.7 | 0.4991 |
| 3200 | 9.0863 | 26529.0 | 65.8425 | 184166.9 | 60595.2 | 26310.1 | 1.2319 | -87407.7 | 0.3067 |
| 3300 | 9.1085 | 27438.8 | 66.1224 | 190765.2 | 61505.0 | 26061.6 | 1.2827 | -87525.2 | 0.1257 |
| 3400 | 9.1298 | 28350.7 | 66.3947 | 197391.1 | 62416.9 | 25823.1 | 1.3335 | -87642.3 | -0.0449 |
| 3500 | 9.1502 | 29264.7 | 66.6596 | 204043.8 | 63331.0 | 25594.6 | 1.3843 | -87758.9 | -0.2060 |
| 3600 | 9.1699 | 30180.7 | 66.9177 | 210722.9 | 64246.9 | 25376.1 | 1.4351 | -87875.3 | -0.3583 |
| 3700 | 9.1888 | 31098.6 | 67.1691 | 217427.2 | 65164.9 | 25167.6 | 1.4859 | -87991.3 | -0.5026 |
| 3800 | 9.2071 | 32018.4 | 67.4145 | 224156.5 | 66084.6 | 24969.1 | 1.5367 | -88106.8 | -0.6394 |
| 3900 | 9.2248 | 32940.1 | 67.6538 | 230909.8 | 67006.3 | 24780.6 | 1.5875 | -88221.9 | -0.7694 |
| 4000 | 9.2420 | 33863.4 | 67.8876 | 237687.0 | 67929.6 | 24592.1 | 1.6383 | -88336.7 | -0.8931 |
| 4100 | 9.2586 | 34788.4 | 68.1160 | 244487.2 | 68854.7 | 24413.6 | 1.6891 | -88450.9 | -1.0109 |
| 4200 | 9.2749 | 35715.1 | 68.3393 | 251310.1 | 69781.3 | 24235.1 | 1.7399 | -88564.7 | -1.1232 |
| 4300 | 9.2907 | 36643.3 | 68.5577 | 258155.0 | 70709.6 | 24066.6 | 1.7907 | -88677.8 | -1.2304 |
| 4400 | 9.3061 | 37573.3 | 68.7715 | 265021.4 | 71639.5 | 23908.1 | 1.8415 | -88790.4 | -1.3329 |
| 4500 | 9.3212 | 38504.6 | 68.9808 | 271909.0 | 72570.9 | 23759.6 | 1.8923 | -88902.3 | -1.4310 |
| 4600 | 9.3359 | 39437.4 | 69.1859 | 278817.5 | 73503.7 | 23611.1 | 1.9431 | -89013.7 | -1.5249 |
| 4700 | 9.3504 | 40371.7 | 69.3868 | 285746.1 | 74438.0 | 23472.6 | 1.9939 | -89124.3 | -1.6150 |
| 4800 | 9.3645 | 41307.5 | 69.5838 | 292694.7 | 75373.7 | 23334.1 | 2.0447 | -89234.2 | -1.7013 |
| 4900 | 9.3784 | 42244.7 | 69.7770 | 299662.6 | 76310.9 | 23205.6 | 2.0955 | -89343.2 | -1.7843 |
| 5000 | 9.3920 | 43183.3 | 69.9667 | 306650.0 | 77249.5 | 23087.1 | 2.1463 | -89451.4 | -1.8640 |
| 5100 | 9.4061 | 44123.1 | 70.1528 | 313656.0 | 78189.4 | 22978.6 | 2.1971 | -89558.9 | -1.9407 |
| 5200 | 9.4196 | 45064.5 | 70.3356 | 320680.5 | 79130.7 | 22870.1 | 2.2479 | -89665.3 | -2.0146 |
| 5300 | 9.4329 | 46007.0 | 70.5151 | 327723.1 | 80073.2 | 22761.6 | 2.2987 | -89770.8 | -2.0857 |
| 5400 | 9.4460 | 46951.1 | 70.6916 | 334783.4 | 81017.3 | 22653.1 | 2.3495 | -89875.3 | -2.1543 |
| 5500 | 9.4590 | 47896.3 | 70.8650 | 341861.3 | 81962.5 | 22554.6 | 2.4003 | -89978.8 | -2.2205 |
| 5600 | 9.4719 | 48842.8 | 71.0356 | 348956.4 | 82909.0 | 22456.1 | 2.4511 | -90081.3 | -2.2844 |
| 5700 | 9.4846 | 49790.6 | 71.2033 | 356068.3 | 83856.9 | 22357.6 | 2.5019 | -90182.7 | -2.3461 |
| 5800 | 9.4973 | 50739.8 | 71.3684 | 363196.9 | 84806.0 | 22259.1 | 2.5527 | -90283.0 | -2.4057 |
| 5900 | 9.5098 | 51690.1 | 71.5308 | 370341.9 | 85756.3 | 22160.6 | 2.6035 | -90382.2 | -2.4634 |
| 6000 | 9.5222 | 52641.7 | 71.6908 | 377503.0 | 86707.9 | 22062.1 | 2.6543 | -90480.2 | -2.5192 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(105) H₂S (gas); molecular weight, 34.082

| T, °K | C _p ^o , cal/mole °K | H _f ^o -H ₀ ^o , cal/mole | S _f ^o , cal/mole °K | -(F _f ^o -H ₀ ^o), cal/mole | H _f ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| C | ----- | C | ----- | 0 | -7195.5 | -4122.0 | ----- | -173282.3 | ----- |
| 1CC | 7.9566 | 790.6 | 40.4217 | 3251.5 | -6408.9 | -4255.0 | 12.1373 | -173984.4 | 371.9996 |
| 2CC | 7.9512 | 1587.3 | 45.9424 | 7601.2 | -5612.3 | -4453.8 | 7.4273 | -174718.7 | 181.5817 |
| 298.15 | 8.1631 | 2379.5 | 49.1628 | 12278.4 | -4820.0 | -4820.0 | 5.7713 | -175456.3 | 118.6178 |
| 300 | 8.1884 | 2354.7 | 49.2135 | 12369.4 | -4804.9 | -4827.6 | 5.7491 | -175470.0 | 117.8247 |
| 4CC | 8.5200 | 3229.4 | 51.6126 | 17415.6 | -3570.1 | -5785.5 | 4.8237 | -176189.9 | 85.8088 |
| 500 | 8.5087 | 4100.5 | 53.5548 | 22676.9 | -3095.0 | -6551.2 | 4.1536 | -176861.8 | 66.5221 |
| 6CC | 9.3289 | 5012.2 | 55.2158 | 28117.3 | -2187.3 | -7156.4 | 3.6538 | -177482.4 | 53.6168 |
| 7CC | 9.7633 | 5966.8 | 56.6864 | 33713.7 | -1232.8 | -7743.9 | 3.2653 | -178051.6 | 44.3676 |
| 800 | 10.1527 | 6964.7 | 58.0183 | 39449.9 | -234.8 | -8221.8 | 2.9540 | -178571.0 | 37.4093 |
| 900 | 10.6012 | 8004.6 | 59.2427 | 45313.8 | 805.1 | -8662.5 | 2.6982 | -179043.2 | 31.9822 |
| 1000 | 10.9750 | 9083.5 | 60.3795 | 51295.6 | 1884.4 | -9070.7 | 2.4833 | -179473.6 | 27.6295 |
| 1100 | 11.3220 | 10159.3 | 61.4423 | 57387.2 | 2999.7 | -9451.2 | 2.2991 | -179863.8 | 24.0601 |
| 1200 | 11.6300 | 11347.1 | 62.4409 | 63581.9 | 4147.6 | -9808.3 | 2.1397 | -180219.8 | 21.0793 |
| 1300 | 11.9048 | 12524.1 | 63.3828 | 69873.5 | 5324.6 | -10146.5 | 2.0002 | -180544.9 | 18.5524 |
| 1400 | 12.1494 | 13727.1 | 64.2742 | 76256.8 | 6527.5 | -10469.0 | 1.8760 | -180843.0 | 16.3827 |
| 1500 | 12.3672 | 14953.1 | 65.1200 | 82726.8 | 7753.6 | -10779.6 | 1.7656 | -181117.3 | 14.4993 |
| 1600 | 12.5616 | 16199.7 | 65.9245 | 89279.4 | 9000.2 | -11079.8 | 1.6663 | -181370.5 | 12.8490 |
| 1700 | 12.7355 | 17464.8 | 66.6513 | 95910.5 | 10265.2 | -11371.3 | 1.5762 | -181605.4 | 11.3908 |
| 1800 | 12.8918 | 18746.3 | 67.4238 | 102616.5 | 11546.7 | -11655.3 | 1.4939 | -181824.0 | 10.0930 |
| 1900 | 13.0328 | 20042.6 | 68.1246 | 109394.2 | 12843.1 | -11934.6 | 1.4187 | -182028.5 | 8.9305 |
| 2000 | 13.1606 | 21352.4 | 68.7564 | 116240.5 | 14152.8 | -12209.4 | 1.3490 | -182220.3 | 7.8831 |
| 2100 | 13.2771 | 22674.4 | 69.4414 | 123152.6 | 15474.8 | -12480.5 | 1.2849 | -182401.1 | 6.9345 |
| 2200 | 13.3838 | 24007.5 | 70.0615 | 130127.9 | 16807.9 | -12748.2 | 1.2251 | -182572.1 | 6.0713 |
| 2300 | 13.4820 | 25350.8 | 70.6587 | 137164.1 | 18151.3 | -13013.6 | 1.1698 | -182734.3 | 5.2824 |
| 2400 | 13.5727 | 26703.6 | 71.2344 | 144258.9 | 19504.1 | -13276.6 | 1.1174 | -182888.7 | 4.5587 |
| 2500 | 13.6571 | 28065.2 | 71.7902 | 151410.3 | 20865.6 | -13537.7 | 1.0687 | -183036.1 | 3.8923 |
| 2600 | 13.7359 | 29434.5 | 72.3274 | 158616.3 | 22235.3 | -13798.2 | 1.0251 | -183177.2 | 3.2766 |
| 2700 | 13.8098 | 30812.2 | 72.8472 | 165875.2 | 23612.6 | -14058.7 | 1.0000 | -183312.5 | 2.7062 |
| 2800 | 13.8794 | 32196.7 | 73.3507 | 173185.2 | 24957.1 | -14319.2 | 0.9750 | -183442.7 | 2.1761 |
| 2900 | 13.9452 | 33587.5 | 73.8389 | 180544.8 | 26308.4 | -14579.7 | 0.9500 | -183568.0 | 1.6822 |
| 3000 | 14.0078 | 34985.6 | 74.3127 | 187952.5 | 27786.1 | -14840.2 | 0.9250 | -183688.8 | 1.2209 |
| 3100 | 14.0674 | 36389.4 | 74.7730 | 195406.9 | 29189.8 | -15100.7 | 0.9000 | -183805.4 | 0.7891 |
| 3200 | 14.1244 | 37799.0 | 75.2205 | 202906.7 | 30599.4 | -15361.2 | 0.8750 | -183918.0 | 0.3841 |
| 3300 | 14.1782 | 39214.2 | 75.6560 | 210450.6 | 32014.6 | -15621.7 | 0.8500 | -184026.9 | 0.0034 |
| 3400 | 14.2290 | 40634.8 | 76.0801 | 218037.5 | 33435.2 | -15882.2 | 0.8250 | -184132.2 | -0.3552 |
| 3500 | 14.2829 | 42060.5 | 76.4934 | 225666.3 | 34861.0 | -16142.7 | 0.8000 | -184233.9 | -0.6934 |
| 3600 | 14.3323 | 43491.3 | 76.8964 | 233335.9 | 36291.8 | -16403.2 | 0.7750 | -184332.3 | -1.0131 |
| 3700 | 14.3803 | 44926.9 | 77.2898 | 241045.2 | 37727.4 | -16663.7 | 0.7500 | -184427.4 | -1.3156 |
| 3800 | 14.4271 | 46367.3 | 77.6739 | 248793.5 | 39167.8 | -16924.2 | 0.7250 | -184519.2 | -1.6023 |
| 3900 | 14.4727 | 47812.3 | 78.0492 | 256579.7 | 40612.8 | -17184.7 | 0.7000 | -184607.7 | -1.8745 |
| 4000 | 14.5173 | 49261.8 | 78.4162 | 264403.1 | 42062.3 | -17445.2 | 0.6750 | -184693.1 | -2.1331 |
| 4100 | 14.5611 | 50715.7 | 78.7752 | 272262.7 | 43516.2 | -17705.7 | 0.6500 | -184775.3 | -2.3793 |
| 4200 | 14.6041 | 52174.0 | 79.1266 | 280157.9 | 44974.5 | -17966.2 | 0.6250 | -184854.2 | -2.6138 |
| 4300 | 14.6463 | 53636.5 | 79.4708 | 288087.8 | 46437.0 | -18226.7 | 0.6000 | -184930.0 | -2.8376 |
| 4400 | 14.6880 | 55103.3 | 79.8080 | 296051.8 | 47903.7 | -18487.2 | 0.5750 | -185002.5 | -3.0512 |
| 4500 | 14.7291 | 56574.1 | 80.1385 | 304049.2 | 49374.6 | -18747.7 | 0.5500 | -185071.8 | -3.2555 |
| 4600 | 14.7698 | 58049.1 | 80.4627 | 312079.3 | 50849.5 | -19008.2 | 0.5250 | -185137.8 | -3.4509 |
| 4700 | 14.8100 | 59528.1 | 80.7808 | 320141.5 | 52328.5 | -19268.7 | 0.5000 | -185200.6 | -3.6381 |
| 4800 | 14.8499 | 61011.1 | 81.0930 | 328235.2 | 53811.5 | -19529.2 | 0.4750 | -185260.0 | -3.8175 |
| 4900 | 14.8894 | 62498.0 | 81.3996 | 336359.9 | 55298.5 | -19789.7 | 0.4500 | -185316.1 | -3.9897 |
| 5000 | 14.9287 | 63988.9 | 81.7008 | 344515.0 | 56789.4 | -20050.2 | 0.4250 | -185368.8 | -4.1550 |
| 5100 | 14.9677 | 65483.8 | 81.9968 | 352699.9 | 58284.2 | -20310.7 | 0.4000 | -185418.1 | -4.3139 |
| 5200 | 15.0065 | 66982.5 | 82.2878 | 360914.2 | 59782.9 | -20571.2 | 0.3750 | -185463.9 | -4.4667 |
| 5300 | 15.0451 | 68485.1 | 82.5740 | 369157.3 | 61285.5 | -20831.7 | 0.3500 | -185506.3 | -4.6138 |
| 5400 | 15.0836 | 69991.5 | 82.8556 | 377428.8 | 62792.0 | -21092.2 | 0.3250 | -185545.1 | -4.7554 |
| 5500 | 15.1220 | 71501.8 | 83.1327 | 385728.3 | 64302.2 | -21352.7 | 0.3000 | -185580.4 | -4.8920 |
| 5600 | 15.1603 | 73015.9 | 83.4056 | 394055.2 | 65816.3 | -21613.2 | 0.2750 | -185612.1 | -5.0237 |
| 5700 | 15.1985 | 74533.8 | 83.6742 | 402409.2 | 67334.3 | -21873.7 | 0.2500 | -185640.2 | -5.1507 |
| 5800 | 15.2367 | 76055.6 | 83.9385 | 410789.9 | 68856.0 | -22134.2 | 0.2250 | -185664.7 | -5.2735 |
| 5900 | 15.2748 | 77581.2 | 84.1997 | 419196.9 | 70381.6 | -22394.7 | 0.2000 | -185685.5 | -5.3920 |
| 6000 | 15.3129 | 79110.5 | 84.4567 | 427629.7 | 71911.0 | -22655.2 | 0.1750 | -185702.5 | -5.5067 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(106) He (gas); molecular weight, 4.003

| T, °K | C_p^0 , cal/mole °K | $H_f^0 - H_0^0$, cal/mole | S_f^0 , cal/mole °K | $-(F_f^0 - H_0^0)$, cal/mole | H_f^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| C | ----- | C | ----- | C | -1481.3 | 0 | ----- | 0 | ----- |
| 1CC | 4.9681 | 496.8 | 24.6984 | 1573.0 | -984.4 | 0 | 0 | 0 | 0 |
| 2CC | 4.9681 | 993.6 | 28.1421 | 4634.8 | -487.6 | 0 | 0 | 0 | 0 |
| 298.15 | 4.9681 | 1481.3 | 30.1258 | 7500.7 | C.0 | 0 | 0 | 0 | 0 |
| 300 | 4.9681 | 1450.4 | 30.1565 | 7556.5 | 9.2 | 0 | 0 | 0 | 0 |
| 400 | 4.9681 | 1987.2 | 31.5857 | 10647.0 | 506.0 | 0 | 0 | 0 | 0 |
| 500 | 4.9681 | 2484.1 | 32.6944 | 13863.1 | 1002.8 | 0 | 0 | 0 | 0 |
| 600 | 4.9681 | 2980.9 | 33.6002 | 17179.2 | 1499.6 | 0 | 0 | 0 | 0 |
| 700 | 4.9681 | 3477.7 | 34.3660 | 20578.5 | 1956.5 | 0 | 0 | 0 | 0 |
| 800 | 4.9681 | 3974.5 | 35.0294 | 24049.0 | 2493.3 | 0 | 0 | 0 | 0 |
| 900 | 4.9681 | 4471.3 | 35.6146 | 27581.8 | 2990.1 | 0 | 0 | 0 | 0 |
| 1000 | 4.9681 | 4968.1 | 36.1380 | 31169.9 | 3486.9 | 0 | 0 | 0 | 0 |
| 1100 | 4.9681 | 5465.0 | 36.6115 | 34807.7 | 3982.7 | 0 | 0 | 0 | 0 |
| 1200 | 4.9681 | 5961.8 | 37.0436 | 38450.8 | 4480.5 | 0 | 0 | 0 | 0 |
| 1300 | 4.9681 | 6458.6 | 37.4415 | 42215.3 | 4977.3 | 0 | 0 | 0 | 0 |
| 1400 | 4.9681 | 6955.4 | 37.8097 | 45978.1 | 5474.2 | 0 | 0 | 0 | 0 |
| 1500 | 4.9681 | 7452.2 | 38.1524 | 49776.4 | 5971.0 | 0 | 0 | 0 | 0 |
| 1600 | 4.9681 | 7949.0 | 38.4731 | 53607.9 | 6467.8 | 0 | 0 | 0 | 0 |
| 1700 | 4.9681 | 8445.9 | 38.7743 | 57470.4 | 6964.6 | 0 | 0 | 0 | 0 |
| 1800 | 4.9681 | 8942.7 | 39.0582 | 61362.1 | 7461.4 | 0 | 0 | 0 | 0 |
| 1900 | 4.9681 | 9439.5 | 39.3268 | 65281.5 | 7958.2 | 0 | 0 | 0 | 0 |
| 2000 | 4.9681 | 9936.3 | 39.5817 | 69227.0 | 8455.0 | 0 | 0 | 0 | 0 |
| 2100 | 4.9681 | 10433.1 | 39.8241 | 73197.4 | 8951.9 | 0 | 0 | 0 | 0 |
| 2200 | 4.9681 | 10929.9 | 40.0552 | 77191.5 | 9448.7 | 0 | 0 | 0 | 0 |
| 2300 | 4.9681 | 11426.7 | 40.2760 | 81208.1 | 9945.5 | 0 | 0 | 0 | 0 |
| 2400 | 4.9681 | 11923.6 | 40.4875 | 85246.4 | 10442.3 | 0 | 0 | 0 | 0 |
| 2500 | 4.9681 | 12420.4 | 40.6903 | 89305.3 | 10939.1 | 0 | 0 | 0 | 0 |
| 2600 | 4.9681 | 12917.2 | 40.8851 | 93384.2 | 11435.9 | 0 | 0 | 0 | 0 |
| 2700 | 4.9681 | 13414.0 | 41.0726 | 97482.1 | 11932.8 | 0 | 0 | 0 | 0 |
| 2800 | 4.9681 | 13910.8 | 41.2533 | 101598.5 | 12429.6 | 0 | 0 | 0 | 0 |
| 2900 | 4.9681 | 14407.6 | 41.4277 | 105732.6 | 12926.4 | 0 | 0 | 0 | 0 |
| 3000 | 4.9681 | 14904.4 | 41.5961 | 109883.8 | 13423.2 | 0 | 0 | 0 | 0 |
| 3100 | 4.9681 | 15401.3 | 41.7590 | 114051.6 | 13920.0 | 0 | 0 | 0 | 0 |
| 3200 | 4.9681 | 15898.1 | 41.9167 | 118235.4 | 14416.8 | 0 | 0 | 0 | 0 |
| 3300 | 4.9681 | 16394.9 | 42.0696 | 122434.8 | 14913.6 | 0 | 0 | 0 | 0 |
| 3400 | 4.9681 | 16891.7 | 42.2175 | 126649.2 | 15410.5 | 0 | 0 | 0 | 0 |
| 3500 | 4.9681 | 17388.5 | 42.3619 | 130878.2 | 15907.3 | 0 | 0 | 0 | 0 |
| 3600 | 4.9681 | 17885.3 | 42.5019 | 135121.4 | 16404.1 | 0 | 0 | 0 | 0 |
| 3700 | 4.9681 | 18382.2 | 42.6380 | 139378.5 | 16900.9 | 0 | 0 | 0 | 0 |
| 3800 | 4.9681 | 18879.0 | 42.7705 | 143648.9 | 17397.7 | 0 | 0 | 0 | 0 |
| 3900 | 4.9681 | 19375.8 | 42.8995 | 147932.4 | 17894.5 | 0 | 0 | 0 | 0 |
| 4000 | 4.9681 | 19872.6 | 43.0253 | 152228.7 | 18391.3 | 0 | 0 | 0 | 0 |
| 4100 | 4.9681 | 20369.4 | 43.1480 | 156537.4 | 18888.2 | 0 | 0 | 0 | 0 |
| 4200 | 4.9681 | 20866.2 | 43.2677 | 160858.2 | 19385.0 | 0 | 0 | 0 | 0 |
| 4300 | 4.9681 | 21363.0 | 43.3846 | 165190.9 | 19881.8 | 0 | 0 | 0 | 0 |
| 4400 | 4.9681 | 21859.8 | 43.4988 | 169535.1 | 20378.6 | 0 | 0 | 0 | 0 |
| 4500 | 4.9681 | 22356.7 | 43.6105 | 173890.5 | 20875.4 | 0 | 0 | 0 | 0 |
| 4600 | 4.9681 | 22853.5 | 43.7197 | 178257.1 | 21372.2 | 0 | 0 | 0 | 0 |
| 4700 | 4.9681 | 23350.3 | 43.8265 | 182634.4 | 21869.1 | 0 | 0 | 0 | 0 |
| 4800 | 4.9681 | 23847.1 | 43.9311 | 187022.3 | 22365.9 | 0 | 0 | 0 | 0 |
| 4900 | 4.9681 | 24343.9 | 44.0336 | 191420.6 | 22862.7 | 0 | 0 | 0 | 0 |
| 5000 | 4.9681 | 24840.7 | 44.1335 | 195828.9 | 23359.5 | 0 | 0 | 0 | 0 |
| 5100 | 4.9681 | 25337.6 | 44.2323 | 200247.3 | 23856.3 | 0 | 0 | 0 | 0 |
| 5200 | 4.9681 | 25834.4 | 44.3288 | 204675.4 | 24353.1 | 0 | 0 | 0 | 0 |
| 5300 | 4.9681 | 26331.2 | 44.4234 | 209113.0 | 24849.9 | 0 | 0 | 0 | 0 |
| 5400 | 4.9681 | 26828.0 | 44.5163 | 213560.0 | 25346.8 | 0 | 0 | 0 | 0 |
| 5500 | 4.9681 | 27324.8 | 44.6075 | 218016.2 | 25843.6 | 0 | 0 | 0 | 0 |
| 5600 | 4.9681 | 27821.6 | 44.6970 | 222481.4 | 26340.4 | 0 | 0 | 0 | 0 |
| 5700 | 4.9681 | 28318.5 | 44.7845 | 226955.5 | 26837.2 | 0 | 0 | 0 | 0 |
| 5800 | 4.9681 | 28815.3 | 44.8711 | 231438.3 | 27334.0 | 0 | 0 | 0 | 0 |
| 5900 | 4.9681 | 29312.1 | 44.9562 | 235929.7 | 27830.8 | 0 | 0 | 0 | 0 |
| 6000 | 4.9681 | 29808.9 | 45.0397 | 240429.5 | 28327.6 | 0 | 0 | 0 | 0 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(107) Li (gas); molecular weight, 6.940

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| C | ----- | C | ----- | C | 36542.8 | 38050.0 | ----- | 0 | ----- |
| 1CC | 4.9681 | 496.8 | 27.7161 | 2274.8 | 37440.6 | 38428.8 | -78.3066 | 0 | 0 |
| 2CC | 4.9681 | 993.6 | 31.1598 | 5238.3 | 37537.4 | 38484.9 | -36.2773 | 0 | 0 |
| 29E.15 | 4.9681 | 1481.3 | 33.1435 | 8400.5 | 38425.1 | 38425.1 | -22.4409 | 0 | 0 |
| 3CC | 4.9681 | 1450.4 | 33.1742 | 8461.8 | 38434.2 | 38423.2 | -22.2672 | 0 | 0 |
| 4CC | 4.9681 | 1987.3 | 34.6035 | 11854.1 | 38931.1 | 38297.2 | -15.2791 | 0 | 0 |
| a 5CC | 4.9681 | 2484.1 | 35.7121 | 15372.0 | 39427.9 | 37390.4 | -11.1358 | 0 | 0 |
| 600 | 4.9681 | 2980.9 | 36.6175 | 18989.8 | 39924.7 | 37164.2 | -8.4202 | 0 | 0 |
| 7CC | 4.9681 | 3477.7 | 37.3837 | 22690.9 | 40421.5 | 36961.9 | -6.4915 | 0 | 0 |
| 8CC | 4.9681 | 3974.5 | 38.0471 | 26463.2 | 40918.3 | 36766.5 | -5.0526 | 0 | 0 |
| 9CC | 4.9682 | 4471.3 | 38.6323 | 30297.7 | 41415.1 | 36572.3 | -3.9395 | 0 | 0 |
| 10CC | 4.9682 | 4968.1 | 39.1557 | 34187.6 | 41911.9 | 36375.3 | -3.0538 | 0 | 0 |
| 11CC | 4.9682 | 5465.0 | 39.6292 | 38127.2 | 42408.8 | 36187.6 | -2.3328 | 0 | 0 |
| 12CC | 4.9682 | 5961.8 | 40.0615 | 42112.1 | 42905.6 | 35997.0 | -1.7352 | 0 | 0 |
| 13CC | 4.9683 | 6458.6 | 40.4592 | 46138.4 | 43402.4 | 35807.6 | -1.2324 | 0 | 0 |
| 14CC | 4.9685 | 6955.4 | 40.8274 | 50202.9 | 43899.2 | 35619.4 | -0.8034 | 0 | 0 |
| 1500 | 4.9685 | 7452.3 | 41.1702 | 54303.0 | 44396.1 | 35422.5 | -0.4337 | 0 | 0 |
| 16CC | 4.9698 | 7949.2 | 41.4909 | 58436.2 | 44893.0 | 35246.8 | -0.1120 | 0 | 0 |
| 17CC | 4.9713 | 8446.3 | 41.7922 | 62600.5 | 45390.1 | 35062.5 | 0.1705 | 0 | 0 |
| 1800 | 4.9738 | 8943.5 | 42.0765 | 66794.1 | 45887.3 | 34879.5 | 0.4202 | 0 | 0 |
| 19CC | 4.9777 | 9441.1 | 42.3455 | 71015.3 | 46384.9 | 34698.1 | 0.6426 | 0 | 0 |
| 2000 | 4.9833 | 9939.1 | 42.6009 | 75262.7 | 46882.9 | 34518.3 | 0.8418 | 0 | 0 |
| 2100 | 4.9910 | 10437.8 | 42.8442 | 79535.1 | 47381.6 | 34340.4 | 1.0209 | 0 | 0 |
| 2200 | 5.0013 | 10937.4 | 43.0767 | 83831.2 | 47881.2 | 34164.6 | 1.1828 | 0 | 0 |
| 2300 | 5.0145 | 11438.2 | 43.2992 | 88150.1 | 48382.0 | 33991.2 | 1.3301 | 0 | 0 |
| 2400 | 5.0309 | 11940.4 | 43.5130 | 92490.8 | 48884.2 | 33820.4 | 1.4642 | 0 | 0 |
| 2500 | 5.0508 | 12444.5 | 43.7188 | 96852.4 | 49388.3 | 33652.7 | 1.5872 | 0 | 0 |
| 26CC | 5.0745 | 12950.7 | 43.9173 | 101234.3 | 49894.5 | | 0 | 0 | 0 |
| 27CC | 5.1021 | 13459.5 | 44.1093 | 105635.7 | 50403.3 | | 0 | 0 | 0 |
| 2800 | 5.1237 | 13971.3 | 44.2954 | 110056.0 | 50915.0 | | 0 | 0 | 0 |
| 29CC | 5.1493 | 14486.4 | 44.4762 | 114494.6 | 51430.2 | | 0 | 0 | 0 |
| 30CC | 5.2090 | 15005.3 | 44.6521 | 118951.0 | 51945.1 | | 0 | 0 | 0 |
| 3100 | 5.2528 | 15528.2 | 44.8236 | 123424.9 | 52472.1 | | 0 | 0 | 0 |
| 3200 | 5.3005 | 16055.9 | 44.9911 | 127915.6 | 52995.7 | | 0 | 0 | 0 |
| 3300 | 5.3516 | 16588.5 | 45.1550 | 132423.0 | 53532.3 | | 0 | 0 | 0 |
| 3400 | 5.4068 | 17126.3 | 45.3155 | 136946.5 | 54070.1 | | 0 | 0 | 0 |
| 3500 | 5.4657 | 17669.5 | 45.4731 | 141486.0 | 54613.7 | | 0 | 0 | 0 |
| 36CC | 5.5281 | 18219.6 | 45.6280 | 146041.0 | 55163.4 | | 0 | 0 | 0 |
| 3700 | 5.5940 | 18775.7 | 45.7803 | 150611.5 | 55719.5 | | 0 | 0 | 0 |
| 3800 | 5.6635 | 19338.5 | 45.9304 | 155197.0 | 56282.3 | | 0 | 0 | 0 |
| 39CC | 5.7364 | 19908.5 | 46.0785 | 159797.5 | 56852.3 | | 0 | 0 | 0 |
| 40CC | 5.8128 | 20485.5 | 46.2246 | 164412.7 | 57429.7 | | 0 | 0 | 0 |
| 4100 | 5.8927 | 21071.1 | 46.3691 | 169042.4 | 58014.9 | | 0 | 0 | 0 |
| 4200 | 5.9762 | 21664.6 | 46.5121 | 173686.4 | 58608.4 | | 0 | 0 | 0 |
| 4300 | 6.0635 | 22266.5 | 46.6538 | 178344.7 | 59210.3 | | 0 | 0 | 0 |
| 4400 | 6.1555 | 22870.5 | 46.7926 | 183016.7 | 59814.7 | | 0 | 0 | 0 |
| 4500 | 6.2521 | 23488.1 | 46.9313 | 187702.8 | 60431.9 | | 0 | 0 | 0 |
| 46CC | 6.3555 | 24115.0 | 47.0691 | 192402.8 | 61058.8 | | 0 | 0 | 0 |
| 47CC | 6.4111 | 24751.3 | 47.2059 | 197116.6 | 61695.1 | | 0 | 0 | 0 |
| 4800 | 6.5098 | 25397.3 | 47.3415 | 201844.0 | 62341.1 | | 0 | 0 | 0 |
| 49CC | 6.6117 | 26053.4 | 47.4772 | 206585.0 | 62997.2 | | 0 | 0 | 0 |
| 50CC | 6.7165 | 26719.8 | 47.6118 | 211339.4 | 63663.6 | | 0 | 0 | 0 |
| 5100 | 6.8225 | 27395.5 | 47.7456 | 216107.2 | 64335.3 | | 0 | 0 | 0 |
| 52CC | 6.9338 | 28083.3 | 47.8792 | 220888.4 | 65027.1 | | 0 | 0 | 0 |
| 5300 | 7.0485 | 28782.4 | 48.0123 | 225683.0 | 65726.2 | | 0 | 0 | 0 |
| 5400 | 7.1664 | 29493.1 | 48.1452 | 230490.9 | 66436.9 | | 0 | 0 | 0 |
| 5500 | 7.2875 | 30215.8 | 48.2778 | 235312.0 | 67159.6 | | 0 | 0 | 0 |
| 5600 | 7.4119 | 30950.7 | 48.4102 | 240146.5 | 67894.5 | | 0 | 0 | 0 |
| 5700 | 7.5395 | 31698.3 | 48.5425 | 244994.1 | 68642.1 | | 0 | 0 | 0 |
| 5800 | 7.6701 | 32458.7 | 48.6748 | 249854.9 | 69402.5 | | 0 | 0 | 0 |
| 5900 | 7.8036 | 33232.4 | 48.8070 | 254729.0 | 70176.2 | | 0 | 0 | 0 |
| 6000 | 7.9399 | 34019.6 | 48.9393 | 259616.4 | 70963.4 | | 0 | 0 | 0 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Li, 453.70° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (108) Li (crystal, liquid); molecular weight, 6.940

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H _O ^o , ^a cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H _O ^o), ^a cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|---------------------|----------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| C | ----- | 0 | 0 | 0 | -1106.2 | 0 | ----- | -38050.0 | ----- |
| 100 | 3.151 | 118.0 | 1.746 | 56.6 | -988.2 | 0 | 0 | -38428.8 | 78.3066 |
| 200 | 5.150 | 558.7 | 4.734 | 388.1 | -547.5 | 0 | 0 | -38484.9 | 36.2773 |
| 298.15 | 5.941 | 1106.2 | 6.951 | 566.2 | C | 0 | 0 | -38425.1 | 22.4409 |
| 300 | 5.952 | 1117.2 | 6.988 | 579.2 | 11.0 | 0 | 0 | -38423.2 | 22.2672 |
| 400 | 6.570 | 1740.1 | 8.775 | 1769.9 | 633.9 | 0 | 0 | -38297.2 | 15.2791 |
| ^b 453.70 | 6.901 | 2101.8 | 9.623 | 2264.2 | 995.6 | 0 | 0 | -26432.6 | 12.7423 |
| 453.70 | 7.264 | 2818.9 | 11.204 | 2264.2 | 1712.7 | 0 | 0 | -37353.3 | 12.7423 |
| 500 | 7.200 | 3153.7 | 11.907 | 2799.8 | 2047.5 | 0 | 0 | -37380.4 | 11.1358 |
| 600 | 7.060 | 3866.7 | 13.207 | 4057.5 | 2760.5 | 0 | 0 | -37164.2 | 8.4202 |
| 700 | 6.928 | 4565.8 | 14.285 | 5433.7 | 3459.6 | 0 | 0 | -36961.9 | 6.4915 |
| 800 | 6.916 | 5258.0 | 15.209 | 6909.2 | 4151.8 | 0 | 0 | -36766.5 | 5.0526 |
| 900 | 6.904 | 5949.0 | 16.023 | 8471.7 | 4842.8 | 0 | 0 | -36572.3 | 3.9395 |
| 1000 | 6.892 | 6638.8 | 16.750 | 10111.2 | 5532.6 | 0 | 0 | -36379.3 | 3.0538 |
| 1100 | 6.880 | 7327.4 | 17.406 | 11819.2 | 6221.2 | 0 | 0 | -36187.6 | 2.3328 |
| 1200 | 6.868 | 8014.8 | 18.004 | 13590.0 | 6908.6 | 0 | 0 | -35997.0 | 1.7352 |
| 1300 | 6.856 | 8701.0 | 18.554 | 15419.2 | 7594.8 | 0 | 0 | -35807.6 | 1.2324 |
| 1400 | 6.844 | 9386.0 | 19.061 | 17299.4 | 8279.8 | 0 | 0 | -35619.4 | 0.8034 |
| 1500 | 6.832 | 10069.8 | 19.533 | 19229.7 | 8963.6 | 0 | 0 | -35432.5 | 0.4337 |
| 1600 | 6.820 | 10752.4 | 19.974 | 21206.0 | 9646.2 | 0 | 0 | -35246.8 | 0.1120 |
| 1700 | 6.808 | 11433.8 | 20.387 | 23224.1 | 10327.6 | 0 | 0 | -35062.5 | -0.1705 |
| 1800 | 6.796 | 12114.0 | 20.776 | 25282.8 | 11007.8 | 0 | 0 | -34879.5 | -0.4202 |
| 1900 | 6.784 | 12793.0 | 21.143 | 27378.7 | 11686.8 | 0 | 0 | -34698.1 | -0.6426 |
| 2000 | 6.772 | 13470.8 | 21.490 | 29509.2 | 12364.6 | 0 | 0 | -34518.3 | -0.8418 |
| 2100 | 6.760 | 14147.4 | 21.820 | 31674.6 | 13041.2 | 0 | 0 | -34340.4 | -1.0209 |
| 2200 | 6.748 | 14822.8 | 22.135 | 33874.2 | 13716.6 | 0 | 0 | -34164.6 | -1.1828 |
| 2300 | 6.736 | 15497.0 | 22.434 | 36101.2 | 14390.8 | 0 | 0 | -33991.2 | -1.3301 |
| 2400 | 6.724 | 16170.0 | 22.721 | 38360.4 | 15063.8 | 0 | 0 | -33820.4 | -1.4642 |
| 2500 | 6.712 | 16841.8 | 22.995 | 40645.7 | 15735.6 | 0 | 0 | -33652.7 | -1.5872 |

^aH_O^o refers to crystal state.

^bMelting point.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(109) Li₂ (gas); molecular weight, 13.880

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|------------------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 48127.6 | 50340.0 | ----- | -25760.0 | ----- |
| 100 | 7.3089 | 702.3 | 38.3105 | 3128.8 | 48829.9 | 50806.3 | -103.4224 | -26051.4 | 53.1907 |
| 200 | 8.2148 | 1483.0 | 43.6851 | 7254.0 | 49610.6 | 50705.6 | -47.9280 | -26264.3 | 24.6265 |
| 298.15 | 8.6234 | 2312.0 | 47.0521 | 11716.6 | 50439.6 | 50439.6 | -29.7268 | -26410.5 | 15.1549 |
| 300 | 8.6284 | 2327.9 | 47.1054 | 11803.7 | 50455.5 | 50433.5 | -29.4989 | -26413.0 | 15.0355 |
| 400 | 8.8278 | 3201.8 | 49.6179 | 16645.4 | 51329.4 | 50061.6 | -20.3429 | -26532.7 | 10.2152 |
| ^a 500 | 8.9449 | 4090.8 | 51.6014 | 21709.8 | 52218.4 | 48123.4 | -14.9611 | -26637.3 | 7.3105 |
| 600 | 9.0257 | 4989.6 | 53.2397 | 26954.3 | 53117.2 | 47596.2 | -11.4736 | -26732.2 | 5.3668 |
| 700 | 9.0882 | 5895.4 | 54.6359 | 32349.8 | 54023.0 | 47103.8 | -9.0093 | -26820.0 | 3.9737 |
| 800 | 9.1407 | 6806.9 | 55.8530 | 37875.5 | 54934.5 | 46630.9 | -7.1798 | -26902.2 | 2.9255 |
| 900 | 9.1871 | 7723.3 | 56.9323 | 43515.8 | 55850.9 | 46165.3 | -5.7713 | -26979.4 | 2.1078 |
| 1000 | 9.2298 | 8644.2 | 57.9025 | 49258.3 | 56771.8 | 45706.6 | -4.6558 | -27052.1 | 1.4518 |
| 1100 | 9.2700 | 9569.2 | 58.7841 | 55093.3 | 57696.8 | 45254.4 | -3.7519 | -27120.7 | 0.9137 |
| 1200 | 9.3084 | 10498.1 | 59.5924 | 61012.7 | 58625.7 | 44808.5 | -3.0062 | -27185.4 | 0.4641 |
| 1300 | 9.3457 | 11430.8 | 60.3389 | 67009.7 | 59558.4 | 44368.8 | -2.3819 | -27246.4 | 0.0829 |
| 1400 | 9.3821 | 12367.2 | 61.0328 | 73078.7 | 60494.8 | 43935.2 | -1.8513 | -27303.6 | -0.2446 |
| 1500 | 9.4178 | 13307.2 | 61.6814 | 79214.8 | 61434.8 | 43507.6 | -1.3964 | -27357.4 | -0.5290 |
| 1600 | 9.4530 | 14250.8 | 62.2903 | 85413.7 | 62378.4 | 43086.0 | -1.0023 | -27407.7 | -0.7784 |
| 1700 | 9.4878 | 15197.8 | 62.8644 | 91671.7 | 63325.4 | 42670.2 | -0.6577 | -27454.7 | -0.9988 |
| 1800 | 9.5223 | 16148.3 | 63.4077 | 97985.5 | 64275.9 | 42260.3 | -0.3545 | -27498.7 | -1.1950 |
| 1900 | 9.5566 | 17102.3 | 63.9235 | 104352.3 | 65229.9 | 41856.3 | -0.0857 | -27539.9 | -1.3709 |
| 2000 | 9.5907 | 18059.6 | 64.4145 | 110769.4 | 66187.2 | 41458.0 | 0.1542 | -27578.6 | -1.5293 |
| 2100 | 9.6246 | 19020.4 | 64.8833 | 117234.5 | 67148.0 | 41065.6 | 0.3689 | -27615.2 | -1.6729 |
| 2200 | 9.6584 | 19984.6 | 65.3318 | 123745.4 | 68112.2 | 40679.0 | 0.5619 | -27650.2 | -1.8037 |
| 2300 | 9.6921 | 20952.1 | 65.7619 | 130300.2 | 69079.7 | 40298.1 | 0.7371 | -27684.2 | -1.9231 |
| 2400 | 9.7257 | 21923.0 | 66.1751 | 136897.2 | 70050.6 | 39923.0 | 0.8957 | -27717.8 | -2.0328 |
| 2500 | 9.7592 | 22897.2 | 66.5728 | 143534.7 | 71024.8 | 39553.6 | 1.0405 | -27751.7 | -2.1338 |
| 2600 | 9.7927 | 23874.8 | 66.9562 | 150211.3 | 72002.4 | ----- | ----- | -27786.6 | -2.2272 |
| 2700 | 9.8261 | 24855.8 | 67.3264 | 156925.5 | 72983.4 | ----- | ----- | -27823.2 | -2.3138 |
| 2800 | 9.8594 | 25840.0 | 67.6844 | 163676.2 | 73967.6 | ----- | ----- | -27862.5 | -2.3942 |
| 2900 | 9.8927 | 26827.6 | 68.0309 | 170462.0 | 74955.2 | ----- | ----- | -27905.1 | -2.4693 |
| 3000 | 9.9260 | 27818.6 | 68.3669 | 177282.0 | 75946.2 | ----- | ----- | -27951.9 | -2.5394 |
| 3100 | 9.9592 | 28812.8 | 68.6929 | 184135.1 | 76940.4 | ----- | ----- | -28003.8 | -2.6052 |
| 3200 | 9.9924 | 29810.4 | 69.0096 | 191020.3 | 77938.0 | ----- | ----- | -28061.5 | -2.6669 |
| 3300 | 10.0256 | 30811.3 | 69.3176 | 197936.7 | 78938.9 | ----- | ----- | -28125.6 | -2.7251 |
| 3400 | 10.0588 | 31815.5 | 69.6174 | 204883.5 | 79943.1 | ----- | ----- | -28197.1 | -2.7799 |
| 3500 | 10.0919 | 32823.1 | 69.9094 | 211859.9 | 80950.7 | ----- | ----- | -28276.8 | -2.8318 |
| 3600 | 10.1250 | 33833.9 | 70.1942 | 218865.1 | 81961.5 | ----- | ----- | -28365.3 | -2.8809 |
| 3700 | 10.1582 | 34848.1 | 70.4721 | 225898.5 | 82975.7 | ----- | ----- | -28453.3 | -2.9275 |
| 3800 | 10.1912 | 35865.6 | 70.7434 | 232959.3 | 83993.1 | ----- | ----- | -28541.5 | -2.9718 |
| 3900 | 10.2243 | 36886.3 | 71.0085 | 240047.0 | 85013.9 | ----- | ----- | -28630.6 | -3.0140 |
| 4000 | 10.2574 | 37910.4 | 71.2678 | 247160.8 | 86038.0 | ----- | ----- | -28720.4 | -3.0543 |
| 4100 | 10.2905 | 38937.8 | 71.5215 | 254300.4 | 87065.4 | ----- | ----- | -28810.5 | -3.0928 |
| 4200 | 10.3235 | 39968.5 | 71.7699 | 261465.0 | 88096.1 | ----- | ----- | -28901.6 | -3.1297 |
| 4300 | 10.3566 | 41002.5 | 72.0132 | 268654.2 | 89130.1 | ----- | ----- | -29000.0 | -3.1650 |
| 4400 | 10.3896 | 42039.8 | 72.2517 | 275867.4 | 90167.4 | ----- | ----- | -29105.5 | -3.1989 |
| 4500 | 10.4226 | 43080.4 | 72.4855 | 283104.3 | 91208.0 | ----- | ----- | -29218.8 | -3.2315 |
| 4600 | 10.4557 | 44124.4 | 72.7149 | 290364.4 | 92252.0 | ----- | ----- | -29339.5 | -3.2629 |
| 4700 | 10.4887 | 45171.6 | 72.9402 | 297647.2 | 93299.2 | ----- | ----- | -29467.0 | -3.2932 |
| 4800 | 10.5217 | 46222.1 | 73.1613 | 304952.3 | 94349.7 | ----- | ----- | -29601.5 | -3.3225 |
| 4900 | 10.5547 | 47275.9 | 73.3786 | 312279.3 | 95403.5 | ----- | ----- | -29742.9 | -3.3508 |
| 5000 | 10.5877 | 48333.0 | 73.5922 | 319627.9 | 96460.6 | ----- | ----- | -29891.6 | -3.3782 |
| 5100 | 10.6207 | 49393.5 | 73.8022 | 326997.6 | 97521.1 | ----- | ----- | -30047.6 | -3.4048 |
| 5200 | 10.6537 | 50457.2 | 74.0087 | 334388.2 | 98584.8 | ----- | ----- | -31211.7 | -3.4306 |
| 5300 | 10.6867 | 51524.2 | 74.2120 | 341799.3 | 99651.8 | ----- | ----- | -32381.5 | -3.4557 |
| 5400 | 10.7197 | 52594.5 | 74.4120 | 349230.5 | 100722.1 | ----- | ----- | -33556.7 | -3.4801 |
| 5500 | 10.7527 | 53668.2 | 74.6090 | 356681.6 | 101795.7 | ----- | ----- | -34737.4 | -3.5039 |
| 5600 | 10.7857 | 54745.1 | 74.8031 | 364152.2 | 102872.7 | ----- | ----- | -35924.4 | -3.5271 |
| 5700 | 10.8187 | 55825.3 | 74.9943 | 371642.1 | 103952.9 | ----- | ----- | -37117.7 | -3.5498 |
| 5800 | 10.8516 | 56908.8 | 75.1827 | 379151.0 | 105036.4 | ----- | ----- | -38318.5 | -3.5719 |
| 5900 | 10.8846 | 57995.6 | 75.3685 | 386678.6 | 106123.2 | ----- | ----- | -39525.9 | -3.5937 |
| 6000 | 10.9176 | 59085.7 | 75.5517 | 394224.6 | 107213.3 | ----- | ----- | -40740.1 | -3.6149 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Li, 453.70° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(110) LiCl (gas); molecular weight, 42.397

| T, °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -49965.9 | -47763.0 | ----- | -114361.4 | ----- |
| 100 | 6.9778 | 695.3 | 42.8478 | 3589.5 | -49270.7 | -47533.7 | 107.9285 | -114659.8 | 246.4629 |
| 200 | 7.4134 | 1410.7 | 47.7896 | 8147.2 | -48555.2 | -47621.7 | 55.9648 | -114940.1 | 121.0530 |
| 298.15 | 7.9492 | 2165.9 | 50.8546 | 12996.4 | -47800.0 | -47800.0 | 38.8083 | -115175.7 | 79.6698 |
| 300 | 7.9576 | 2180.6 | 50.9038 | 13090.5 | -47785.3 | -47803.8 | 38.5922 | -115179.8 | 79.1492 |
| 400 | 8.3174 | 2995.8 | 53.2465 | 18302.8 | -46970.1 | -48026.2 | 29.8688 | -115391.8 | 58.1553 |
| 500 | 8.5406 | 3839.6 | 55.1283 | 23724.6 | -46126.3 | -49023.0 | 24.5753 | -115585.7 | 45.5366 |
| 600 | 8.6853 | 4701.4 | 56.6991 | 29318.1 | -45264.6 | -49308.6 | 20.9944 | -115765.2 | 37.1103 |
| 700 | 8.7850 | 5575.2 | 58.0459 | 35057.0 | -44390.8 | -49573.2 | 18.4220 | -115931.8 | 31.0825 |
| 800 | 8.8579 | 6457.5 | 59.2240 | 40921.7 | -43508.4 | -49825.7 | 16.4828 | -116087.0 | 26.5554 |
| 900 | 8.9139 | 7346.2 | 60.2706 | 46897.4 | -42619.7 | -50073.3 | 14.9668 | -116232.2 | 23.0297 |
| 1000 | 8.9590 | 8239.9 | 61.2122 | 52972.3 | -41726.0 | -50316.6 | 13.7480 | -116368.5 | 20.2057 |
| 1100 | 8.9967 | 9137.7 | 62.0679 | 59137.0 | -40828.2 | -50556.2 | 12.7461 | -116497.2 | 17.8925 |
| 1200 | 9.0292 | 10039.1 | 62.8521 | 65383.5 | -39926.9 | -50792.5 | 11.9072 | -116619.1 | 15.9628 |
| 1300 | 9.0579 | 10943.4 | 63.5760 | 71705.4 | -39022.5 | -51025.7 | 11.1939 | -116734.9 | 14.3283 |
| 1400 | 9.0840 | 11850.5 | 64.2483 | 78097.0 | -38115.4 | -51256.1 | 10.5800 | -116845.5 | 12.9260 |
| 1500 | 9.1080 | 12760.2 | 64.8758 | 84553.6 | -37205.8 | -51483.9 | 10.0454 | -116951.3 | 11.7094 |
| 1600 | 9.1304 | 13672.1 | 65.4643 | 91070.9 | -36293.8 | -51709.0 | 9.5755 | -117052.9 | 10.6441 |
| 1700 | 9.1516 | 14586.2 | 66.0185 | 97645.3 | -35379.7 | -51931.6 | 9.1592 | -117150.6 | 9.7032 |
| 1800 | 9.1718 | 15502.4 | 66.5422 | 104273.6 | -34463.5 | -52151.8 | 8.7875 | -117244.9 | 8.8662 |
| 1900 | 9.1912 | 16420.5 | 67.0386 | 110952.8 | -33545.4 | -52369.6 | 8.4536 | -117336.2 | 8.1167 |
| 2000 | 9.2101 | 17340.6 | 67.5105 | 117680.5 | -32625.3 | -52585.0 | 8.1519 | -117424.8 | 7.4417 |
| 2100 | 9.2284 | 18262.5 | 67.9603 | 124454.2 | -31703.4 | -52798.2 | 7.8778 | -117511.1 | 6.8304 |
| 2200 | 9.2463 | 19186.3 | 68.3901 | 131271.9 | -30779.7 | -53009.1 | 7.6274 | -117595.6 | 6.2744 |
| 2300 | 9.2638 | 20111.8 | 68.8015 | 138131.6 | -29854.2 | -53217.7 | 7.3981 | -117678.6 | 5.7663 |
| 2400 | 9.2811 | 21039.0 | 69.1961 | 145031.6 | -28926.9 | -53424.0 | 7.1869 | -117760.5 | 5.3003 |
| 2500 | 9.2981 | 21968.0 | 69.5753 | 151970.3 | -27998.0 | -53628.2 | 6.9920 | -117841.9 | 4.8712 |
| 2600 | 9.3148 | 22898.6 | 69.9403 | 158946.2 | -27067.3 | -53832.5 | 6.8083 | -117923.1 | 4.4749 |
| 2700 | 9.3314 | 23830.9 | 70.2922 | 165957.9 | -26135.0 | -54037.8 | 6.6346 | -118004.6 | 4.1076 |
| 2800 | 9.3479 | 24764.9 | 70.6318 | 173004.2 | -25201.0 | -54244.0 | 6.4710 | -118086.9 | 3.7664 |
| 2900 | 9.3642 | 25700.5 | 70.9601 | 180083.9 | -24265.4 | -54451.2 | 6.3174 | -118170.5 | 3.4485 |
| 3000 | 9.3804 | 26637.7 | 71.2779 | 187195.9 | -23328.2 | -54658.4 | 6.1738 | -118255.8 | 3.1515 |
| 3100 | 9.3965 | 27576.6 | 71.5857 | 194339.1 | -22389.3 | -54865.6 | 6.0302 | -118343.3 | 2.8735 |
| 3200 | 9.4125 | 28517.0 | 71.8843 | 201512.7 | -21448.9 | -55072.8 | 5.8866 | -118433.3 | 2.6127 |
| 3300 | 9.4284 | 29459.1 | 72.1742 | 208715.7 | -20506.8 | -55280.0 | 5.7530 | -118526.3 | 2.3675 |
| 3400 | 9.4443 | 30402.7 | 72.4559 | 215947.3 | -19563.2 | -55487.2 | 5.6194 | -118622.8 | 2.1366 |
| 3500 | 9.4601 | 31347.9 | 72.7299 | 223206.6 | -18618.0 | -55694.4 | 5.4858 | -118723.1 | 1.9186 |
| 3600 | 9.4758 | 32294.7 | 72.9966 | 230493.0 | -17671.2 | -55901.6 | 5.3522 | -118827.7 | 1.7126 |
| 3700 | 9.4915 | 33243.1 | 73.2564 | 237805.7 | -16722.8 | -56108.8 | 5.2186 | -118936.9 | 1.5176 |
| 3800 | 9.5071 | 34193.0 | 73.5098 | 245144.1 | -15772.9 | -56316.0 | 5.0850 | -119051.0 | 1.3326 |
| 3900 | 9.5227 | 35144.5 | 73.7569 | 252507.5 | -14821.4 | -56523.2 | 4.9514 | -119170.5 | 1.1570 |
| 4000 | 9.5383 | 36097.6 | 73.9982 | 259895.3 | -13868.4 | -56730.4 | 4.8178 | -119295.7 | 0.9899 |
| 4100 | 9.5538 | 37052.2 | 74.2339 | 267306.9 | -12913.7 | -56937.6 | 4.6842 | -119427.0 | 0.8309 |
| 4200 | 9.5693 | 38008.3 | 74.4643 | 274741.9 | -11957.6 | -57144.8 | 4.5506 | -119564.7 | 0.6792 |
| 4300 | 9.5848 | 38966.0 | 74.6897 | 282199.6 | -10999.9 | -57352.0 | 4.4170 | -119709.3 | 0.5345 |
| 4400 | 9.6003 | 39925.3 | 74.9102 | 289679.6 | -10040.6 | -57559.2 | 4.2834 | -119854.6 | 0.3961 |
| 4500 | 9.6157 | 40886.1 | 75.1261 | 297181.5 | -9079.8 | -57766.4 | 4.1498 | -120011.0 | 0.2638 |
| 4600 | 9.6311 | 41848.4 | 75.3376 | 304704.7 | -8117.5 | -57973.6 | 4.0162 | -120175.5 | 0.1370 |
| 4700 | 9.6465 | 42812.3 | 75.5449 | 312248.9 | -7153.6 | -58180.8 | 3.8826 | -120347.7 | 0.0154 |
| 4800 | 9.6619 | 43777.7 | 75.7482 | 319813.6 | -6188.2 | -58388.0 | 3.7490 | -120527.9 | -0.1012 |
| 4900 | 9.6772 | 44744.7 | 75.9476 | 327398.4 | -5221.2 | -58595.2 | 3.6154 | -120716.6 | -0.2133 |
| 5000 | 9.6925 | 45713.2 | 76.1432 | 335003.0 | -4252.8 | -58802.4 | 3.4818 | -120914.0 | -0.3211 |
| 5100 | 9.7079 | 46683.2 | 76.3353 | 342626.9 | -3282.7 | -59009.6 | 3.3482 | -121119.0 | -0.4248 |
| 5200 | 9.7232 | 47654.7 | 76.5240 | 350269.9 | -2311.2 | -59216.8 | 3.2146 | -121334.5 | -0.5247 |
| 5300 | 9.7385 | 48627.8 | 76.7093 | 357931.6 | -1338.1 | -59424.0 | 3.0810 | -121559.7 | -0.6210 |
| 5400 | 9.7538 | 49602.4 | 76.8915 | 365611.7 | -363.5 | -59631.2 | 2.9474 | -121794.9 | -0.7139 |
| 5500 | 9.7691 | 50578.6 | 77.0706 | 373309.8 | 612.7 | -59838.4 | 2.8138 | -122040.4 | -0.8036 |
| 5600 | 9.7843 | 51556.3 | 77.2468 | 381025.7 | 1590.3 | -60045.6 | 2.6802 | -122296.6 | -0.8903 |
| 5700 | 9.7996 | 52535.5 | 77.4201 | 388759.1 | 2569.5 | -60252.8 | 2.5466 | -122563.8 | -0.9741 |
| 5800 | 9.8149 | 53516.2 | 77.5907 | 396509.6 | 3550.3 | -60460.0 | 2.4130 | -122842.3 | -1.0552 |
| 5900 | 9.8301 | 54498.4 | 77.7586 | 404277.1 | 4532.5 | -60667.2 | 2.2794 | -123132.5 | -1.1338 |
| 6000 | 9.8454 | 55482.2 | 77.9239 | 412061.2 | 5516.3 | -60874.4 | 2.1458 | -123434.6 | -1.2099 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Li, 453.70° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
(111) LiCl (crystal, liquid); molecular weight, 42.397

| T, °K | C_p , cal/mole °K | $H_T^\circ - H_0^\circ$, ^a cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, ^a cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------|----------------------------------------------------|------------------------------|-------------------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | 0 | 0 | -99923.6 | -97720.7 | ----- | -164319.1 | ----- |
| 100 | 6.637 | 260.0 | 3.806 | 120.6 | -99663.6 | -97926.6 | 209.5248 | -165052.7 | 348.0591 |
| 200 | 10.310 | 1145.8 | 9.800 | 814.2 | -98777.8 | -97844.4 | 102.5406 | -165162.7 | 167.6288 |
| 298.15 | 11.470 | 2223.6 | 14.170 | 2001.2 | -97700.0 | -97700.0 | 67.3672 | -165075.7 | 108.2287 |
| 300 | 11.487 | 2244.9 | 14.241 | 2027.4 | -97678.7 | -97697.2 | 66.9255 | -165073.2 | 107.4825 |
| 400 | 12.150 | 3429.2 | 17.644 | 3628.4 | -96494.4 | -97507.2 | 49.1458 | -164316.1 | 77.4323 |
| b 500 | 12.721 | 4673.0 | 20.417 | 5535.5 | -95250.6 | -98147.2 | 38.4607 | -164710.0 | 59.4219 |
| 600 | 13.269 | 5972.6 | 22.785 | 7698.4 | -93951.0 | -97995.0 | 31.3160 | -164451.6 | 47.4319 |
| 700 | 13.806 | 7326.4 | 24.871 | 10083.3 | -92597.2 | -97779.6 | 26.2220 | -164138.2 | 38.8825 |
| 800 | 14.338 | 8733.7 | 26.749 | 12665.5 | -91189.9 | -97507.2 | 22.4111 | -163768.5 | 32.4837 |
| c 883 | 14.777 | 9942.0 | 28.186 | 14946.2 | -89981.6 | -96284.5 | 19.9080 | -161798.6 | 28.2783 |
| 883 | 15.0 | 14702.0 | 33.577 | 14946.2 | -85221.6 | -92470.9 | 19.9080 | -158639.8 | 28.2783 |
| 900 | 15.0 | 14957.0 | 33.863 | 15519.7 | -84966.6 | -92420.1 | 19.4784 | -158579.0 | 27.5413 |
| 1000 | 15.0 | 16457.0 | 35.443 | 18986.0 | -83466.6 | -92057.1 | 17.2384 | -158109.1 | 23.6961 |
| 1100 | 15.0 | 17957.0 | 36.873 | 22603.3 | -81966.6 | -91694.6 | 15.4131 | -157635.6 | 20.5595 |
| 1200 | 15.0 | 19457.0 | 38.178 | 26356.6 | -80466.6 | -91332.2 | 13.8979 | -157158.8 | 17.9535 |
| 1300 | 15.0 | 20957.0 | 39.378 | 30234.4 | -78966.6 | -90969.8 | 12.6206 | -156579.1 | 15.7550 |
| 1400 | 15.0 | 22457.0 | 40.490 | 34229.0 | -77466.6 | -90607.4 | 11.5306 | -156196.7 | 13.8766 |
| 1500 | 15.0 | 23957.0 | 41.525 | 38330.5 | -75966.6 | -90244.7 | 10.5895 | -155712.2 | 12.2536 |
| 1600 | 15.0 | 25457.0 | 42.493 | 42531.8 | -74466.6 | -89881.8 | 9.7693 | -155225.7 | 10.8378 |
| 1700 | 15.0 | 26957.0 | 43.402 | 46826.4 | -72966.6 | -89518.5 | 9.0485 | -154737.5 | 9.5925 |
| 1800 | 15.0 | 28457.0 | 44.260 | 51211.0 | -71466.6 | -89154.8 | 8.4105 | -154248.0 | 8.4892 |
| 1900 | 15.0 | 29957.0 | 45.071 | 55677.9 | -69966.6 | -88790.8 | 7.8420 | -153757.4 | 7.5051 |
| 2000 | 15.0 | 31457.0 | 45.840 | 60223.0 | -68466.6 | -88426.3 | 7.3324 | -153266.1 | 6.6222 |
| 2100 | 15.0 | 32957.0 | 46.572 | 64844.2 | -66966.6 | -88061.4 | 6.8733 | -152774.3 | 5.8260 |
| 2200 | 15.0 | 34457.0 | 47.270 | 69537.0 | -65466.6 | -87696.0 | 6.4575 | -152282.5 | 5.1045 |
| 2300 | 15.0 | 35957.0 | 47.937 | 74298.1 | -63966.6 | -87330.1 | 6.0797 | -151791.0 | 4.4479 |
| 2400 | 15.0 | 37457.0 | 48.575 | 79123.0 | -62466.6 | -86963.7 | 5.7345 | -151300.2 | 3.8478 |
| 2500 | 15.0 | 38957.0 | 49.187 | 84010.5 | -60966.6 | -86596.8 | 5.4184 | -150810.5 | 3.2975 |
| 2600 | 15.0 | 40457.0 | 49.776 | 88960.6 | -59466.6 | | | -150322.4 | 2.7914 |
| 2700 | 15.0 | 41957.0 | 50.342 | 93966.4 | -57966.6 | | | -149836.2 | 2.3242 |
| 2800 | 15.0 | 43457.0 | 50.887 | 99026.6 | -56466.6 | | | -149352.5 | 1.8916 |
| 2900 | 15.0 | 44957.0 | 51.414 | 104143.6 | -54966.6 | | | -148871.7 | 1.4904 |
| 3000 | 15.0 | 46457.0 | 51.922 | 109309.0 | -53466.6 | | | -148394.2 | 1.1170 |
| 3100 | 15.0 | 47957.0 | 52.414 | 114526.4 | -51966.6 | | | -147920.5 | 0.7688 |
| 3200 | 15.0 | 49457.0 | 52.890 | 119791.0 | -50466.6 | | | -147451.0 | 0.4434 |
| 3300 | 15.0 | 50957.0 | 53.352 | 125104.6 | -48966.6 | | | -146986.1 | 0.1389 |
| 3400 | 15.0 | 52457.0 | 53.800 | 130463.0 | -47466.6 | | | -146526.2 | -0.1469 |
| 3500 | 15.0 | 53957.0 | 54.234 | 135862.0 | -45966.6 | | | -146071.8 | -0.4158 |
| 3600 | 15.0 | 55457.0 | 54.657 | 141308.2 | -44466.6 | | | -145623.1 | -0.6687 |
| 3700 | 15.0 | 56957.0 | 55.068 | 146794.6 | -42966.6 | | | -145180.6 | -0.9072 |
| 3800 | 15.0 | 58457.0 | 55.468 | 152321.4 | -41466.6 | | | -144744.7 | -1.1326 |
| 3900 | 15.0 | 59957.0 | 55.858 | 157889.2 | -39966.6 | | | -144315.7 | -1.3456 |
| 4000 | 15.0 | 61457.0 | 56.237 | 163491.0 | -38466.6 | | | -143894.0 | -1.5477 |
| 4100 | 15.0 | 62957.0 | 56.608 | 169135.8 | -36966.6 | | | -143479.8 | -1.7390 |
| 4200 | 15.0 | 64457.0 | 56.969 | 174812.8 | -35466.6 | | | -143073.7 | -1.9209 |
| 4300 | 15.0 | 65957.0 | 57.322 | 180527.6 | -33966.6 | | | -142676.0 | -2.0938 |
| 4400 | 15.0 | 67457.0 | 57.667 | 186277.8 | -32466.6 | | | -142280.6 | -2.2583 |
| 4500 | 15.0 | 68957.0 | 58.004 | 192061.0 | -30966.6 | | | -141897.8 | -2.4152 |
| 4600 | 15.0 | 70457.0 | 58.334 | 197879.4 | -29466.6 | | | -141524.6 | -2.5647 |
| 4700 | 15.0 | 71957.0 | 58.656 | 203726.2 | -27966.6 | | | -141160.7 | -2.7077 |
| 4800 | 15.0 | 73457.0 | 58.972 | 209608.6 | -26466.6 | | | -140806.3 | -2.8442 |
| 4900 | 15.0 | 74957.0 | 59.281 | 215519.9 | -24966.6 | | | -140461.9 | -2.9750 |
| 5000 | 15.0 | 76457.0 | 59.585 | 221468.0 | -23466.6 | | | -140127.8 | -3.0999 |
| 5100 | 15.0 | 77957.0 | 59.882 | 227441.2 | -21966.6 | | | -139802.9 | -3.2199 |
| 5200 | 15.0 | 79457.0 | 60.173 | 233442.6 | -20466.6 | | | -139489.9 | -3.3350 |
| 5300 | 15.0 | 80957.0 | 60.459 | 239475.7 | -18966.6 | | | -139188.2 | -3.4454 |
| 5400 | 15.0 | 82457.0 | 60.739 | 245533.6 | -17466.6 | | | -138898.0 | -3.5517 |
| 5500 | 15.0 | 83957.0 | 61.014 | 251620.0 | -15966.6 | | | -138619.7 | -3.6538 |
| 5600 | 15.0 | 85457.0 | 61.284 | 257733.4 | -14466.6 | | | -138353.5 | -3.7522 |
| 5700 | 15.0 | 86957.0 | 61.550 | 263878.0 | -12966.6 | | | -138100.0 | -3.8467 |
| 5800 | 15.0 | 88457.0 | 61.811 | 270046.8 | -11466.6 | | | -137859.2 | -3.9379 |
| 5900 | 15.0 | 89957.0 | 62.067 | 276238.3 | -9966.6 | | | -137631.6 | -4.0259 |
| 6000 | 15.0 | 91457.0 | 62.319 | 282457.0 | -8466.6 | | | -137417.4 | -4.1109 |

^a H_0° refers to crystal state.

^bA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Li, 453.70° K.

^cMelting point.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(112) $(\text{LiCl})_2$ (gas); molecular weight, 84.794

| T_i , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|---------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -148501.4 | -144095.5 | ----- | -277292.3 | ----- |
| 100 | 9.9198 | 835.3 | 53.9383 | 4558.5 | -147666.1 | -144192.2 | 316.2738 | -278444.3 | 593.3426 |
| 200 | 14.9750 | 2104.1 | 62.5268 | 10401.3 | -146397.3 | -144530.4 | 158.5619 | -279167.2 | 288.7384 |
| 298.15 | 17.2555 | 3701.4 | 68.9946 | 16869.3 | -144800.0 | -144800.0 | 106.5300 | -279551.4 | 188.2531 |
| 300 | 17.2829 | 3733.4 | 69.1014 | 16997.1 | -144768.0 | -144805.1 | 105.8754 | -279557.1 | 186.9895 |
| 400 | 18.3159 | 5519.5 | 74.2329 | 24173.6 | -142981.9 | -145094.0 | 79.4813 | -279825.2 | 136.0544 |
| a 500 | 18.8440 | 7380.2 | 78.3826 | 31811.1 | -141121.2 | -146914.5 | 63.5444 | -280040.0 | 105.4668 |
| 600 | 19.1456 | 9280.9 | 81.8473 | 39827.4 | -139220.5 | -147308.6 | 52.8285 | -280221.7 | 85.0605 |
| 700 | 19.3327 | 11205.5 | 84.8137 | 48164.0 | -137295.9 | -147660.7 | 45.1547 | -280377.9 | 70.4757 |
| 800 | 19.4563 | 13145.4 | 87.4038 | 56777.7 | -135356.0 | -147990.6 | 39.3862 | -280513.2 | 59.5314 |
| 900 | 19.5421 | 15095.6 | 89.7007 | 65635.0 | -133405.8 | -148312.9 | 34.8896 | -280630.7 | 51.0153 |
| 1000 | 19.6040 | 17053.0 | 91.7630 | 74710.0 | -131448.4 | -148629.4 | 31.2844 | -280733.4 | 44.1998 |
| 1100 | 19.6500 | 19015.8 | 93.6337 | 83981.3 | -129485.6 | -148941.5 | 28.3287 | -280823.6 | 38.6215 |
| 1200 | 19.6852 | 20982.7 | 95.3451 | 93431.4 | -127518.7 | -149249.9 | 25.8604 | -280903.1 | 33.9715 |
| 1300 | 19.7127 | 22952.6 | 96.9219 | 103045.8 | -125548.8 | -149555.3 | 23.7671 | -280973.7 | 30.0359 |
| 1400 | 19.7345 | 24925.0 | 98.3836 | 112812.0 | -123576.4 | -149857.9 | 21.9698 | -281036.7 | 26.6617 |
| 1500 | 19.7522 | 26899.4 | 99.7457 | 122719.2 | -121602.0 | -150158.2 | 20.4087 | -281093.2 | 23.7367 |
| 1600 | 19.7667 | 28875.4 | 101.0210 | 132758.2 | -119626.0 | -150456.4 | 19.0398 | -281144.2 | 21.1769 |
| 1700 | 19.7787 | 30852.7 | 102.2197 | 142920.9 | -117648.7 | -150752.5 | 17.8299 | -281190.6 | 18.9179 |
| 1800 | 19.7888 | 32831.0 | 103.3505 | 153199.9 | -115670.4 | -151046.8 | 16.7521 | -281233.1 | 16.9095 |
| 1900 | 19.7974 | 34810.4 | 104.4207 | 163588.9 | -113691.0 | -151339.4 | 15.7861 | -281272.7 | 15.1123 |
| 2000 | 19.8047 | 36790.5 | 105.4364 | 174082.2 | -111710.9 | -151630.4 | 14.9152 | -281309.9 | 13.4946 |
| 2100 | 19.8110 | 38771.3 | 106.4028 | 184674.6 | -109730.1 | -151919.7 | 14.1255 | -281345.6 | 12.0308 |
| 2200 | 19.8164 | 40752.7 | 107.3245 | 195361.3 | -107748.7 | -152207.5 | 13.4058 | -281380.6 | 10.6988 |
| 2300 | 19.8212 | 42734.5 | 108.2055 | 206138.1 | -105766.9 | -152493.9 | 12.7482 | -281415.7 | 9.4845 |
| 2400 | 19.8254 | 44716.9 | 109.0492 | 217001.2 | -103784.5 | -152778.8 | 12.1436 | -281451.7 | 8.3703 |
| 2500 | 19.8291 | 46699.6 | 109.8586 | 227946.8 | -101801.8 | -153062.3 | 11.5868 | -281489.6 | 7.3451 |
| 2600 | 19.8324 | 48682.7 | 110.6363 | 238971.8 | -99818.7 | -153349.4 | - | -281530.3 | 6.3986 |
| 2700 | 19.8353 | 50666.1 | 111.3849 | 250073.1 | -97835.3 | -153637.1 | - | -281574.6 | 5.5221 |
| 2800 | 19.8379 | 52649.7 | 112.1063 | 261247.9 | -95851.7 | -153924.9 | - | -281623.5 | 4.7081 |
| 2900 | 19.8402 | 54633.6 | 112.8025 | 272493.5 | -93867.8 | -154212.8 | - | -281678.0 | 3.9500 |
| 3000 | 19.8424 | 56617.8 | 113.4751 | 283807.6 | -91883.6 | -154500.7 | - | -281738.9 | 3.2424 |
| 3100 | 19.8443 | 58602.1 | 114.1258 | 295187.8 | -89899.3 | -154788.6 | - | -281807.1 | 2.5803 |
| 3200 | 19.8460 | 60586.6 | 114.7558 | 306632.1 | -87914.8 | -155076.5 | - | -281883.6 | 1.9594 |
| 3300 | 19.8476 | 62571.3 | 115.3666 | 318138.3 | -85930.1 | -155364.4 | - | -281969.1 | 1.3759 |
| 3400 | 19.8490 | 64556.1 | 115.9591 | 329704.8 | -83945.3 | -155652.3 | - | -282064.5 | 0.8266 |
| 3500 | 19.8504 | 66541.1 | 116.5345 | 341329.6 | -81960.3 | -155940.2 | - | -282170.6 | 0.3085 |
| 3600 | 19.8516 | 68526.2 | 117.0937 | 353011.1 | -79975.2 | -156228.1 | - | -282288.2 | -0.1810 |
| 3700 | 19.8527 | 70511.4 | 117.6376 | 364747.8 | -77990.0 | -156516.0 | - | -282418.1 | -0.6442 |
| 3800 | 19.8537 | 72496.7 | 118.1671 | 376538.2 | -76004.7 | -156803.9 | - | -282560.9 | -1.0833 |
| 3900 | 19.8547 | 74482.2 | 118.6828 | 388380.8 | -74019.2 | -157091.8 | - | -282717.4 | -1.5001 |
| 4000 | 19.8556 | 76467.7 | 119.1855 | 400274.3 | -72033.7 | -157379.7 | - | -282888.4 | -1.8963 |
| 4100 | 19.8564 | 78453.3 | 119.6758 | 412217.5 | -70048.1 | -157667.6 | - | -283074.6 | -2.2733 |
| 4200 | 19.8572 | 80438.9 | 120.1543 | 424209.1 | -68062.5 | -157955.5 | - | -283275.7 | -2.6327 |
| 4300 | 19.8579 | 82424.7 | 120.6215 | 436247.9 | -66076.9 | -158243.4 | - | -283495.5 | -2.9756 |
| 4400 | 19.8585 | 84410.5 | 121.0781 | 448333.0 | -64090.9 | -158531.3 | - | -283718.8 | -3.3032 |
| 4500 | 19.8591 | 86396.4 | 121.5244 | 460463.2 | -62105.0 | -158819.2 | - | -283967.4 | -3.6165 |
| 4600 | 19.8597 | 88382.3 | 121.9608 | 472637.6 | -60119.1 | -159107.1 | - | -284235.0 | -3.9164 |
| 4700 | 19.8603 | 90368.3 | 122.3880 | 484855.1 | -58133.1 | -159395.0 | - | -284521.2 | -4.2038 |
| 4800 | 19.8608 | 92354.4 | 122.8061 | 497114.8 | -56147.0 | -159682.9 | - | -284826.5 | -4.4796 |
| 4900 | 19.8613 | 94340.5 | 123.2156 | 509416.0 | -54160.9 | -159970.8 | - | -285151.6 | -4.7444 |
| 5000 | 19.8617 | 96326.7 | 123.6169 | 521757.7 | -52174.8 | -160258.7 | - | -285497.1 | -4.9989 |
| 5100 | 19.8621 | 98312.8 | 124.0102 | 534139.1 | -50188.6 | -160546.6 | - | -285861.1 | -5.2437 |
| 5200 | 19.8625 | 100299.1 | 124.3959 | 546559.5 | -48202.3 | -160834.5 | - | -286249.0 | -5.4795 |
| 5300 | 19.8629 | 102285.3 | 124.7742 | 559018.0 | -46216.1 | -161122.4 | - | -286659.2 | -5.7066 |
| 5400 | 19.8633 | 104271.7 | 125.1455 | 571514.1 | -44229.8 | -161410.3 | - | -287092.5 | -5.9257 |
| 5500 | 19.8636 | 106258.0 | 125.5100 | 584046.9 | -42243.4 | -161698.2 | - | -287549.5 | -6.1371 |
| 5600 | 19.8639 | 108244.4 | 125.8679 | 596615.9 | -40257.0 | -161986.1 | - | -288030.9 | -6.3413 |
| 5700 | 19.8642 | 110230.8 | 126.2195 | 609220.3 | -38270.6 | -162274.0 | - | -288537.3 | -6.5386 |
| 5800 | 19.8645 | 112217.2 | 126.5650 | 621859.6 | -36284.2 | -162561.9 | - | -289069.4 | -6.7295 |
| 5900 | 19.8648 | 114203.7 | 126.9045 | 634533.1 | -34297.7 | -162849.8 | - | -289627.7 | -6.9143 |
| 6000 | 19.8650 | 116190.2 | 127.2384 | 647240.3 | -32311.2 | -163137.7 | - | -290212.9 | -7.0933 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Li, 453.70° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(113) LiF (gas); molecular weight, 25.940

| T, °K | C _p ^o , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -81909.3 | -79748.3 | ----- | -136153.3 | ----- |
| 100 | 6.9601 | 694.4 | 40.0486 | 3310.4 | -81214.9 | -79519.3 | 177.7047 | -136454.2 | 293.8827 |
| 200 | 7.0976 | 1394.7 | 44.8976 | 7584.8 | -80514.6 | -79609.8 | 90.7901 | -136776.6 | 144.6455 |
| 298.15 | 7.4839 | 2109.3 | 47.7996 | 12142.1 | -79800.0 | -79800.0 | 62.1255 | -137083.2 | 95.3964 |
| 300 | 7.4918 | 2123.2 | 47.8459 | 12230.6 | -79786.1 | -79804.1 | 61.7647 | -137088.6 | 94.7768 |
| 400 | 7.8858 | 2892.7 | 50.0570 | 17130.1 | -79016.6 | -80042.5 | 47.2123 | -137356.0 | 69.7880 |
| 500 | 8.1840 | 3697.0 | 51.8505 | 22228.2 | -78212.3 | -81054.5 | 38.4196 | -137580.6 | 54.7675 |
| 600 | 8.3973 | 4526.7 | 53.3626 | 27490.9 | -77382.6 | -81353.5 | 32.5048 | -137772.6 | 44.7385 |
| 700 | 8.5511 | 5374.5 | 54.6692 | 32893.9 | -76534.8 | -81630.0 | 28.2648 | -137940.9 | 37.5655 |
| 800 | 8.6650 | 6235.6 | 55.8189 | 38419.5 | -75673.7 | -81893.2 | 25.0743 | -138091.7 | 32.1795 |
| 900 | 8.7520 | 7106.6 | 56.8447 | 44053.6 | -74802.7 | -82150.5 | 22.5849 | -138229.3 | 27.9860 |
| 1000 | 8.8207 | 7985.4 | 57.7705 | 49785.1 | -73923.9 | -82403.1 | 20.5871 | -138356.7 | 24.6280 |
| 1100 | 8.8765 | 8870.3 | 58.6139 | 55605.0 | -73039.0 | -82651.7 | 18.9476 | -138475.9 | 21.8781 |
| 1200 | 8.9231 | 9760.4 | 59.3883 | 61505.6 | -72148.9 | -82896.8 | 17.5773 | -138588.6 | 19.5846 |
| 1300 | 8.9630 | 10654.7 | 60.1042 | 67480.7 | -71254.6 | -83138.9 | 16.4142 | -138695.7 | 17.6424 |
| 1400 | 8.9978 | 11552.8 | 60.7697 | 73524.7 | -70356.5 | -83378.2 | 15.4146 | -138798.1 | 15.9763 |
| 1500 | 9.0287 | 12454.2 | 61.3915 | 79633.1 | -69455.1 | -83614.9 | 14.5457 | -138896.4 | 14.5314 |
| 1600 | 9.0567 | 13358.5 | 61.9752 | 85801.8 | -68550.9 | -83849.2 | 13.7831 | -138991.2 | 13.2662 |
| 1700 | 9.0824 | 14265.4 | 62.5250 | 92027.1 | -67643.9 | -84081.3 | 13.1086 | -139082.8 | 12.1491 |
| 1800 | 9.1062 | 15174.9 | 63.0448 | 98305.8 | -66734.4 | -84311.1 | 12.5072 | -139171.7 | 11.1555 |
| 1900 | 9.1285 | 16086.6 | 63.5378 | 104635.1 | -65822.7 | -84539.0 | 11.9678 | -139258.2 | 10.2659 |
| 2000 | 9.1496 | 17000.5 | 64.0065 | 111012.5 | -64908.8 | -84764.7 | 11.4811 | -139342.6 | 9.4648 |
| 2100 | 9.1698 | 17916.5 | 64.4534 | 117435.7 | -63992.8 | -84988.6 | 11.0395 | -139425.3 | 8.7396 |
| 2200 | 9.1891 | 18834.5 | 64.8805 | 123902.5 | -63074.8 | -85210.5 | 10.6368 | -139506.7 | 8.0799 |
| 2300 | 9.2077 | 19754.3 | 65.2893 | 130411.2 | -62155.0 | -85430.5 | 10.2684 | -139587.1 | 7.4772 |
| 2400 | 9.2258 | 20676.0 | 65.6816 | 136959.9 | -61233.3 | -85648.7 | 9.9297 | -139666.9 | 6.9244 |
| 2500 | 9.2433 | 21599.5 | 66.0586 | 143547.0 | -60309.9 | -85865.0 | 9.6174 | -139746.6 | 6.4155 |
| 2600 | 9.2605 | 22524.6 | 66.4214 | 150171.1 | -59384.7 | | | -139826.6 | 5.9455 |
| 2700 | 9.2773 | 23451.5 | 66.7713 | 156830.8 | -58457.8 | | | -139907.2 | 5.5101 |
| 2800 | 9.2937 | 24380.1 | 67.1089 | 163525.0 | -57529.2 | | | -139989.1 | 5.1056 |
| 2900 | 9.3099 | 25310.3 | 67.4354 | 170252.3 | -56599.0 | | | -140072.5 | 4.7287 |
| 3000 | 9.3259 | 26242.1 | 67.7512 | 177011.7 | -55667.3 | | | -140158.0 | 4.3767 |
| 3100 | 9.3417 | 27175.4 | 68.0573 | 183802.2 | -54733.9 | | | -140246.0 | 4.0473 |
| 3200 | 9.3573 | 28110.4 | 68.3541 | 190622.8 | -53798.9 | | | -140336.9 | 3.7382 |
| 3300 | 9.3727 | 29046.9 | 68.6423 | 197472.7 | -52862.4 | | | -140431.1 | 3.4477 |
| 3400 | 9.3880 | 29984.9 | 68.9223 | 204351.0 | -51924.4 | | | -140529.0 | 3.1741 |
| 3500 | 9.4032 | 30924.5 | 69.1947 | 211256.9 | -50984.8 | | | -140631.0 | 2.9159 |
| 3600 | 9.4183 | 31865.6 | 69.4598 | 218189.7 | -50043.7 | | | -140737.5 | 2.6719 |
| 3700 | 9.4332 | 32808.2 | 69.7181 | 225148.7 | -49101.2 | | | -140848.9 | 2.4409 |
| 3800 | 9.4481 | 33752.2 | 69.9698 | 232133.1 | -48157.1 | | | -140965.5 | 2.2219 |
| 3900 | 9.4629 | 34697.8 | 70.2154 | 239142.4 | -47211.5 | | | -141087.6 | 2.0139 |
| 4000 | 9.4776 | 35644.8 | 70.4552 | 246176.0 | -46264.5 | | | -141215.8 | 1.8162 |
| 4100 | 9.4923 | 36593.3 | 70.6894 | 253233.3 | -45316.0 | | | -141350.2 | 1.6279 |
| 4200 | 9.5069 | 37543.3 | 70.9183 | 260313.7 | -44366.0 | | | -141491.3 | 1.4484 |
| 4300 | 9.5215 | 38494.7 | 71.1422 | 267416.8 | -43414.6 | | | -141639.4 | 1.2771 |
| 4400 | 9.5360 | 39447.6 | 71.3613 | 274542.0 | -42461.8 | | | -141788.5 | 1.1135 |
| 4500 | 9.5504 | 40401.9 | 71.5757 | 281688.9 | -41507.4 | | | -141948.9 | 0.9569 |
| 4600 | 9.5648 | 41357.6 | 71.7858 | 288857.0 | -40551.7 | | | -142117.6 | 0.8069 |
| 4700 | 9.5792 | 42314.8 | 71.9916 | 296045.9 | -39594.5 | | | -142294.1 | 0.6632 |
| 4800 | 9.5935 | 43273.5 | 72.1935 | 303255.2 | -38635.8 | | | -142479.0 | 0.5253 |
| 4900 | 9.6078 | 44233.5 | 72.3914 | 310484.5 | -37675.8 | | | -142672.4 | 0.3928 |
| 5000 | 9.6221 | 45195.0 | 72.5857 | 317733.4 | -36714.3 | | | -142874.7 | 0.2654 |
| 5100 | 9.6364 | 46158.0 | 72.7764 | 325001.5 | -35751.3 | | | -143084.9 | 0.1429 |
| 5200 | 9.6506 | 47122.3 | 72.9636 | 332288.5 | -34787.0 | | | -143305.7 | 0.0249 |
| 5300 | 9.6648 | 48088.1 | 73.1476 | 339594.1 | -33821.2 | | | -143536.3 | -0.0888 |
| 5400 | 9.6790 | 49055.3 | 73.3284 | 346917.9 | -32854.0 | | | -143777.2 | -0.1985 |
| 5500 | 9.6932 | 50023.9 | 73.5061 | 354259.7 | -31885.4 | | | -144028.5 | -0.3044 |
| 5600 | 9.7073 | 50993.9 | 73.6809 | 361619.0 | -30915.4 | | | -144290.7 | -0.4067 |
| 5700 | 9.7214 | 51965.4 | 73.8528 | 368995.7 | -29944.0 | | | -144564.1 | -0.5056 |
| 5800 | 9.7355 | 52938.2 | 74.0220 | 376389.5 | -28971.1 | | | -144849.0 | -0.6012 |
| 5900 | 9.7496 | 53912.5 | 74.1886 | 383800.1 | -27996.9 | | | -145145.6 | -0.6938 |
| 6000 | 9.7637 | 54888.1 | 74.3525 | 391227.1 | -27021.2 | | | -145454.3 | -0.7835 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Li, 453.70° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (115) $(\text{LiF})_2$ (gas); molecular weight, 51.880

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -224285.2 | -219963.2 | ----- | -332773.2 | ----- |
| 100 | 8.9212 | 811.7 | 49.3501 | 4123.3 | -223473.5 | -220082.3 | 482.0945 | -333952.2 | 714.4505 |
| 200 | 13.3361 | 1927.6 | 56.9045 | 9453.3 | -222357.6 | -220547.9 | 241.4056 | -334881.5 | 349.1164 |
| 298.15 | 16.0654 | 3385.2 | 62.7978 | 15337.9 | -220900.0 | -220900.0 | 162.0146 | -335466.4 | 228.5565 |
| 300 | 16.1013 | 3415.0 | 62.8973 | 15454.2 | -220870.2 | -220906.1 | 161.0160 | -335475.2 | 227.0401 |
| 400 | 17.5122 | 5103.2 | 67.7443 | 21994.5 | -219182.0 | -221233.8 | 120.7591 | -335860.8 | 165.9106 |
| 500 | 18.2798 | 6896.4 | 71.7425 | 28974.9 | -217388.8 | -223073.2 | 96.5013 | -336125.5 | 129.1970 |
| 600 | 18.7330 | 8748.9 | 75.1187 | 36322.4 | -215536.3 | -223478.2 | 80.2372 | -336316.4 | 104.7045 |
| 700 | 19.0198 | 10637.5 | 78.0296 | 43983.2 | -213647.7 | -223838.0 | 68.5998 | -336459.9 | 87.2012 |
| 800 | 19.2118 | 12549.7 | 80.5826 | 51916.4 | -211735.5 | -224174.4 | 59.8584 | -336571.4 | 74.0687 |
| 900 | 19.3461 | 14478.0 | 82.8536 | 60090.3 | -209807.2 | -224502.9 | 53.0492 | -336660.4 | 63.8515 |
| 1000 | 19.4435 | 16417.7 | 84.8973 | 68479.6 | -207867.5 | -224825.8 | 47.5939 | -336733.0 | 55.6758 |
| 1100 | 19.5164 | 18365.9 | 86.7540 | 77063.5 | -205919.3 | -225144.8 | 43.1243 | -336793.2 | 48.9853 |
| 1200 | 19.5723 | 20320.4 | 88.4547 | 85825.2 | -203964.8 | -225460.6 | 39.3944 | -336844.0 | 43.4089 |
| 1300 | 19.6160 | 22279.9 | 90.0231 | 94750.1 | -202005.3 | -225773.9 | 36.2334 | -336887.5 | 38.6898 |
| 1400 | 19.6509 | 24243.3 | 91.4781 | 103826.0 | -200041.9 | -226085.2 | 33.5209 | -336925.0 | 34.6443 |
| 1500 | 19.6791 | 26209.9 | 92.8349 | 113042.4 | -198075.3 | -226394.8 | 31.1664 | -336957.9 | 31.1379 |
| 1600 | 19.7023 | 28179.0 | 94.1057 | 122390.1 | -196106.2 | -226702.9 | 29.1033 | -336986.9 | 28.0695 |
| 1700 | 19.7216 | 30150.2 | 95.3007 | 131861.0 | -194135.0 | -227009.7 | 27.2807 | -337012.9 | 25.3619 |
| 1800 | 19.7378 | 32123.2 | 96.4285 | 141448.0 | -192162.0 | -227315.4 | 25.6583 | -337036.5 | 22.9549 |
| 1900 | 19.7515 | 34097.7 | 97.4960 | 151144.7 | -190187.5 | -227620.0 | 24.2048 | -337058.5 | 20.8011 |
| 2000 | 19.7632 | 36073.4 | 98.5094 | 160945.4 | -188211.8 | -227923.7 | 22.8952 | -337079.4 | 18.8627 |
| 2100 | 19.7733 | 38050.3 | 99.4739 | 170845.0 | -186234.9 | -228226.5 | 21.7085 | -337100.0 | 17.1087 |
| 2200 | 19.7821 | 40028.1 | 100.3940 | 180838.7 | -184257.2 | -228528.4 | 20.6279 | -337120.8 | 15.5140 |
| 2300 | 19.7898 | 42006.7 | 101.2735 | 190922.4 | -182278.5 | -228829.5 | 19.6406 | -337142.7 | 14.0580 |
| 2400 | 19.7965 | 43986.0 | 102.1159 | 201092.2 | -180299.2 | -229129.9 | 18.7338 | -337166.4 | 12.7232 |
| 2500 | 19.8024 | 45965.9 | 102.9242 | 211344.5 | -178319.3 | -229429.5 | 17.8988 | -337192.7 | 11.4951 |
| 2600 | 19.8077 | 47946.4 | 103.7009 | 221676.0 | -176338.8 | -176338.8 | - | -337222.5 | 10.3613 |
| 2700 | 19.8124 | 49927.5 | 104.4486 | 232083.7 | -174357.8 | -174357.8 | - | -337256.7 | 9.3115 |
| 2800 | 19.8166 | 51908.9 | 105.1692 | 242564.8 | -172376.3 | -172376.3 | - | -337296.0 | 8.3365 |
| 2900 | 19.8204 | 53890.8 | 105.8646 | 253116.7 | -170394.4 | -170394.4 | - | -337341.4 | 7.4286 |
| 3000 | 19.8238 | 55873.0 | 106.5366 | 263736.9 | -168412.2 | -168412.2 | - | -337393.8 | 6.5812 |
| 3100 | 19.8269 | 57855.5 | 107.1867 | 274423.3 | -166429.7 | -166429.7 | - | -337454.0 | 5.7883 |
| 3200 | 19.8297 | 59838.4 | 107.8162 | 285173.6 | -164446.9 | -164446.9 | - | -337522.8 | 5.0448 |
| 3300 | 19.8323 | 61821.5 | 108.4265 | 295985.9 | -162463.8 | -162463.8 | - | -337601.0 | 4.3462 |
| 3400 | 19.8346 | 63804.8 | 109.0186 | 306858.3 | -160480.4 | -160480.4 | - | -337689.6 | 3.6886 |
| 3500 | 19.8367 | 65788.4 | 109.5935 | 317789.0 | -158496.8 | -158496.8 | - | -337789.2 | 3.0683 |
| 3600 | 19.8387 | 67772.1 | 110.1524 | 328776.5 | -156513.1 | -156513.1 | - | -337900.6 | 2.4824 |
| 3700 | 19.8405 | 69756.1 | 110.6960 | 339819.0 | -154529.1 | -154529.1 | - | -338024.6 | 1.9279 |
| 3800 | 19.8422 | 71740.2 | 111.2251 | 350915.2 | -152545.0 | -152545.0 | - | -338161.7 | 1.4024 |
| 3900 | 19.8437 | 73724.5 | 111.7405 | 362063.6 | -150560.7 | -150560.7 | - | -338312.9 | 0.9036 |
| 4000 | 19.8451 | 75709.0 | 112.2430 | 373262.8 | -148576.2 | -148576.2 | - | -338478.8 | 0.4295 |
| 4100 | 19.8464 | 77693.5 | 112.7330 | 384511.7 | -146591.7 | -146591.7 | - | -338660.0 | -0.0216 |
| 4200 | 19.8477 | 79678.3 | 113.2113 | 395809.0 | -144607.0 | -144607.0 | - | -338857.4 | -0.4515 |
| 4300 | 19.8488 | 81663.1 | 113.6783 | 407153.6 | -142622.1 | -142622.1 | - | -339071.7 | -0.8617 |
| 4400 | 19.8499 | 83648.0 | 114.1346 | 418544.4 | -140637.2 | -140637.2 | - | -339290.7 | -1.2534 |
| 4500 | 19.8509 | 85633.1 | 114.5807 | 429980.2 | -138652.2 | -138652.2 | - | -339535.1 | -1.6281 |
| 4600 | 19.8518 | 87618.2 | 115.0170 | 441460.2 | -136667.0 | -136667.0 | - | -339798.8 | -1.9867 |
| 4700 | 19.8527 | 89603.4 | 115.4440 | 452983.3 | -134681.8 | -134681.8 | - | -340081.1 | -2.3303 |
| 4800 | 19.8535 | 91588.7 | 115.8620 | 464548.7 | -132696.5 | -132696.5 | - | -340382.8 | -2.6599 |
| 4900 | 19.8543 | 93574.1 | 116.2713 | 476155.4 | -130711.1 | -130711.1 | - | -340704.3 | -2.9763 |
| 5000 | 19.8550 | 95559.6 | 116.6724 | 487802.7 | -128725.6 | -128725.6 | - | -341046.5 | -3.2803 |
| 5100 | 19.8557 | 97545.1 | 117.0656 | 499489.6 | -126740.1 | -126740.1 | - | -341407.2 | -3.5728 |
| 5200 | 19.8563 | 99530.7 | 117.4512 | 511215.5 | -124754.5 | -124754.5 | - | -341791.9 | -3.8542 |
| 5300 | 19.8569 | 101516.4 | 117.8294 | 522979.6 | -122768.8 | -122768.8 | - | -342199.0 | -4.1254 |
| 5400 | 19.8575 | 103502.1 | 118.2006 | 534781.2 | -120783.1 | -120783.1 | - | -342629.4 | -4.3869 |
| 5500 | 19.8581 | 105487.9 | 118.5650 | 546619.5 | -118797.3 | -118797.3 | - | -343083.5 | -4.6392 |
| 5600 | 19.8586 | 107473.7 | 118.9228 | 558494.0 | -116811.5 | -116811.5 | - | -343562.2 | -4.8828 |
| 5700 | 19.8591 | 109459.6 | 119.2743 | 570403.9 | -114825.6 | -114825.6 | - | -344065.9 | -5.1182 |
| 5800 | 19.8595 | 111445.5 | 119.6197 | 582348.6 | -112839.7 | -112839.7 | - | -344595.4 | -5.3458 |
| 5900 | 19.8600 | 113431.5 | 119.9592 | 594327.6 | -110853.7 | -110853.7 | - | -345151.2 | -5.5660 |
| 6000 | 19.8604 | 115417.5 | 120.2930 | 606340.2 | -108867.7 | -108867.7 | - | -345733.9 | -5.7793 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Li, 453.70° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (116) $(\text{LiF})_3$ (gas); molecular weight, 77.820

| T , °K | C_p^0 , cal/mole °K | $H_f^0 - H_0^0$, cal/mole | S_T^0 , cal/mole °K | $-(F_f^0 - H_0^0)$, cal/mole | H_f^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| 0 | | 0 | | 0 | -349455.2 | -342972.2 | | -512187.2 | |
| 100 | 10.9998 | 864.6 | 53.9469 | 4530.1 | -348590.6 | -343503.7 | 147.9952 | -514308.7 | 1396.5292 |
| 200 | 16.9245 | 2285.9 | 63.5628 | 10426.6 | -347169.3 | -344454.7 | 372.2421 | -515955.2 | 533.8084 |
| 298.15 | 20.9917 | 4155.2 | 71.1130 | 17047.1 | -345300.0 | -345300.0 | 248.2023 | -517149.7 | 348.0151 |
| 300 | 21.0583 | 4194.1 | 71.2431 | 17178.8 | -345261.1 | -345314.9 | 246.6413 | -517168.5 | 345.6776 |
| 400 | 24.0965 | 6460.9 | 77.7432 | 24636.4 | -342994.3 | -346072.0 | 183.6912 | -518012.6 | 251.4184 |
| 500 | 26.1726 | 8981.2 | 83.3584 | 32698.0 | -340747.0 | -349000.7 | 145.7411 | -518579.0 | 194.7846 |
| 600 | 27.5736 | 11673.0 | 88.2623 | 41284.4 | -337782.2 | -349695.0 | 120.2932 | -518952.3 | 156.9942 |
| 700 | 28.5365 | 14481.4 | 92.5896 | 50331.3 | -334973.8 | -350259.3 | 102.0830 | -519192.2 | 129.9851 |
| 800 | 29.2163 | 17370.9 | 96.4470 | 59786.7 | -332084.3 | -350742.6 | 88.4052 | -519338.2 | 109.7207 |
| 900 | 29.7099 | 20318.5 | 99.9181 | 69607.9 | -329136.7 | -351180.2 | 77.7526 | -519416.5 | 93.9561 |
| 1000 | 30.0775 | 23308.7 | 103.0683 | 79759.6 | -326146.5 | -351584.0 | 69.2203 | -519444.7 | 81.3431 |
| 1100 | 30.3578 | 26331.1 | 105.9487 | 90212.5 | -323124.1 | -351962.2 | 62.2318 | -519434.9 | 71.0233 |
| 1200 | 30.5758 | 29378.2 | 108.5999 | 100941.7 | -320077.0 | -352320.7 | 56.4019 | -519395.9 | 62.4238 |
| 1300 | 30.7484 | 32444.7 | 111.0544 | 111926.0 | -317010.5 | -352663.4 | 51.4634 | -519333.7 | 55.1480 |
| 1400 | 30.8372 | 35526.7 | 113.3393 | 123146.9 | -313928.5 | -352993.4 | 47.2273 | -519253.2 | 48.9125 |
| 1500 | 31.0005 | 38621.3 | 115.4733 | 134588.7 | -310833.9 | -353313.1 | 43.5520 | -519157.7 | 43.5093 |
| 1600 | 31.0940 | 41726.2 | 117.4771 | 146237.2 | -307729.0 | -353624.1 | 40.3331 | -519050.0 | 38.7824 |
| 1700 | 31.1721 | 44839.6 | 119.3646 | 158080.2 | -304615.6 | -353927.7 | 37.4908 | -518932.4 | 34.6125 |
| 1800 | 31.2340 | 47960.2 | 121.1483 | 170106.7 | -301495.0 | -354225.1 | 34.9619 | -518806.8 | 30.9068 |
| 1900 | 31.2940 | 51086.9 | 122.8388 | 182306.8 | -298368.3 | -354517.1 | 32.6976 | -518674.8 | 27.5920 |
| 2000 | 31.3420 | 54218.7 | 124.4452 | 194671.7 | -295236.5 | -354804.4 | 30.6584 | -518538.0 | 24.6095 |
| 2100 | 31.3835 | 57355.1 | 125.9754 | 207193.3 | -292100.1 | -355087.4 | 28.8115 | -518397.7 | 21.9117 |
| 2200 | 31.4196 | 60495.3 | 127.4362 | 219864.4 | -288959.9 | -355366.8 | 27.1307 | -518255.4 | 19.4599 |
| 2300 | 31.4512 | 63638.8 | 128.8336 | 232678.4 | -285816.4 | -355642.8 | 25.5958 | -518112.6 | 17.2219 |
| 2400 | 31.4790 | 66785.4 | 130.1727 | 245629.2 | -282669.8 | -355915.8 | 24.1868 | -517970.6 | 15.1709 |
| 2500 | 31.5035 | 69934.5 | 131.4583 | 258711.2 | -279520.7 | -356186.0 | 22.8902 | -517830.9 | 13.2846 |
| 2600 | 31.5254 | 73086.0 | 132.6943 | 271919.2 | -276369.2 | | | -517694.9 | 11.5438 |
| 2700 | 31.5448 | 76239.5 | 133.8845 | 285248.5 | -273215.7 | | | -517564.0 | 9.9323 |
| 2800 | 31.5623 | 79394.9 | 135.0320 | 298694.7 | -270060.3 | | | -517439.8 | 8.4364 |
| 2900 | 31.5780 | 82551.9 | 136.1398 | 312253.6 | -266903.3 | | | -517323.7 | 7.0439 |
| 3000 | 31.5922 | 85710.5 | 137.2106 | 325921.4 | -263744.7 | | | -517217.1 | 5.7446 |
| 3100 | 31.6050 | 88870.3 | 138.2467 | 339694.6 | -260584.9 | | | -517121.3 | 4.5293 |
| 3200 | 31.6167 | 92031.4 | 139.2504 | 353569.7 | -257423.8 | | | -517037.8 | 3.3901 |
| 3300 | 31.6273 | 95193.6 | 140.2234 | 367543.6 | -254261.6 | | | -516967.5 | 2.3202 |
| 3400 | 31.6371 | 98356.9 | 141.1677 | 381613.4 | -251098.3 | | | -516912.1 | 1.3133 |
| 3500 | 31.6460 | 101521.0 | 142.0849 | 395776.3 | -247934.2 | | | -516872.7 | 0.3641 |
| 3600 | 31.6541 | 104686.0 | 142.9766 | 410029.5 | -244769.2 | | | -516850.5 | -0.5324 |
| 3700 | 31.6617 | 107851.8 | 143.8439 | 424370.8 | -241603.4 | | | -516846.5 | -1.3804 |
| 3800 | 31.6686 | 111018.4 | 144.6884 | 438797.6 | -238436.9 | | | -516862.0 | -2.1837 |
| 3900 | 31.6751 | 114185.5 | 145.5111 | 453307.7 | -235269.7 | | | -516898.0 | -2.9459 |
| 4000 | 31.6810 | 117353.3 | 146.3131 | 467899.1 | -232101.9 | | | -516955.6 | -3.6701 |
| 4100 | 31.6865 | 120521.7 | 147.0955 | 482569.7 | -228933.5 | | | -517036.0 | -4.3590 |
| 4200 | 31.6917 | 123690.6 | 147.8591 | 497317.6 | -225764.6 | | | -517140.3 | -5.0152 |
| 4300 | 31.6964 | 126860.1 | 148.6049 | 512140.9 | -222595.2 | | | -517269.5 | -5.6411 |
| 4400 | 31.7009 | 130029.9 | 149.3336 | 527038.0 | -219425.3 | | | -517405.6 | -6.2386 |
| 4500 | 31.7051 | 133200.2 | 150.0461 | 542007.1 | -216255.0 | | | -517579.4 | -6.8098 |
| 4600 | 31.7090 | 136370.9 | 150.7430 | 557046.7 | -213084.3 | | | -517782.0 | -7.3563 |
| 4700 | 31.7126 | 139542.0 | 151.4249 | 572155.2 | -209913.2 | | | -518012.2 | -7.8798 |
| 4800 | 31.7161 | 142713.4 | 152.0926 | 587331.2 | -206741.8 | | | -518271.2 | -8.3817 |
| 4900 | 31.7193 | 145885.2 | 152.7466 | 602573.3 | -203570.0 | | | -518559.8 | -8.8634 |
| 5000 | 31.7223 | 149057.3 | 153.3875 | 617880.1 | -200397.9 | | | -518879.2 | -9.3261 |
| 5100 | 31.7252 | 152229.7 | 154.0157 | 633250.3 | -197225.5 | | | -519226.1 | -9.7709 |
| 5200 | 31.7279 | 155402.3 | 154.6318 | 648682.8 | -194052.9 | | | -519608.9 | -10.1989 |
| 5300 | 31.7304 | 158575.3 | 155.2361 | 664176.3 | -190880.0 | | | -520025.3 | -10.6111 |
| 5400 | 31.7328 | 161748.4 | 155.8293 | 679729.7 | -187706.8 | | | -520476.2 | -11.0084 |
| 5500 | 31.7351 | 164921.8 | 156.4116 | 695341.8 | -184533.4 | | | -520962.7 | -11.3915 |
| 5600 | 31.7373 | 168095.4 | 156.9834 | 711011.6 | -181359.8 | | | -521485.8 | -11.7614 |
| 5700 | 31.7393 | 171269.3 | 157.5452 | 726738.1 | -178185.9 | | | -522046.4 | -12.1186 |
| 5800 | 31.7412 | 174443.3 | 158.0972 | 742520.3 | -175011.9 | | | -522645.4 | -12.4639 |
| 5900 | 31.7431 | 177617.5 | 158.6398 | 758357.2 | -171837.7 | | | -523283.9 | -12.7979 |
| 6000 | 31.7448 | 180791.9 | 159.1733 | 774248.0 | -168663.3 | | | -523962.6 | -13.1211 |

A change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Li, 453.70° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(117) LiH (gas); molecular weight, 7.948

| T, °K | C _p ^o , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|------------------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | | 0 | | 0 | 31544.3 | 33662.4 | | -56016.0 | |
| 100 | 6.9645 | 688.8 | 33.1850 | 2629.7 | 32233.1 | 33853.8 | -69.7780 | -56320.8 | 119.4780 |
| 200 | 6.9837 | 1385.9 | 38.0162 | 6217.3 | 32930.2 | 33808.8 | -32.7858 | -56617.3 | 57.8112 |
| 298.15 | 7.1057 | 2076.1 | 40.8224 | 10095.1 | 33620.4 | 33620.4 | -20.6511 | -56902.4 | 37.4004 |
| 300 | 7.1094 | 2089.3 | 40.8664 | 10170.6 | 33633.6 | 33616.2 | -20.4993 | -56907.6 | 37.1432 |
| 400 | 7.3639 | 2812.2 | 42.9444 | 14365.5 | 34356.5 | 33369.0 | -14.3970 | -57178.3 | 26.7567 |
| ^a 500 | 7.6550 | 3563.2 | 44.6190 | 18746.3 | 35107.5 | 32357.1 | -10.7973 | -57420.9 | 20.4963 |
| 600 | 7.9217 | 4342.4 | 46.0388 | 23280.9 | 35886.7 | 32073.2 | -8.4500 | -57635.4 | 16.3059 |
| 700 | 8.1459 | 5146.1 | 47.2774 | 27948.0 | 36690.4 | 31826.8 | -6.7875 | -57825.3 | 13.3022 |
| 800 | 8.3294 | 5970.2 | 48.3775 | 32731.8 | 37514.5 | 31605.9 | -5.5495 | -57994.8 | 11.0423 |
| 900 | 8.4789 | 6810.9 | 49.3675 | 37619.9 | 38355.2 | 31400.0 | -4.5932 | -58147.3 | 9.2798 |
| 1000 | 8.6019 | 7665.1 | 50.2674 | 42602.3 | 39209.4 | 31205.3 | -3.8329 | -58287.2 | 7.8662 |
| 1100 | 8.7044 | 8530.6 | 51.0922 | 47670.8 | 40074.9 | 31019.0 | -3.2148 | -58415.4 | 6.7069 |
| 1200 | 8.7911 | 9405.5 | 51.8534 | 52818.6 | 40949.8 | 30838.7 | -2.7027 | -58534.1 | 5.7388 |
| 1300 | 8.8657 | 10288.4 | 52.5601 | 58039.7 | 41832.7 | 30662.5 | -2.2719 | -58644.8 | 4.9180 |
| 1400 | 8.9308 | 11178.3 | 53.2195 | 63329.0 | 42722.5 | 30489.4 | -1.9049 | -58748.6 | 4.2132 |
| 1500 | 8.9885 | 12074.3 | 53.8377 | 68682.2 | 43618.6 | 30318.0 | -1.5884 | -58846.2 | 3.6014 |
| 1600 | 9.0403 | 12975.8 | 54.4195 | 74095.4 | 44520.1 | 30148.2 | -1.3131 | -58938.5 | 3.0651 |
| 1700 | 9.0874 | 13882.2 | 54.9690 | 79565.0 | 45426.5 | 29979.6 | -1.0715 | -59025.9 | 2.5912 |
| 1800 | 9.1307 | 14793.1 | 55.4896 | 85088.2 | 46337.4 | 29812.3 | -0.8580 | -59109.1 | 2.1694 |
| 1900 | 9.1708 | 15708.2 | 55.9844 | 90662.1 | 47252.5 | 29645.3 | -0.6680 | -59188.3 | 1.7914 |
| 2000 | 9.2084 | 16627.2 | 56.4557 | 96284.3 | 48171.5 | 29478.9 | -0.4979 | -59264.2 | 1.4508 |
| 2100 | 9.2438 | 17549.8 | 56.9059 | 101952.5 | 49094.1 | 29313.0 | -0.3449 | -59337.1 | 1.1422 |
| 2200 | 9.2775 | 18475.9 | 57.3367 | 107664.8 | 50020.2 | 29148.0 | -0.2069 | -59407.4 | 0.8514 |
| 2300 | 9.3097 | 19405.3 | 57.7498 | 113419.3 | 50949.6 | 28983.5 | -0.0810 | -59475.6 | 0.6047 |
| 2400 | 9.3406 | 20337.8 | 58.1467 | 119214.2 | 51882.1 | 28819.8 | 0.0331 | -59542.1 | 0.3691 |
| 2500 | 9.3704 | 21273.4 | 58.5286 | 125048.1 | 52817.7 | 28657.0 | 0.1379 | -59607.5 | 0.1521 |
| 2600 | 9.3994 | 22211.9 | 58.8967 | 130919.5 | 53756.2 | | | -59672.0 | -0.0484 |
| 2700 | 9.4275 | 23153.2 | 59.2519 | 136827.0 | 54697.5 | | | -59736.3 | -0.2343 |
| 2800 | 9.4549 | 24097.3 | 59.5953 | 142769.5 | 55641.6 | | | -59800.7 | -0.4071 |
| 2900 | 9.4817 | 25044.2 | 59.9276 | 148745.7 | 56588.5 | | | -59865.8 | -0.5681 |
| 3000 | 9.5080 | 25993.7 | 60.2494 | 154754.7 | 57538.0 | | | -59932.0 | -0.7186 |
| 3100 | 9.5338 | 26945.8 | 60.5616 | 160795.3 | 58490.1 | | | -59999.8 | -0.8595 |
| 3200 | 9.5592 | 27900.4 | 60.8647 | 166866.7 | 59444.7 | | | -60069.6 | -0.9917 |
| 3300 | 9.5843 | 28857.6 | 61.1593 | 172967.9 | 60401.9 | | | -60141.8 | -1.1161 |
| 3400 | 9.6090 | 29817.3 | 61.4457 | 179098.3 | 61361.6 | | | -60216.8 | -1.2333 |
| 3500 | 9.6335 | 30779.4 | 61.7246 | 185256.8 | 62323.7 | | | -60295.1 | -1.3440 |
| 3600 | 9.6577 | 31744.0 | 61.9964 | 191443.0 | 63288.3 | | | -60377.0 | -1.4486 |
| 3700 | 9.6817 | 32710.9 | 62.2613 | 197655.9 | 64255.2 | | | -60462.9 | -1.5478 |
| 3800 | 9.7054 | 33680.3 | 62.5198 | 203895.0 | 65224.6 | | | -60553.2 | -1.6418 |
| 3900 | 9.7290 | 34652.0 | 62.7722 | 210159.7 | 66196.3 | | | -60648.3 | -1.7312 |
| 4000 | 9.7524 | 35626.1 | 63.0188 | 216449.3 | 67170.4 | | | -60748.4 | -1.8162 |
| 4100 | 9.7757 | 36602.5 | 63.2599 | 222763.2 | 68146.8 | | | -60854.1 | -1.8972 |
| 4200 | 9.7988 | 37581.2 | 63.4958 | 229101.1 | 69125.5 | | | -60965.6 | -1.9745 |
| 4300 | 9.8218 | 38562.2 | 63.7266 | 235462.2 | 70106.5 | | | -61083.3 | -2.0484 |
| 4400 | 9.8447 | 39545.6 | 63.9527 | 241846.2 | 71089.9 | | | -61201.2 | -2.1190 |
| 4500 | 9.8675 | 40531.2 | 64.1742 | 248252.6 | 72075.5 | | | -61329.6 | -2.1866 |
| 4600 | 9.8902 | 41519.1 | 64.3913 | 254680.9 | 73063.4 | | | -61465.4 | -2.2514 |
| 4700 | 9.9128 | 42509.2 | 64.6042 | 261130.7 | 74053.5 | | | -61608.4 | -2.3136 |
| 4800 | 9.9353 | 43501.6 | 64.8132 | 267601.6 | 75045.9 | | | -61758.8 | -2.3734 |
| 4900 | 9.9577 | 44496.3 | 65.0183 | 274093.2 | 76040.6 | | | -61917.1 | -2.4308 |
| 5000 | 9.9801 | 45493.2 | 65.2197 | 280605.2 | 77037.4 | | | -62083.4 | -2.4861 |
| 5100 | 10.0024 | 46492.3 | 65.4175 | 287137.0 | 78036.6 | | | -62256.8 | -2.5394 |
| 5200 | 10.0247 | 47493.6 | 65.6120 | 293688.5 | 79037.9 | | | -62440.1 | -2.5908 |
| 5300 | 10.0469 | 48497.2 | 65.8031 | 300259.3 | 80041.5 | | | -62632.4 | -2.6404 |
| 5400 | 10.0690 | 49503.0 | 65.9911 | 306849.1 | 81047.3 | | | -62834.1 | -2.6883 |
| 5500 | 10.0912 | 50511.0 | 66.1761 | 313457.4 | 82055.3 | | | -63045.6 | -2.7346 |
| 5600 | 10.1132 | 51521.2 | 66.3581 | 320084.2 | 83065.5 | | | -63267.1 | -2.7794 |
| 5700 | 10.1352 | 52533.7 | 66.5373 | 326729.0 | 84078.0 | | | -63499.1 | -2.8228 |
| 5800 | 10.1572 | 53548.3 | 66.7138 | 333391.6 | 85092.6 | | | -63741.7 | -2.8648 |
| 5900 | 10.1792 | 54565.1 | 66.8876 | 340071.6 | 86109.4 | | | -63995.4 | -2.9056 |
| 6000 | 10.2011 | 55584.1 | 67.0589 | 346769.0 | 87128.4 | | | -64260.3 | -2.9452 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Li, 453.70° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (118) LiO (gas); molecular weight, 22.940

| T_f , °K | C_p° , cal/mole °K | $H_T^\circ - H_O^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_O^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|------------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 11892.9 | 14036.5 | ----- | -83005.5 | ----- |
| 100 | 6.9577 | 694.7 | 41.6145 | 3466.8 | 12587.6 | 14266.4 | -26.9833 | -83329.6 | 178.3552 |
| 200 | 7.0274 | 1392.3 | 46.4481 | 7897.3 | 13285.3 | 14175.5 | -11.4237 | -83686.2 | 86.8430 |
| 298.15 | 7.3149 | 2094.8 | 49.3017 | 12604.6 | 13987.7 | 13987.7 | -6.3525 | -83994.0 | 56.6906 |
| 300 | 7.3217 | 2108.3 | 49.3470 | 12695.8 | 14001.3 | 13983.8 | -6.2893 | -83993.3 | 56.3109 |
| 400 | 7.6864 | 2858.9 | 51.5037 | 17742.6 | 14751.8 | 13756.3 | -3.7607 | -84263.5 | 40.9908 |
| ^a 500 | 7.9960 | 3643.6 | 53.2536 | 22983.2 | 15536.6 | 12761.9 | -2.3031 | -84486.1 | 31.7718 |
| 600 | 8.2316 | 4455.6 | 54.7333 | 28384.4 | 16348.5 | 12483.3 | -1.3831 | -84677.3 | 25.6106 |
| 700 | 8.4074 | 5287.9 | 56.0160 | 33923.3 | 17180.9 | 12227.5 | -0.7399 | -84845.6 | 21.2003 |
| 800 | 8.5398 | 6135.6 | 57.1477 | 39582.6 | 18028.6 | 11984.2 | -0.2672 | -84996.9 | 17.8864 |
| 900 | 8.6415 | 6994.9 | 58.1597 | 45348.8 | 18887.8 | 11745.4 | 0.0930 | -85135.5 | 15.3044 |
| 1000 | 8.7217 | 7863.2 | 59.0745 | 51211.3 | 19756.1 | 11510.1 | 0.3754 | -85264.2 | 13.2356 |
| 1100 | 8.7863 | 8738.7 | 59.9089 | 57161.1 | 20631.7 | 11277.6 | 0.6019 | -85385.1 | 11.5405 |
| 1200 | 8.8395 | 9620.1 | 60.6757 | 63190.8 | 21513.0 | 11047.3 | 0.7868 | -85499.8 | 10.1259 |
| 1300 | 8.8844 | 10506.3 | 61.3851 | 69294.3 | 22399.3 | 10819.0 | 0.9398 | -85609.1 | 8.9274 |
| 1400 | 8.9230 | 11396.8 | 62.0450 | 75466.2 | 23289.7 | 10592.4 | 1.0685 | -85714.1 | 7.8988 |
| 1500 | 8.9567 | 12290.8 | 62.6618 | 81701.9 | 24183.7 | 10367.3 | 1.1776 | -85815.3 | 7.0063 |
| 1600 | 8.9866 | 13188.0 | 63.2408 | 87997.3 | 25089.9 | 10143.4 | 1.2709 | -85913.1 | 6.2245 |
| 1700 | 9.0136 | 14088.0 | 63.7864 | 94346.9 | 25981.0 | 9920.6 | 1.3515 | -86008.2 | 5.5338 |
| 1800 | 9.0382 | 14990.6 | 64.3023 | 100753.6 | 26883.6 | 9698.7 | 1.4216 | -86100.7 | 4.9192 |
| 1900 | 9.0608 | 15895.6 | 64.7916 | 107208.5 | 27788.5 | 9477.4 | 1.4829 | -86191.1 | 4.3688 |
| 2000 | 9.0819 | 16802.7 | 65.2569 | 113711.1 | 28695.7 | 9256.8 | 1.5369 | -86279.8 | 3.8728 |
| 2100 | 9.1018 | 17711.9 | 65.7005 | 120259.1 | 29604.9 | 9036.6 | 1.5845 | -86367.1 | 3.4237 |
| 2200 | 9.1205 | 18623.0 | 66.1244 | 126850.5 | 30516.0 | 8816.8 | 1.6266 | -86453.4 | 3.0149 |
| 2300 | 9.1384 | 19536.0 | 66.5302 | 133483.4 | 31428.9 | 8597.2 | 1.6643 | -86539.1 | 2.6414 |
| 2400 | 9.1555 | 20450.7 | 66.9195 | 140156.0 | 32343.6 | 8377.9 | 1.6978 | -86624.7 | 2.2986 |
| 2500 | 9.1719 | 21367.1 | 67.2935 | 146866.8 | 33260.0 | 8158.8 | 1.7280 | -86710.6 | 1.9829 |
| 2600 | 9.1879 | 22285.1 | 67.6536 | 153614.3 | 34178.0 | 7940.0 | 1.7580 | -86797.3 | 1.6912 |
| 2700 | 9.2033 | 23204.6 | 68.0006 | 160397.1 | 35097.6 | 7721.6 | 1.7880 | -86885.4 | 1.4209 |
| 2800 | 9.2184 | 24125.7 | 68.3356 | 167214.0 | 36018.7 | 7503.7 | 1.8180 | -86975.2 | 1.1696 |
| 2900 | 9.2331 | 25048.3 | 68.6594 | 174063.8 | 36941.2 | 7286.2 | 1.8480 | -87067.4 | 0.9354 |
| 3000 | 9.2475 | 25972.3 | 68.9726 | 180945.5 | 37865.3 | 7069.1 | 1.8780 | -87162.4 | 0.7166 |
| 3100 | 9.2616 | 26897.8 | 69.2761 | 187858.0 | 38790.7 | 6852.6 | 1.9080 | -87260.8 | 0.5116 |
| 3200 | 9.2755 | 27824.6 | 69.5703 | 194800.4 | 39717.5 | 6636.6 | 1.9380 | -87362.9 | 0.3193 |
| 3300 | 9.2892 | 28752.9 | 69.8560 | 201771.8 | 40645.8 | 6421.1 | 1.9680 | -87469.3 | 0.1384 |
| 3400 | 9.3027 | 29682.5 | 70.1335 | 208771.4 | 41575.4 | 6206.1 | 1.9980 | -87580.4 | -0.0321 |
| 3500 | 9.3160 | 30613.4 | 70.4033 | 215798.3 | 42506.4 | 6000.0 | 2.0280 | -87696.8 | -0.1930 |
| 3600 | 9.3292 | 31545.7 | 70.6660 | 222851.8 | 43438.6 | 5794.4 | 2.0580 | -87818.7 | -0.3452 |
| 3700 | 9.3423 | 32479.3 | 70.9218 | 229931.2 | 44372.2 | 5589.1 | 2.0880 | -87946.8 | -0.4894 |
| 3800 | 9.3552 | 33414.1 | 71.1711 | 237035.9 | 45307.1 | 5384.1 | 2.1180 | -88081.2 | -0.6262 |
| 3900 | 9.3681 | 34350.3 | 71.4142 | 244165.2 | 46243.2 | 5179.6 | 2.1480 | -88222.6 | -0.7562 |
| 4000 | 9.3808 | 35287.7 | 71.6516 | 251318.6 | 47180.7 | 4975.6 | 2.1780 | -88371.1 | -0.8799 |
| 4100 | 9.3935 | 36226.5 | 71.8834 | 258495.4 | 48119.4 | 4772.1 | 2.2080 | -88527.4 | -0.9978 |
| 4200 | 9.4061 | 37166.4 | 72.1099 | 265695.1 | 49059.4 | 4569.1 | 2.2380 | -88691.6 | -1.1102 |
| 4300 | 9.4186 | 38107.7 | 72.3314 | 272917.2 | 50000.6 | 4366.6 | 2.2680 | -88864.4 | -1.2177 |
| 4400 | 9.4310 | 39050.2 | 72.5480 | 280161.2 | 50943.1 | 4164.6 | 2.2980 | -89039.4 | -1.3204 |
| 4500 | 9.4434 | 39993.9 | 72.7601 | 287426.6 | 51886.8 | 3963.1 | 2.3280 | -89227.3 | -1.4188 |
| 4600 | 9.4557 | 40938.8 | 72.9678 | 294713.0 | 52831.8 | 3762.1 | 2.3580 | -89424.8 | -1.5131 |
| 4700 | 9.4680 | 41885.0 | 73.1713 | 302020.0 | 53778.0 | 3561.6 | 2.3880 | -89631.7 | -1.6036 |
| 4800 | 9.4803 | 42832.4 | 73.3708 | 309347.2 | 54725.4 | 3361.6 | 2.4180 | -89848.3 | -1.6905 |
| 4900 | 9.4924 | 43781.1 | 73.5664 | 316694.1 | 55674.0 | 3162.1 | 2.4480 | -90074.9 | -1.7741 |
| 5000 | 9.5046 | 44730.9 | 73.7582 | 324060.3 | 56623.9 | 2963.1 | 2.4780 | -90311.9 | -1.8545 |
| 5100 | 9.5167 | 45682.0 | 73.9466 | 331445.6 | 57574.9 | 2764.6 | 2.5080 | -90558.2 | -1.9320 |
| 5200 | 9.5288 | 46634.3 | 74.1315 | 338849.5 | 58527.2 | 2566.6 | 2.5380 | -90816.5 | -2.0068 |
| 5300 | 9.5409 | 47587.7 | 74.3131 | 346271.8 | 59480.7 | 2369.1 | 2.5680 | -91086.1 | -2.0789 |
| 5400 | 9.5529 | 48542.4 | 74.4916 | 353712.0 | 60435.4 | 2172.1 | 2.5980 | -91367.3 | -2.1485 |
| 5500 | 9.5649 | 49498.3 | 74.6670 | 361170.0 | 61391.3 | 1975.6 | 2.6280 | -91660.5 | -2.2159 |
| 5600 | 9.5769 | 50455.4 | 74.8394 | 368645.3 | 62348.4 | 1780.6 | 2.6580 | -91965.8 | -2.2810 |
| 5700 | 9.5888 | 51413.7 | 75.0090 | 376137.8 | 63306.6 | 1587.1 | 2.6880 | -92283.7 | -2.3441 |
| 5800 | 9.6008 | 52373.2 | 75.1759 | 383647.0 | 64266.1 | 1394.1 | 2.7180 | -92614.3 | -2.4052 |
| 5900 | 9.6127 | 53333.8 | 75.3401 | 391172.9 | 65226.8 | 1201.6 | 2.7480 | -92958.1 | -2.4644 |
| 6000 | 9.6246 | 54295.7 | 75.5018 | 398715.0 | 66189.7 | 1010.6 | 2.7780 | -93315.2 | -2.5219 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Li, 453.70° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(119) Li_2O (gas); molecular weight, 29.880

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -38032.3 | -34782.5 | ----- | -169869.0 | ----- |
| 100 | 7.9643 | 795.1 | 46.7794 | 3882.9 | -37237.2 | -34570.2 | 80.4861 | -170595.1 | 363.8312 |
| 200 | 8.4698 | 1610.1 | 52.4094 | 8871.8 | -36422.2 | -34984.5 | 42.5614 | -171331.1 | 177.1054 |
| 298.15 | 9.4923 | 2489.8 | 55.9744 | 14199.0 | -35542.5 | -35542.5 | 29.8916 | -171949.2 | 115.3755 |
| 300 | 9.5128 | 2507.4 | 56.0332 | 14302.6 | -35524.9 | -35553.4 | 29.7308 | -171959.7 | 114.5983 |
| 400 | 10.5445 | 3511.8 | 58.9155 | 20054.4 | -34520.5 | -36149.9 | 23.2076 | -172466.9 | 83.2382 |
| 500 | 11.3510 | 4608.6 | 61.3595 | 26071.2 | -33423.7 | -38245.9 | 19.1606 | -172874.3 | 64.3714 |
| 600 | 11.9384 | 5774.6 | 63.4839 | 32315.7 | -32257.7 | -38883.4 | 16.3524 | -173208.2 | 51.7663 |
| 700 | 12.3617 | 6990.8 | 65.3578 | 38759.7 | -31041.5 | -39454.5 | 14.3148 | -173489.5 | 42.7466 |
| 800 | 12.6700 | 8243.2 | 67.0296 | 45380.5 | -29789.1 | -39985.3 | 12.7653 | -173732.9 | 35.9716 |
| 900 | 12.8987 | 9522.1 | 68.5358 | 52160.1 | -28510.2 | -40495.4 | 11.5441 | -173948.6 | 30.6951 |
| 1000 | 13.0718 | 10821.1 | 69.9042 | 59083.1 | -27211.2 | -40989.9 | 10.5549 | -174143.5 | 26.4689 |
| 1100 | 13.2052 | 12135.2 | 71.1566 | 66137.0 | -25897.1 | -41472.4 | 9.7360 | -174322.7 | 23.0074 |
| 1200 | 13.3099 | 13461.1 | 72.3102 | 73311.1 | -24571.2 | -41945.5 | 9.0456 | -174489.5 | 20.1200 |
| 1300 | 13.3934 | 14796.5 | 73.3790 | 80596.3 | -23235.8 | -42410.9 | 8.4545 | -174646.7 | 17.6745 |
| 1400 | 13.4609 | 16139.3 | 74.3741 | 87984.5 | -21893.0 | -42870.1 | 7.9428 | -174796.1 | 15.5765 |
| 1500 | 13.5162 | 17488.2 | 75.3048 | 95468.9 | -20544.1 | -43324.1 | 7.4943 | -174939.2 | 13.7567 |
| 1600 | 13.5621 | 18842.2 | 76.1786 | 103043.6 | -19190.1 | -43773.8 | 7.0976 | -175077.2 | 12.1632 |
| 1700 | 13.6004 | 20200.4 | 77.0020 | 110703.0 | -17831.9 | -44219.8 | 6.7442 | -175211.1 | 10.7560 |
| 1800 | 13.6329 | 21562.1 | 77.7803 | 118442.5 | -16470.2 | -44662.9 | 6.4267 | -175341.8 | 9.5042 |
| 1900 | 13.6605 | 22926.8 | 78.5182 | 126257.7 | -15105.5 | -45103.4 | 6.1400 | -175470.0 | 8.3833 |
| 2000 | 13.6843 | 24294.1 | 79.2195 | 134144.9 | -13738.2 | -45541.7 | 5.8797 | -175596.6 | 7.3738 |
| 2100 | 13.7049 | 25663.6 | 79.8876 | 142100.5 | -12368.7 | -45978.2 | 5.6416 | -175722.3 | 6.4598 |
| 2200 | 13.7228 | 27035.0 | 80.5256 | 150121.4 | -10997.3 | -46413.2 | 5.4228 | -175847.9 | 5.6283 |
| 2300 | 13.7384 | 28408.0 | 81.1360 | 158204.7 | -9624.3 | -46846.8 | 5.2217 | -175974.3 | 4.8686 |
| 2400 | 13.7522 | 29782.6 | 81.7210 | 166347.7 | -8249.7 | -47279.2 | 5.0351 | -176102.2 | 4.1716 |
| 2500 | 13.7645 | 31158.4 | 82.2826 | 174548.1 | -6873.9 | -47710.7 | 4.8623 | -176232.7 | 3.5300 |
| 2600 | 13.7753 | 32535.4 | 82.8227 | 182803.5 | -5496.9 | | | -176366.7 | 2.9372 |
| 2700 | 13.7850 | 33913.5 | 83.3428 | 191112.0 | -4118.8 | | | -176505.1 | 2.3880 |
| 2800 | 13.7937 | 35292.4 | 83.8443 | 199471.5 | -2739.9 | | | -176648.8 | 1.8776 |
| 2900 | 13.8016 | 36672.2 | 84.3284 | 207880.3 | -1360.1 | | | -176798.9 | 1.4019 |
| 3000 | 13.8087 | 38052.7 | 84.7964 | 216336.6 | 20.4 | | | -176956.3 | 0.9576 |
| 3100 | 13.8151 | 39433.9 | 85.2493 | 224839.0 | 1401.6 | | | -177122.0 | 0.5416 |
| 3200 | 13.8209 | 40815.7 | 85.6880 | 233386.0 | 2783.4 | | | -177296.8 | 0.1512 |
| 3300 | 13.8262 | 42198.1 | 86.1134 | 241976.2 | 4165.8 | | | -177481.6 | -0.2159 |
| 3400 | 13.8311 | 43580.9 | 86.5262 | 250608.3 | 5548.6 | | | -177677.4 | -0.5618 |
| 3500 | 13.8355 | 44964.3 | 86.9272 | 259281.1 | 6932.0 | | | -177884.9 | -0.8882 |
| 3600 | 13.8396 | 46348.0 | 87.3171 | 267993.4 | 8315.7 | | | -178105.0 | -1.1970 |
| 3700 | 13.8434 | 47732.2 | 87.6963 | 276744.1 | 9699.9 | | | -178338.5 | -1.4894 |
| 3800 | 13.8469 | 49116.7 | 88.0655 | 285532.3 | 11084.4 | | | -178586.2 | -1.7668 |
| 3900 | 13.8501 | 50501.5 | 88.4252 | 294356.9 | 12469.2 | | | -178848.8 | -2.0333 |
| 4000 | 13.8531 | 51886.7 | 88.7759 | 303217.0 | 13854.4 | | | -179127.1 | -2.2810 |
| 4100 | 13.8558 | 53272.1 | 89.1180 | 312111.8 | 15239.8 | | | -179421.9 | -2.5199 |
| 4200 | 13.8584 | 54657.9 | 89.4520 | 321040.4 | 16625.6 | | | -179733.8 | -2.7478 |
| 4300 | 13.8608 | 56043.8 | 89.7781 | 330001.9 | 18011.5 | | | -180063.8 | -2.9655 |
| 4400 | 13.8630 | 57430.0 | 90.0968 | 338995.7 | 19397.7 | | | -180399.6 | -3.1736 |
| 4500 | 13.8651 | 58816.4 | 90.4083 | 348021.0 | 20784.1 | | | -180761.9 | -3.3730 |
| 4600 | 13.8671 | 60203.0 | 90.7131 | 357077.2 | 22170.7 | | | -181144.7 | -3.5640 |
| 4700 | 13.8689 | 61589.8 | 91.0113 | 366163.4 | 23557.5 | | | -181547.2 | -3.7473 |
| 4800 | 13.8706 | 62976.8 | 91.3033 | 375279.2 | 24944.5 | | | -181970.3 | -3.9234 |
| 4900 | 13.8722 | 64363.9 | 91.5894 | 384423.9 | 26331.6 | | | -182414.5 | -4.0926 |
| 5000 | 13.8738 | 65751.2 | 91.8696 | 393596.9 | 27718.9 | | | -182880.4 | -4.2556 |
| 5100 | 13.8752 | 67138.7 | 92.1444 | 402797.7 | 29106.4 | | | -183366.0 | -4.4125 |
| 5200 | 13.8765 | 68526.3 | 92.4138 | 412025.6 | 30494.0 | | | -183876.9 | -4.5638 |
| 5300 | 13.8778 | 69914.0 | 92.6782 | 421280.3 | 31881.7 | | | -184411.3 | -4.7098 |
| 5400 | 13.8790 | 71301.8 | 92.9376 | 430561.1 | 33269.5 | | | -184970.1 | -4.8508 |
| 5500 | 13.8802 | 72689.8 | 93.1923 | 439867.6 | 34657.5 | | | -185553.8 | -4.9872 |
| 5600 | 13.8812 | 74077.9 | 93.4424 | 449199.4 | 36045.6 | | | -186163.1 | -5.1190 |
| 5700 | 13.8823 | 75466.1 | 93.6881 | 458555.9 | 37433.8 | | | -186798.6 | -5.2467 |
| 5800 | 13.8832 | 76854.3 | 93.9295 | 467936.9 | 38822.0 | | | -187461.0 | -5.3704 |
| 5900 | 13.8842 | 78242.7 | 94.1668 | 477341.7 | 40210.4 | | | -188150.7 | -5.4903 |
| 6000 | 13.8850 | 79631.2 | 94.4002 | 486770.1 | 41598.9 | | | -188868.4 | -5.6067 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Li, 453.70° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
(120) Li_2O (crystal, liquid); molecular weight, 29.880

| T, °K | C_p° , cal/mole °K | $H_T^\circ - H_O^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_O^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | (ΔH_f°) , cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | C | 0 | 0 | -144132.2 | -140882.4 | ----- | -275968.9 | ----- |
| 100 | 2.457 | 64.3 | 0.868 | 22.5 | -144067.5 | -141400.5 | 303.5157 | -277425.8 | 587.2648 |
| 200 | 8.852 | 643.2 | 4.680 | 292.8 | -143489.0 | -142051.3 | 145.1222 | -278357.8 | 283.6662 |
| 298.15 | 12.927 | 1732.2 | 9.056 | 967.8 | -142400.0 | -142400.0 | 97.9630 | -278806.7 | 183.4469 |
| 300 | 12.980 | 1756.0 | 9.135 | 984.5 | -142376.2 | -142404.7 | 97.3191 | -278811.0 | 182.1866 |
| 400 | 15.2585 | 3161.2 | 13.2207 | 2107.1 | -140951.0 | -142580.4 | 71.3656 | -278897.4 | 131.4002 |
| b 500 | 16.6270 | 4779.7 | 16.7820 | 3611.3 | -139352.5 | -144174.7 | 55.7179 | -278803.0 | 100.9286 |
| 600 | 17.6481 | 6495.3 | 19.9072 | 5449.0 | -137636.5 | -144262.6 | 45.2117 | -278587.4 | 80.6256 |
| 700 | 18.5052 | 8304.0 | 22.6935 | 7581.5 | -135828.5 | -144241.2 | 37.7053 | -278276.2 | 66.1371 |
| 800 | 19.2749 | 10153.5 | 25.2155 | 9978.9 | -133938.7 | -144134.9 | 32.0782 | -277882.5 | 55.2845 |
| 900 | 19.9937 | 12157.3 | 27.5276 | 12617.6 | -131974.9 | -143960.2 | 27.7057 | -277413.4 | 46.8567 |
| 1000 | 20.6610 | 14151.2 | 29.6700 | 15478.8 | -129941.0 | -143715.6 | 24.2126 | -276873.3 | 40.1267 |
| 1100 | 21.3477 | 16292.8 | 31.6725 | 18546.9 | -127839.4 | -143414.7 | 21.3603 | -276265.0 | 34.6317 |
| 1200 | 22.0003 | 18460.3 | 33.5580 | 21809.4 | -125671.9 | -143046.3 | 18.9088 | -275590.3 | 30.0632 |
| 1300 | 22.6430 | 20692.5 | 35.3444 | 25255.2 | -123435.7 | -142614.8 | 16.9874 | -274850.5 | 26.2074 |
| 1400 | 23.2785 | 22988.6 | 37.0457 | 28875.4 | -121143.6 | -142120.7 | 15.2781 | -274046.6 | 22.9118 |
| 1500 | 23.9088 | 25348.0 | 38.6733 | 32661.9 | -118784.2 | -141564.2 | 13.8018 | -273179.3 | 20.0642 |
| 1600 | 24.5350 | 27770.2 | 40.2364 | 36607.9 | -116361.9 | -140945.6 | 12.5152 | -272249.0 | 17.5808 |
| c 1700 | 25.1580 | 30254.9 | 41.7425 | 40707.3 | -113877.3 | -140265.2 | 11.3855 | -271256.5 | 15.3973 |
| 1700 | 21.5 | 44534.9 | 50.1425 | 40707.3 | -99597.3 | -125963.2 | 11.3855 | -256931.7 | 15.3973 |
| 1800 | 21.5 | 46684.9 | 51.3709 | 45782.7 | -97447.3 | -125640.0 | 10.4887 | -256318.9 | 13.5642 |
| 1900 | 21.5 | 48834.9 | 52.5333 | 50978.5 | -95297.3 | -125295.2 | 9.6850 | -255661.8 | 11.9284 |
| 2000 | 21.5 | 50984.9 | 53.6362 | 56287.4 | -93147.3 | -124950.8 | 8.9657 | -255005.7 | 10.4599 |
| 2100 | 21.5 | 53134.9 | 54.6851 | 61703.9 | -90997.3 | -124606.8 | 8.3165 | -254350.9 | 9.1347 |
| 2200 | 21.5 | 55284.9 | 55.6853 | 67222.8 | -88847.3 | -124263.1 | 7.7275 | -253697.3 | 7.9331 |
| 2300 | 21.5 | 57434.9 | 56.6410 | 72839.5 | -86697.3 | -123919.8 | 7.1518 | -253047.3 | 6.8387 |
| 2400 | 21.5 | 59584.9 | 57.5561 | 78549.7 | -84547.3 | -123576.8 | 6.7017 | -252399.8 | 5.8382 |
| 2500 | 21.5 | 61734.9 | 58.4337 | 84349.4 | -82397.3 | -123234.1 | 6.2523 | -251756.2 | 4.9200 |
| 2600 | 21.5 | 63884.9 | 59.2770 | 90235.3 | -80247.3 | | | -251117.2 | 4.0746 |
| 2700 | 21.5 | 66034.9 | 60.0884 | 96203.8 | -78097.3 | | | -250483.6 | 3.2939 |
| 2800 | 21.5 | 68184.9 | 60.8703 | 102252.0 | -75947.3 | | | -249856.3 | 2.5707 |
| 2900 | 21.5 | 70334.9 | 61.6248 | 108376.9 | -73797.3 | | | -249236.1 | 1.8990 |
| 3000 | 21.5 | 72484.9 | 62.3536 | 114576.0 | -71647.3 | | | -248624.1 | 1.2737 |
| 3100 | 21.5 | 74634.9 | 63.0586 | 120846.9 | -69497.3 | | | -248020.9 | 0.6902 |
| 3200 | 21.5 | 76784.9 | 63.7412 | 127187.0 | -67347.3 | | | -247427.5 | 0.1445 |
| 3300 | 21.5 | 78934.9 | 64.4028 | 133594.4 | -65197.3 | | | -246844.6 | -0.3670 |
| 3400 | 21.5 | 81084.9 | 65.0447 | 140066.9 | -63047.3 | | | -246273.3 | -0.8472 |
| 3500 | 21.5 | 83234.9 | 65.6679 | 146602.7 | -60897.3 | | | -245714.2 | -1.2990 |
| 3600 | 21.5 | 85384.9 | 66.2736 | 153199.9 | -58747.3 | | | -245168.1 | -1.7247 |
| 3700 | 21.5 | 87534.9 | 66.8626 | 159856.9 | -56597.3 | | | -244635.7 | -2.1265 |
| 3800 | 21.5 | 89684.9 | 67.4360 | 166571.9 | -54447.3 | | | -244117.9 | -2.5064 |
| 3900 | 21.5 | 91834.9 | 67.9945 | 173343.6 | -52297.3 | | | -243615.4 | -2.8660 |
| 4000 | 21.5 | 93984.9 | 68.5388 | 180170.4 | -50147.3 | | | -243128.8 | -3.2069 |
| 4100 | 21.5 | 96134.9 | 69.0697 | 187050.9 | -47997.3 | | | -242659.0 | -3.5306 |
| 4200 | 21.5 | 98284.9 | 69.5878 | 193983.9 | -45847.3 | | | -242206.7 | -3.8383 |
| 4300 | 21.5 | 100434.9 | 70.0937 | 200968.1 | -43697.3 | | | -241772.6 | -4.1311 |
| 4400 | 21.5 | 102584.9 | 70.5880 | 208002.2 | -41547.3 | | | -241344.6 | -4.4101 |
| 4500 | 21.5 | 104734.9 | 71.0712 | 215085.3 | -39397.3 | | | -240934.3 | -4.6762 |
| 4600 | 21.5 | 106884.9 | 71.5437 | 222216.1 | -37247.3 | | | -240562.7 | -4.9304 |
| 4700 | 21.5 | 109034.9 | 72.0061 | 229393.7 | -35097.3 | | | -240202.1 | -5.1734 |
| 4800 | 21.5 | 111184.9 | 72.4587 | 236617.0 | -32947.3 | | | -239862.1 | -5.4059 |
| 4900 | 21.5 | 113334.9 | 72.9020 | 243885.1 | -30797.3 | | | -239543.4 | -5.6286 |
| 5000 | 21.5 | 115484.9 | 73.3364 | 251197.1 | -28647.3 | | | -239246.6 | -5.8422 |
| 5100 | 21.5 | 117634.9 | 73.7622 | 258552.1 | -26497.3 | | | -238969.8 | -6.0471 |
| 5200 | 21.5 | 119784.9 | 74.1796 | 265949.3 | -24347.3 | | | -238718.2 | -6.2439 |
| 5300 | 21.5 | 121934.9 | 74.5892 | 273387.8 | -22197.3 | | | -238490.3 | -6.4331 |
| 5400 | 21.5 | 124084.9 | 74.9911 | 280866.7 | -20047.3 | | | -238287.0 | -6.6151 |
| 5500 | 21.5 | 126234.9 | 75.3856 | 288385.9 | -17897.3 | | | -238108.6 | -6.7904 |
| 5600 | 21.5 | 128384.9 | 75.7730 | 295943.7 | -15747.3 | | | -237956.0 | -6.9593 |
| 5700 | 21.5 | 130534.9 | 76.1535 | 303540.1 | -13597.3 | | | -237820.7 | -7.1221 |
| 5800 | 21.5 | 132684.9 | 76.5274 | 311174.2 | -11447.3 | | | -237700.3 | -7.2793 |
| 5900 | 21.5 | 134834.9 | 76.8950 | 318845.4 | -9297.3 | | | -237608.4 | -7.4311 |
| 6000 | 21.5 | 136984.9 | 77.2563 | 326553.0 | -7147.3 | | | -237614.5 | -7.5778 |

^a H_O° refers to crystal state.^bA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Li , 453.70° K.^cMelting point.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(121) LiOH (gas); molecular weight, 23.948

| T, °K | C _p , cal/mole °K | H _T ^o - H _O ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H _O ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -59602.1 | -56446.6 | ----- | -205111.5 | ----- |
| 100 | 7.9492 | 794.9 | 43.7866 | 3583.8 | -58807.2 | -56495.9 | 125.4651 | -205837.7 | 441.4530 |
| 200 | 8.0434 | 1592.2 | 49.3100 | 8269.8 | -58009.9 | -56788.6 | 63.6274 | -206591.4 | 216.2138 |
| 298.15 | 8.5190 | 2402.1 | 52.5982 | 13280.1 | -57200.0 | -57200.0 | 43.1374 | -207279.5 | 141.7910 |
| 300 | 8.5308 | 2417.8 | 52.6510 | 13377.5 | -57184.2 | -57208.1 | 42.8786 | -207291.7 | 140.8541 |
| 400 | 9.1994 | 3304.3 | 55.1964 | 18774.3 | -56297.8 | -57646.9 | 32.4241 | -207916.9 | 103.0503 |
| a 500 | 9.7986 | 4255.2 | 57.3158 | 24402.7 | -55346.9 | -58824.5 | 26.0700 | -208470.1 | 80.3027 |
| 600 | 10.2759 | 5259.9 | 59.1462 | 30227.9 | -54342.2 | -59260.4 | 21.7697 | -208965.4 | 65.0991 |
| 700 | 10.6547 | 6307.1 | 60.7598 | 36224.8 | -53295.0 | -59652.4 | 18.6763 | -209415.7 | 54.2147 |
| 800 | 10.9665 | 7388.6 | 62.2035 | 42374.2 | -52213.5 | -60014.7 | 16.3416 | -209830.0 | 46.0345 |
| 900 | 11.2335 | 8498.9 | 63.5109 | 48660.9 | -51103.2 | -60358.0 | 14.5151 | -210214.3 | 39.6599 |
| 1000 | 11.4688 | 9634.2 | 64.7069 | 55072.7 | -49967.9 | -60685.4 | 13.0457 | -210572.8 | 34.5512 |
| 1100 | 11.6795 | 10791.8 | 65.8100 | 61599.2 | -48810.2 | -60999.0 | 11.8369 | -210908.5 | 30.3644 |
| 1200 | 11.8695 | 11969.4 | 66.8346 | 68232.1 | -47632.6 | -61300.9 | 10.8246 | -211223.7 | 26.8701 |
| 1300 | 12.0412 | 13165.1 | 67.7915 | 74963.9 | -46437.0 | -61592.6 | 9.9638 | -211520.5 | 23.9090 |
| 1400 | 12.1965 | 14377.1 | 68.6897 | 81788.4 | -45224.9 | -61875.7 | 9.2224 | -211800.7 | 21.3675 |
| 1500 | 12.3367 | 15603.9 | 69.5360 | 88700.1 | -43998.2 | -62151.6 | 8.5771 | -212065.9 | 19.1620 |
| 1600 | 12.4632 | 16844.0 | 70.3363 | 95694.1 | -42758.1 | -62421.3 | 8.0100 | -212317.7 | 17.2298 |
| 1700 | 12.5773 | 18096.1 | 71.0954 | 102766.0 | -41505.9 | -62685.6 | 7.5075 | -212557.4 | 15.5230 |
| 1800 | 12.6803 | 19359.1 | 71.8172 | 109911.9 | -40243.0 | -62945.2 | 7.0588 | -212786.4 | 14.0042 |
| 1900 | 12.7732 | 20631.8 | 72.5053 | 117128.3 | -38970.2 | -63201.8 | 6.6559 | -213005.8 | 12.6437 |
| 2000 | 12.8572 | 21913.4 | 73.1627 | 124412.0 | -37688.6 | -63455.6 | 6.2917 | -213216.9 | 11.4181 |
| 2100 | 12.9330 | 23203.0 | 73.7919 | 131759.9 | -36399.1 | -63707.2 | 5.9609 | -213420.6 | 10.3082 |
| 2200 | 13.0017 | 24499.8 | 74.3951 | 139169.5 | -35102.3 | -63957.1 | 5.6588 | -213618.1 | 9.2982 |
| 2300 | 13.0640 | 25803.1 | 74.9745 | 146638.1 | -33798.9 | -64206.0 | 5.3823 | -213810.2 | 8.3752 |
| 2400 | 13.1206 | 27112.4 | 75.5317 | 154163.6 | -32489.6 | -64453.9 | 5.1273 | -213998.0 | 7.5283 |
| 2500 | 13.1721 | 28427.1 | 76.0684 | 161743.8 | -31175.0 | -64701.3 | 4.8922 | -214182.5 | 6.7485 |
| 2600 | 13.2190 | 29746.7 | 76.5859 | 169376.7 | -29855.4 | | | -214364.4 | 6.0281 |
| 2700 | 13.2619 | 31070.8 | 77.0856 | 177060.4 | -28531.3 | | | -214544.8 | 5.3605 |
| 2800 | 13.3011 | 32398.9 | 77.5686 | 184793.2 | -27203.1 | | | -214724.4 | 4.7401 |
| 2900 | 13.3370 | 33730.9 | 78.0360 | 192573.6 | -25871.2 | | | -214904.0 | 4.1619 |
| 3000 | 13.3700 | 35066.2 | 78.4887 | 200399.9 | -24535.8 | | | -215084.5 | 3.6219 |
| 3100 | 13.4003 | 36404.8 | 78.9276 | 208270.9 | -23197.3 | | | -215266.5 | 3.1162 |
| 3200 | 13.4283 | 37746.2 | 79.3535 | 216185.0 | -21855.8 | | | -215450.9 | 2.6418 |
| 3300 | 13.4541 | 39090.4 | 79.7671 | 224141.2 | -20511.7 | | | -215638.2 | 2.1957 |
| 3400 | 13.4780 | 40437.0 | 80.1691 | 232138.1 | -19165.1 | | | -215829.1 | 1.7755 |
| 3500 | 13.5001 | 41785.9 | 80.5602 | 240174.6 | -17816.2 | | | -216024.3 | 1.3790 |
| 3600 | 13.5206 | 43137.0 | 80.9408 | 248249.8 | -16465.1 | | | -216224.3 | 1.0041 |
| 3700 | 13.5397 | 44490.0 | 81.3115 | 256362.4 | -15112.1 | | | -216429.7 | 0.6492 |
| 3800 | 13.5574 | 45844.9 | 81.6728 | 264511.7 | -13757.2 | | | -216641.0 | 0.3126 |
| 3900 | 13.5740 | 47201.4 | 82.0252 | 272696.7 | -12400.6 | | | -216858.7 | -0.0070 |
| 4000 | 13.5894 | 48559.6 | 82.3690 | 280916.5 | -11042.4 | | | -217083.4 | -0.3109 |
| 4100 | 13.6038 | 49919.3 | 82.7048 | 289170.2 | -9682.8 | | | -217315.5 | -0.6004 |
| 4200 | 13.6173 | 51280.4 | 83.0327 | 297457.2 | -8321.7 | | | -217555.5 | -0.8763 |
| 4300 | 13.6300 | 52642.7 | 83.3533 | 305776.5 | -6959.3 | | | -217803.9 | -1.1397 |
| 4400 | 13.6418 | 54006.3 | 83.6668 | 314127.6 | -5595.8 | | | -218054.7 | -1.3914 |
| 4500 | 13.6529 | 55371.1 | 83.9735 | 322509.7 | -4231.0 | | | -218318.3 | -1.6322 |
| 4600 | 13.6634 | 56736.9 | 84.2737 | 330922.1 | -2865.2 | | | -218591.7 | -1.8629 |
| 4700 | 13.6733 | 58103.7 | 84.5676 | 339364.2 | -1498.3 | | | -218874.8 | -2.0840 |
| 4800 | 13.6826 | 59471.5 | 84.8556 | 347835.4 | -130.5 | | | -219167.8 | -2.2961 |
| 4900 | 13.6913 | 60840.2 | 85.1378 | 356335.1 | 1238.2 | | | -219471.2 | -2.4999 |
| 5000 | 13.6996 | 62209.8 | 85.4145 | 364862.8 | 2607.7 | | | -219785.3 | -2.6958 |
| 5100 | 13.7074 | 63580.1 | 85.6859 | 373417.9 | 3978.1 | | | -220109.1 | -2.8843 |
| 5200 | 13.7149 | 64951.3 | 85.9521 | 381999.8 | 5349.2 | | | -220445.4 | -3.0658 |
| 5300 | 13.7219 | 66323.1 | 86.2134 | 390608.1 | 6721.0 | | | -220793.5 | -3.2408 |
| 5400 | 13.7285 | 67695.6 | 86.4700 | 399242.3 | 8093.5 | | | -221153.7 | -3.4095 |
| 5500 | 13.7348 | 69068.8 | 86.7220 | 407902.0 | 9466.7 | | | -221526.3 | -3.5724 |
| 5600 | 13.7408 | 70442.6 | 86.9695 | 416586.6 | 10840.5 | | | -221911.8 | -3.7297 |
| 5700 | 13.7465 | 71816.9 | 87.2127 | 425295.7 | 12214.9 | | | -222310.4 | -3.8817 |
| 5800 | 13.7519 | 73191.9 | 87.4519 | 434029.0 | 13589.8 | | | -222722.4 | -4.0288 |
| 5900 | 13.7571 | 74567.3 | 87.6870 | 442786.0 | 14965.2 | | | -223148.2 | -4.1712 |
| 6000 | 13.7620 | 75943.3 | 87.9183 | 451566.3 | 16341.2 | | | -223588.1 | -4.3091 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Li, 453.70° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(123) (LiOH)₂ (gas); molecular weight, 47.896

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|------------------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -180943.0 | -174632.1 | ----- | -471961.9 | ----- |
| 100 | 8.9214 | 811.7 | 51.1766 | 4306.0 | -180131.4 | -175508.9 | 379.6005 | -474192.5 | 1011.5763 |
| 200 | 13.4997 | 1931.7 | 58.7538 | 9819.1 | -179011.4 | -176568.9 | 187.3733 | -476174.5 | 492.5460 |
| 298.15 | 17.1186 | 3443.1 | 64.8540 | 15893.2 | -177500.0 | -177500.0 | 123.7097 | -477658.9 | 321.0170 |
| 300 | 17.1772 | 3474.8 | 64.9601 | 16013.3 | -177468.3 | -177516.0 | 122.9070 | -477683.3 | 318.8579 |
| 400 | 19.8935 | 5335.4 | 70.2940 | 22782.2 | -175607.7 | -178306.0 | 90.5115 | -478845.8 | 231.7639 |
| ^a 500 | 21.8583 | 7428.4 | 74.9562 | 30049.7 | -173514.7 | -180469.9 | 70.9270 | -479761.1 | 179.3924 |
| 600 | 23.2776 | 9688.9 | 79.0737 | 37755.3 | -171254.2 | -181090.6 | 57.7586 | -480500.6 | 144.4174 |
| 700 | 24.3367 | 12072.0 | 82.7451 | 45849.6 | -168871.1 | -181585.9 | 48.3230 | -481112.4 | 119.3998 |
| 800 | 25.1660 | 14548.6 | 86.0510 | 54292.2 | -166394.4 | -181996.9 | 41.2289 | -481627.4 | 100.6146 |
| 900 | 25.8462 | 17100.2 | 89.0556 | 63049.8 | -163842.8 | -182352.5 | 35.6996 | -482065.1 | 85.9893 |
| 1000 | 26.4242 | 19714.5 | 91.8094 | 72095.0 | -161228.6 | -182663.6 | 31.2682 | -482438.6 | 74.2793 |
| 1100 | 26.9266 | 22382.6 | 94.3520 | 81404.7 | -158560.5 | -182938.0 | 27.6364 | -482757.0 | 64.6914 |
| 1200 | 27.3692 | 25097.8 | 96.7143 | 90959.4 | -155845.3 | -183181.7 | 24.6057 | -483027.4 | 56.6966 |
| 1300 | 27.7620 | 27854.7 | 98.9208 | 100742.3 | -153088.3 | -183399.6 | 22.0379 | -483255.4 | 49.9283 |
| 1400 | 28.1119 | 30648.8 | 100.9912 | 110739.0 | -150294.3 | -183595.7 | 19.8343 | -483445.7 | 44.1244 |
| 1500 | 28.4245 | 33475.9 | 102.9416 | 120936.6 | -147467.2 | -183774.0 | 17.9228 | -483602.6 | 39.0926 |
| 1600 | 28.7040 | 36332.5 | 104.7852 | 131323.8 | -144610.5 | -183936.9 | 16.2487 | -483729.7 | 34.6884 |
| 1700 | 28.9543 | 39215.7 | 106.5330 | 141890.4 | -141727.3 | -184086.6 | 14.7703 | -483830.3 | 30.8014 |
| 1800 | 29.1788 | 42122.6 | 108.1945 | 152627.5 | -138820.5 | -184224.9 | 13.4550 | -483907.3 | 27.3457 |
| 1900 | 29.3804 | 45050.7 | 109.7776 | 163526.7 | -135892.3 | -184355.4 | 12.2776 | -483963.6 | 24.2533 |
| 2000 | 29.5618 | 47998.0 | 111.2893 | 174580.6 | -132945.1 | -184478.9 | 11.2170 | -484001.6 | 21.4699 |
| 2100 | 29.7252 | 50962.5 | 112.7356 | 185782.4 | -129980.6 | -184596.9 | 10.2570 | -484023.7 | 18.9515 |
| 2200 | 29.8728 | 53942.5 | 114.1219 | 197125.7 | -127000.6 | -184710.2 | 9.3830 | -484032.1 | 16.6619 |
| 2300 | 30.0062 | 56936.5 | 115.4528 | 208604.9 | -124006.5 | -184820.6 | 8.5856 | -484029.1 | 14.5714 |
| 2400 | 30.1271 | 59943.3 | 116.7325 | 220214.6 | -120999.7 | -184928.2 | 7.8532 | -484016.5 | 12.6551 |
| 2500 | 30.2370 | 62961.6 | 117.9646 | 231949.8 | -117981.4 | -185034.1 | 7.1796 | -483996.4 | 10.8922 |
| 2600 | 30.3369 | 65990.4 | 119.1525 | 243806.0 | -114952.7 | - | - | -483970.8 | 9.2649 |
| 2700 | 30.4281 | 69028.7 | 120.2991 | 255779.0 | -111914.3 | - | - | -483941.3 | 7.7583 |
| 2800 | 30.5114 | 72075.7 | 121.4073 | 267864.6 | -108867.3 | - | - | -483909.8 | 6.3594 |
| 2900 | 30.5876 | 75130.7 | 122.4793 | 280059.2 | -105812.3 | - | - | -483877.9 | 5.0571 |
| 3000 | 30.6576 | 78193.1 | 123.5175 | 292359.3 | -102750.0 | - | - | -483847.3 | 3.8417 |
| 3100 | 30.7219 | 81262.1 | 124.5238 | 304761.6 | -99681.0 | - | - | -483819.5 | 2.7047 |
| 3200 | 30.7811 | 84337.3 | 125.5001 | 317263.1 | -96605.8 | - | - | -483795.9 | 1.6389 |
| 3300 | 30.8357 | 87418.1 | 126.4481 | 329860.7 | -93524.9 | - | - | -483777.9 | 0.6377 |
| 3400 | 30.8862 | 90504.3 | 127.3694 | 342551.8 | -90438.8 | - | - | -483766.9 | -0.3046 |
| 3500 | 30.9329 | 93595.3 | 128.2654 | 355333.7 | -87347.8 | - | - | -483764.1 | -1.1930 |
| 3600 | 30.9762 | 96690.7 | 129.1374 | 368204.1 | -84252.3 | - | - | -483770.7 | -2.0321 |
| 3700 | 31.0164 | 99790.4 | 129.9867 | 381160.5 | -81152.7 | - | - | -483787.9 | -2.8258 |
| 3800 | 31.0539 | 102893.9 | 130.8144 | 394200.7 | -78049.1 | - | - | -483816.7 | -3.5778 |
| 3900 | 31.0887 | 106001.1 | 131.6215 | 407322.7 | -74942.0 | - | - | -483858.1 | -4.2913 |
| 4000 | 31.1212 | 109111.6 | 132.4090 | 420524.4 | -71831.4 | - | - | -483913.3 | -4.9691 |
| 4100 | 31.1516 | 112225.3 | 133.1778 | 433803.8 | -68717.8 | - | - | -483983.2 | -5.6140 |
| 4200 | 31.1800 | 115341.9 | 133.9289 | 447159.3 | -65601.2 | - | - | -484068.7 | -6.2283 |
| 4300 | 31.2066 | 118461.2 | 134.6628 | 460589.0 | -62481.8 | - | - | -484170.9 | -6.8141 |
| 4400 | 31.2316 | 121583.1 | 135.3806 | 474091.4 | -59359.9 | - | - | -484277.7 | -7.3734 |
| 4500 | 31.2550 | 124707.5 | 136.0827 | 487664.6 | -56235.6 | - | - | -484410.1 | -7.9080 |
| 4600 | 31.2771 | 127834.1 | 136.7699 | 501307.4 | -53109.0 | - | - | -484562.1 | -8.4195 |
| 4700 | 31.2978 | 130962.8 | 137.4428 | 515018.1 | -49980.2 | - | - | -484733.1 | -8.9093 |
| 4800 | 31.3174 | 134093.6 | 138.1019 | 528795.5 | -46849.4 | - | - | -484924.0 | -9.3790 |
| 4900 | 31.3358 | 137226.3 | 138.7478 | 542638.1 | -43716.8 | - | - | -485135.5 | -9.8297 |
| 5000 | 31.3532 | 140360.7 | 139.3811 | 556544.6 | -40582.3 | - | - | -485368.3 | -10.2625 |
| 5100 | 31.3696 | 143496.9 | 140.0021 | 570513.9 | -37446.2 | - | - | -485620.5 | -10.6786 |
| 5200 | 31.3852 | 146634.6 | 140.6114 | 584544.7 | -34308.4 | - | - | -485897.6 | -11.0789 |
| 5300 | 31.3999 | 149773.9 | 141.2094 | 598635.8 | -31169.2 | - | - | -486198.2 | -11.4643 |
| 5400 | 31.4139 | 152914.6 | 141.7964 | 612786.2 | -28028.4 | - | - | -486522.9 | -11.8357 |
| 5500 | 31.4272 | 156056.7 | 142.3730 | 626994.7 | -24886.4 | - | - | -486872.5 | -12.1938 |
| 5600 | 31.4398 | 159200.0 | 142.9394 | 641260.4 | -21743.0 | - | - | -487247.5 | -12.5394 |
| 5700 | 31.4517 | 162344.6 | 143.4959 | 655582.3 | -18598.5 | - | - | -487549.0 | -12.8731 |
| 5800 | 31.4631 | 165490.3 | 144.0430 | 669959.3 | -15452.7 | - | - | -488077.2 | -13.1956 |
| 5900 | 31.4739 | 168637.2 | 144.5810 | 684390.6 | -12305.9 | - | - | -488532.0 | -13.5074 |
| 6000 | 31.4842 | 171785.1 | 145.1100 | 698875.2 | -9157.9 | - | - | -489016.5 | -13.8092 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Li, 453.70° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(124) Mg (gas); molecular weight, 24.32

| T , °K | C_p^0 , cal/mole °K | $H_f^0 - H_O^0$, cal/mole | S_f^0 , cal/mole °K | $-(F_f^0 - H_O^0)$, cal/mole | H_f^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 34118.7 | 35309.0 | ----- | 0 | ----- |
| 100 | 4.9681 | 496.8 | 30.0767 | 2510.9 | 34615.6 | 35653.0 | -71.8374 | 0 | 0 |
| 200 | 4.9681 | 993.6 | 33.5204 | 5710.4 | 35112.4 | 35671.8 | -32.8573 | 0 | 0 |
| 298.15 | 4.9681 | 1481.3 | 35.5040 | 9104.3 | 35600.0 | 35600.0 | -20.0355 | 0 | 0 |
| 300 | 4.9681 | 1490.4 | 35.5348 | 9170.0 | 35609.2 | 35598.2 | -19.8746 | 0 | 0 |
| 400 | 4.9681 | 1987.3 | 36.9640 | 12798.4 | 36106.0 | 35485.0 | -13.4003 | 0 | 0 |
| 500 | 4.9681 | 2484.1 | 38.0726 | 16552.2 | 36602.8 | 35345.4 | -9.5299 | 0 | 0 |
| 600 | 4.9681 | 2980.9 | 38.9784 | 20406.2 | 37099.6 | 35180.2 | -6.9605 | 0 | 0 |
| 700 | 4.9681 | 3477.7 | 39.7443 | 24343.3 | 37596.5 | 34984.7 | -5.1346 | 0 | 0 |
| 800 | 4.9681 | 3974.5 | 40.4077 | 28351.6 | 38093.3 | 34756.3 | -3.7734 | 0 | 0 |
| 900 | 4.9681 | 4471.3 | 40.9928 | 32422.2 | 38590.1 | 34492.4 | -2.7223 | 0 | 0 |
| 1000 | 4.9681 | 4968.1 | 41.5163 | 36548.1 | 39086.9 | 32053.0 | -1.9272 | 0 | 0 |
| 1100 | 4.9681 | 5465.0 | 41.9898 | 40723.8 | 39583.7 | 31749.8 | -1.2932 | 0 | 0 |
| 1200 | 4.9681 | 5961.8 | 42.4221 | 44944.7 | 40080.5 | 31446.6 | -0.7700 | 0 | 0 |
| 1300 | 4.9682 | 6458.6 | 42.8198 | 49207.1 | 40577.3 | 31143.4 | -0.3317 | 0 | 0 |
| 1400 | 4.9682 | 6955.4 | 43.1875 | 53507.7 | 41074.2 | 30840.3 | 0.0405 | 0 | 0 |
| 1500 | 4.9682 | 7452.2 | 43.5307 | 57843.8 | 41571.0 | 30537.1 | 0.3599 | 0 | 0 |
| 1600 | 4.9682 | 7949.0 | 43.8513 | 62213.1 | 42067.8 | 30233.9 | 0.6366 | 0 | 0 |
| 1700 | 4.9682 | 8445.9 | 44.1525 | 66613.5 | 42564.6 | 29930.7 | 0.8784 | 0 | 0 |
| 1800 | 4.9683 | 8942.7 | 44.4365 | 71043.0 | 43061.4 | 29627.5 | 1.0911 | 0 | 0 |
| 1900 | 4.9685 | 9439.5 | 44.7051 | 75500.2 | 43558.3 | 29324.4 | 1.2794 | 0 | 0 |
| 2000 | 4.9688 | 9936.4 | 44.9600 | 79983.6 | 44055.1 | 29021.2 | 1.4473 | 0 | 0 |
| 2100 | 4.9694 | 10433.3 | 45.2024 | 84491.8 | 44552.0 | 28718.1 | 1.5976 | 0 | 0 |
| 2200 | 4.9704 | 10930.3 | 45.4336 | 89023.7 | 45049.0 | 28415.1 | 1.7325 | 0 | 0 |
| 2300 | 4.9719 | 11427.4 | 45.6546 | 93578.2 | 45546.1 | 28112.2 | 1.8547 | 0 | 0 |
| 2400 | 4.9743 | 11924.7 | 45.8663 | 98154.3 | 46043.4 | 27809.5 | 1.9653 | 0 | 0 |
| 2500 | 4.9777 | 12422.3 | 46.0694 | 102751.2 | 46541.0 | 27507.1 | 2.0662 | 0 | 0 |
| 2600 | 4.9825 | 12920.3 | 46.2647 | 107368.0 | 47039.0 | 27204.2 | 2.1580 | 0 | 0 |
| 2700 | 4.9891 | 13418.8 | 46.4529 | 112003.9 | 47537.6 | 26901.3 | 2.2413 | 0 | 0 |
| 2800 | 4.9977 | 13918.2 | 46.6345 | 116658.3 | 48036.9 | 26600.0 | 2.3173 | 0 | 0 |
| 2900 | 5.0087 | 14418.5 | 46.8100 | 121330.6 | 48537.2 | 26300.0 | 2.3868 | 0 | 0 |
| 3000 | 5.0226 | 14920.0 | 46.9800 | 126020.1 | 49038.7 | 26000.0 | 2.4500 | 0 | 0 |
| 3100 | 5.0397 | 15423.1 | 47.1450 | 130726.4 | 49541.8 | 25700.0 | 2.5070 | 0 | 0 |
| 3200 | 5.0604 | 15928.0 | 47.3053 | 135449.0 | 50046.8 | 25400.0 | 2.5588 | 0 | 0 |
| 3300 | 5.0850 | 16435.3 | 47.4614 | 140187.3 | 50554.0 | 25100.0 | 2.6055 | 0 | 0 |
| 3400 | 5.1140 | 16945.2 | 47.6136 | 144941.1 | 51063.9 | 24800.0 | 2.6473 | 0 | 0 |
| 3500 | 5.1476 | 17458.2 | 47.7623 | 149710.0 | 51577.0 | 24500.0 | 2.6843 | 0 | 0 |
| 3600 | 5.1859 | 17974.9 | 47.9079 | 154493.5 | 52093.6 | 24200.0 | 2.7168 | 0 | 0 |
| 3700 | 5.2294 | 18495.6 | 48.0505 | 159291.4 | 52614.3 | 23900.0 | 2.7450 | 0 | 0 |
| 3800 | 5.2781 | 19020.9 | 48.1906 | 164103.5 | 53139.7 | 23600.0 | 2.7690 | 0 | 0 |
| 3900 | 5.3323 | 19551.4 | 48.3284 | 168929.5 | 53670.2 | 23300.0 | 2.7889 | 0 | 0 |
| 4000 | 5.3919 | 20087.6 | 48.4642 | 173769.1 | 54206.3 | 23000.0 | 2.8048 | 0 | 0 |
| 4100 | 5.4571 | 20630.0 | 48.5981 | 178622.3 | 54748.7 | 22700.0 | 2.8168 | 0 | 0 |
| 4200 | 5.5278 | 21179.2 | 48.7304 | 183488.7 | 55297.9 | 22400.0 | 2.8249 | 0 | 0 |
| 4300 | 5.6041 | 21735.7 | 48.8614 | 188368.3 | 55854.5 | 22100.0 | 2.8292 | 0 | 0 |
| 4400 | 5.6859 | 22300.2 | 48.9912 | 193260.9 | 56418.9 | 21800.0 | 2.8298 | 0 | 0 |
| 4500 | 5.7725 | 22872.9 | 49.1195 | 198166.5 | 56991.7 | 21500.0 | 2.8267 | 0 | 0 |
| 4600 | 5.8648 | 23454.7 | 49.2477 | 203084.9 | 57573.5 | 21200.0 | 2.8200 | 0 | 0 |
| 4700 | 5.9620 | 24046.0 | 49.3749 | 208016.0 | 58164.8 | 20900.0 | 2.8100 | 0 | 0 |
| 4800 | 6.0643 | 24647.3 | 49.5015 | 212959.8 | 58766.0 | 20600.0 | 2.7970 | 0 | 0 |
| 4900 | 6.1714 | 25259.0 | 49.6276 | 217916.3 | 59377.8 | 20300.0 | 2.7810 | 0 | 0 |
| 5000 | 6.2831 | 25881.7 | 49.7534 | 222885.4 | 60000.5 | 20000.0 | 2.7620 | 0 | 0 |
| 5100 | 6.3991 | 26515.8 | 49.8790 | 227867.0 | 60634.5 | 19700.0 | 2.7400 | 0 | 0 |
| 5200 | 6.5194 | 27161.7 | 50.0044 | 232861.1 | 61280.4 | 19400.0 | 2.7150 | 0 | 0 |
| 5300 | 6.6433 | 27819.7 | 50.1297 | 237867.8 | 61938.4 | 19100.0 | 2.6880 | 0 | 0 |
| 5400 | 6.7713 | 28490.4 | 50.2551 | 242887.1 | 62609.1 | 18800.0 | 2.6590 | 0 | 0 |
| 5500 | 6.9020 | 29173.7 | 50.3805 | 247918.8 | 63292.4 | 18500.0 | 2.6280 | 0 | 0 |
| 5600 | 7.0362 | 29870.4 | 50.5060 | 252963.1 | 63989.1 | 18200.0 | 2.5950 | 0 | 0 |
| 5700 | 7.1741 | 30580.9 | 50.6317 | 258020.0 | 64699.6 | 17900.0 | 2.5600 | 0 | 0 |
| 5800 | 7.3150 | 31305.3 | 50.7577 | 263089.5 | 65424.0 | 17600.0 | 2.5230 | 0 | 0 |
| 5900 | 7.4589 | 32044.0 | 50.8840 | 268171.6 | 66162.7 | 17300.0 | 2.4850 | 0 | 0 |
| 6000 | 7.6054 | 32797.2 | 51.0106 | 273266.3 | 66915.9 | 17000.0 | 2.4460 | 0 | 0 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Mg, 923° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
(125) Mg (crystal, liquid); molecular weight, 24.32

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H _O ^o , ^a cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H _O ^o), ^a cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | 0 | 0 | -1190.3 | 0 | ----- | -35309.0 | ----- |
| 100 | 3.753 | 152.9 | 2.263 | 73.4 | -1037.4 | 0 | 0 | -35653.0 | 71.8374 |
| 200 | 5.418 | 630.9 | 5.511 | 471.3 | -559.4 | 0 | 0 | -35671.8 | 32.8573 |
| 298.15 | 5.929 | 1190.3 | 7.780 | 1129.3 | 0 | 0 | 0 | -35600.0 | 20.0355 |
| 300 | 5.937 | 1201.3 | 7.817 | 1143.8 | 11.0 | 0 | 0 | -35598.2 | 19.8746 |
| 400 | 6.241 | 1811.3 | 9.569 | 2016.3 | 621.0 | 0 | 0 | -35485.0 | 13.4003 |
| 500 | 6.493 | 2447.7 | 10.989 | 3046.8 | 1257.4 | 0 | 0 | -35345.4 | 9.5299 |
| 600 | 6.766 | 3109.7 | 12.195 | 4207.3 | 1919.4 | 0 | 0 | -35180.2 | 6.9605 |
| 700 | 7.084 | 3802.0 | 13.261 | 5480.7 | 2611.7 | 0 | 0 | -34984.7 | 5.1346 |
| 800 | 7.426 | 4527.3 | 14.229 | 6855.9 | 3337.0 | 0 | 0 | -34756.3 | 3.7734 |
| 900 | 7.792 | 5288.0 | 15.125 | 8324.5 | 4097.7 | 0 | 0 | -34492.4 | 2.7223 |
| b923 | 7.880 | 5468.2 | 15.322 | 8674.0 | 4277.9 | 0 | 0 | -34402.3 | 2.5071 |
| 923 | 8.0 | 7608.2 | 17.641 | 8674.0 | 6417.9 | 0 | 0 | -32257.3 | 2.5071 |
| 1000 | 8.0 | 8224.2 | 18.282 | 10057.8 | 7033.9 | 0 | 0 | -32053.0 | 1.9272 |
| 1100 | 8.0 | 9024.2 | 19.044 | 11924.2 | 7833.9 | 0 | 0 | -31749.8 | 1.2932 |
| 1200 | 8.0 | 9824.2 | 19.740 | 13863.8 | 8633.9 | 0 | 0 | -31446.6 | 0.7700 |
| 1300 | 8.0 | 10624.2 | 20.381 | 15871.1 | 9433.9 | 0 | 0 | -31143.4 | 0.3317 |
| 1400 | 8.0 | 11424.2 | 20.974 | 17939.4 | 10233.9 | 0 | 0 | -30840.3 | -0.0405 |
| 1500 | 8.0 | 12224.2 | 21.526 | 20064.8 | 11033.9 | 0 | 0 | -30537.1 | -0.3599 |
| 1600 | 8.0 | 13024.2 | 22.042 | 22243.0 | 11833.9 | 0 | 0 | -30233.9 | -0.6366 |
| 1700 | 8.0 | 13824.2 | 22.527 | 24471.7 | 12633.9 | 0 | 0 | -29930.7 | -0.8784 |
| 1800 | 8.0 | 14624.2 | 22.984 | 26747.0 | 13433.9 | 0 | 0 | -29627.5 | -1.0911 |
| 1900 | 8.0 | 15424.2 | 23.417 | 29068.1 | 14233.9 | 0 | 0 | -29324.4 | -1.2794 |
| 2000 | 8.0 | 16224.2 | 23.827 | 31429.8 | 15033.9 | 0 | 0 | -29021.2 | -1.4473 |
| 2100 | 8.0 | 17024.2 | 24.217 | 33831.5 | 15833.9 | 0 | 0 | -28718.1 | -1.5976 |
| 2200 | 8.0 | 17824.2 | 24.590 | 36273.8 | 16633.9 | 0 | 0 | -28415.1 | -1.7325 |
| 2300 | 8.0 | 18624.2 | 24.945 | 38749.3 | 17433.9 | 0 | 0 | -28112.2 | -1.8547 |
| 2400 | 8.0 | 19424.2 | 25.286 | 41262.2 | 18233.9 | 0 | 0 | -27809.5 | -1.9653 |
| 2500 | 8.0 | 20224.2 | 25.612 | 43805.8 | 19033.9 | 0 | 0 | -27507.1 | -2.0662 |

^aH₀^o refers to crystal state.

^bMelting point.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(126) MgCl (gas); molecular weight, 59.777

| T , °K | C_p^0 , cal/mole °K | $H_f^0 - H_0^0$, cal/mole | S_f^0 , cal/mole °K | $-(F_f^0 - H_0^0)$, cal/mole | H_f^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -729.6 | 1557.4 | ----- | -62300.0 | ----- |
| 100 | 7.0772 | 697.2 | 47.3913 | 4041.9 | -32.3 | 1753.8 | 1.0959 | -62596.4 | 133.1610 |
| 200 | 7.8303 | 1442.1 | 52.5232 | 9062.6 | 712.5 | 1657.8 | 2.9818 | -62847.4 | 64.6500 |
| 298.15 | 8.3245 | 2237.5 | 55.7526 | 14385.1 | 1507.9 | 1507.9 | 3.5556 | -63042.7 | 42.0117 |
| 300 | 8.3310 | 2252.9 | 55.8041 | 14488.3 | 1523.3 | 1504.8 | 3.5623 | -63046.1 | 41.7267 |
| 400 | 8.5880 | 3100.2 | 58.2398 | 20195.7 | 2370.6 | 1327.5 | 3.8222 | -63226.0 | 30.2300 |
| 500 | 8.7310 | 3966.8 | 60.1730 | 26119.7 | 3237.2 | 1130.7 | 3.9573 | -63397.1 | 23.3126 |
| 600 | 8.8194 | 4844.7 | 61.7732 | 32219.3 | 4115.1 | 912.1 | 4.0324 | -63560.5 | 18.6887 |
| 700 | 8.8792 | 5729.8 | 63.1375 | 38466.5 | 5000.2 | 665.6 | 4.0740 | -63715.8 | 15.3776 |
| 800 | 8.9229 | 6620.0 | 64.3261 | 44840.9 | 5890.4 | 387.9 | 4.0949 | -63863.1 | 12.8883 |
| 900 | 8.9568 | 7514.0 | 65.3791 | 51327.2 | 6784.4 | 76.0 | 4.1021 | -64003.0 | 10.9478 |
| 1000 | 8.9845 | 8411.1 | 66.3243 | 57913.2 | 7681.5 | -2410.3 | 4.0610 | -64135.9 | 9.3921 |
| 1100 | 9.0080 | 9310.8 | 67.1817 | 64589.1 | 8581.2 | -2759.5 | 4.0099 | -64262.8 | 8.1167 |
| 1200 | 9.0287 | 10212.6 | 67.9664 | 71347.1 | 9483.0 | -3107.9 | 3.9614 | -64384.1 | 7.0518 |
| 1300 | 9.0473 | 11116.4 | 68.6899 | 78180.4 | 10386.9 | -3455.5 | 3.9153 | -64500.5 | 6.1490 |
| 1400 | 9.0645 | 12022.0 | 69.3610 | 85083.3 | 11292.5 | -3802.4 | 3.8718 | -64612.6 | 5.3739 |
| 1500 | 9.0805 | 12929.3 | 69.9869 | 92051.1 | 12199.7 | -4148.7 | 3.8304 | -64720.7 | 4.7009 |
| 1600 | 9.0958 | 13838.1 | 70.5734 | 99079.4 | 13108.5 | -4494.3 | 3.7912 | -64825.3 | 4.1111 |
| 1700 | 9.1103 | 14748.4 | 71.1253 | 106164.6 | 14018.8 | -4839.3 | 3.7537 | -64926.6 | 3.5899 |
| 1800 | 9.1243 | 15660.2 | 71.6464 | 113303.4 | 14930.6 | -5183.8 | 3.7180 | -65024.9 | 3.1258 |
| 1900 | 9.1380 | 16573.3 | 72.1401 | 120493.0 | 15843.7 | -5527.6 | 3.6837 | -65120.5 | 2.7100 |
| 2000 | 9.1513 | 17487.7 | 72.6092 | 127730.6 | 16758.2 | -5870.9 | 3.6510 | -65213.5 | 2.3353 |
| 2100 | 9.1643 | 18403.5 | 73.0560 | 135014.1 | 17673.9 | -6213.6 | 3.6197 | -65304.2 | 1.9957 |
| 2200 | 9.1771 | 19320.6 | 73.4826 | 142341.2 | 18591.0 | -6555.7 | 3.5893 | -65392.7 | 1.6866 |
| 2300 | 9.1898 | 20238.9 | 73.8908 | 149710.0 | 19509.4 | -6897.3 | 3.5604 | -65479.2 | 1.4040 |
| 2400 | 9.2023 | 21158.6 | 74.2822 | 157118.8 | 20429.0 | -7238.3 | 3.5323 | -65563.9 | 1.1446 |
| 2500 | 9.2147 | 22079.4 | 74.6581 | 164565.9 | 21349.8 | -7578.7 | 3.5055 | -65646.9 | 0.9056 |
| 2600 | 9.2270 | 23001.5 | 75.0198 | 172049.9 | 22271.9 | | | -65728.4 | 0.6848 |
| 2700 | 9.2394 | 23924.8 | 75.3682 | 179569.4 | 23195.2 | | | -65808.7 | 0.4800 |
| 2800 | 9.2517 | 24849.4 | 75.7045 | 187123.2 | 24119.8 | | | -65888.0 | 0.2897 |
| 2900 | 9.2641 | 25775.2 | 76.0293 | 194709.9 | 25045.6 | | | -65966.6 | 0.1122 |
| 3000 | 9.2765 | 26702.2 | 76.3436 | 202328.7 | 25972.6 | | | -66044.7 | -0.0536 |
| 3100 | 9.2891 | 27630.5 | 76.6480 | 209978.3 | 26900.9 | | | -66122.8 | -0.2088 |
| 3200 | 9.3018 | 28560.0 | 76.9431 | 217658.0 | 27830.4 | | | -66201.1 | -0.3546 |
| 3300 | 9.3148 | 29490.8 | 77.2295 | 225366.7 | 28761.2 | | | -66280.0 | -0.4917 |
| 3400 | 9.3280 | 30423.0 | 77.5078 | 233103.6 | 29693.4 | | | -66360.0 | -0.6209 |
| 3500 | 9.3415 | 31356.4 | 77.7784 | 240868.0 | 30626.9 | | | -66441.6 | -0.7428 |
| 3600 | 9.3554 | 32291.3 | 78.0418 | 248659.0 | 31561.7 | | | -66525.0 | -0.8581 |
| 3700 | 9.3697 | 33227.5 | 78.2983 | 256476.1 | 32498.0 | | | -66611.0 | -0.9673 |
| 3800 | 9.3844 | 34165.2 | 78.5483 | 264318.5 | 33435.7 | | | -66699.8 | -1.0709 |
| 3900 | 9.3997 | 35104.4 | 78.7923 | 272185.6 | 34374.9 | | | -66792.1 | -1.1694 |
| 4000 | 9.4154 | 36045.2 | 79.0305 | 280076.7 | 35315.6 | | | -66888.4 | -1.2630 |
| 4100 | 9.4317 | 36987.5 | 79.2632 | 287991.5 | 36258.0 | | | -66989.0 | -1.3522 |
| 4200 | 9.4487 | 37931.6 | 79.4907 | 295929.2 | 37202.0 | | | -67094.7 | -1.4373 |
| 4300 | 9.4663 | 38877.3 | 79.7132 | 303889.4 | 38147.7 | | | -67205.8 | -1.5185 |
| 4400 | 9.4845 | 39824.8 | 79.9310 | 311871.7 | 39095.3 | | | -67322.9 | -1.5962 |
| 4500 | 9.5034 | 40774.2 | 80.1444 | 319875.5 | 40044.6 | | | -67446.3 | -1.6706 |
| 4600 | 9.5231 | 41725.6 | 80.3535 | 327900.4 | 40996.0 | | | -67576.7 | -1.7419 |
| 4700 | 9.5434 | 42678.9 | 80.5585 | 335946.1 | 41949.3 | | | -67714.4 | -1.8102 |
| 4800 | 9.5645 | 43634.3 | 80.7596 | 344012.0 | 42904.7 | | | -67860.0 | -1.8759 |
| 4900 | 9.5864 | 44591.8 | 80.9571 | 352097.9 | 43862.2 | | | -68013.7 | -1.9390 |
| 5000 | 9.6090 | 45551.6 | 81.1510 | 360203.3 | 44822.0 | | | -68176.1 | -1.9998 |
| 5100 | 9.6323 | 46513.6 | 81.3415 | 368327.9 | 45784.0 | | | -68347.4 | -2.0583 |
| 5200 | 9.6564 | 47478.1 | 81.5288 | 376471.5 | 46748.5 | | | -68528.2 | -2.1147 |
| 5300 | 9.6812 | 48444.9 | 81.7129 | 384633.6 | 47715.3 | | | -68718.4 | -2.1691 |
| 5400 | 9.7067 | 49414.3 | 81.8941 | 392814.0 | 48684.7 | | | -68918.8 | -2.2216 |
| 5500 | 9.7329 | 50386.3 | 82.0725 | 401012.3 | 49656.7 | | | -69129.2 | -2.2724 |
| 5600 | 9.7598 | 51360.9 | 82.2481 | 409228.4 | 50631.3 | | | -69350.2 | -2.3215 |
| 5700 | 9.7873 | 52338.3 | 82.4211 | 417461.9 | 51608.7 | | | -69582.2 | -2.3691 |
| 5800 | 9.8155 | 53318.4 | 82.5915 | 425712.5 | 52588.8 | | | -69825.3 | -2.4152 |
| 5900 | 9.8443 | 54301.4 | 82.7596 | 433980.1 | 53571.8 | | | -70079.7 | -2.4599 |
| 6000 | 9.8737 | 55287.3 | 82.9253 | 442264.3 | 54557.7 | | | -70345.7 | -2.5032 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Mg, 923° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(127) MgCl_2 (gas); molecular weight, 95.234

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_o^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_o^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -103774.0 | -100390.3 | ----- | -192796.1 | ----- |
| 100 | 8.5475 | 732.0 | 49.5857 | 4226.6 | -103042.0 | -100507.1 | 220.1221 | -193554.5 | 412.4150 |
| 200 | 11.6033 | 1756.3 | 56.5618 | 9556.1 | -102017.8 | -100686.5 | 110.2150 | -194025.1 | 200.6941 |
| 298.15 | 13.0335 | 2974.0 | 61.4968 | 15361.2 | -100800.0 | -100800.0 | 73.9780 | -194301.3 | 130.8548 |
| 300 | 13.0516 | 2998.2 | 61.5775 | 15475.1 | -100775.9 | -100801.9 | 73.5223 | -194305.6 | 129.9765 |
| 400 | 13.7542 | 4342.3 | 65.4396 | 21833.5 | -99431.7 | -100897.0 | 55.1569 | -194518.9 | 94.5721 |
| 500 | 14.1309 | 5738.4 | 68.5533 | 28538.3 | -98035.6 | -100991.3 | 44.1270 | -194701.5 | 73.3077 |
| 600 | 14.3520 | 7163.4 | 71.1508 | 35527.1 | -96610.6 | -101097.1 | 36.7667 | -194862.1 | 59.1187 |
| 700 | 14.4914 | 8606.1 | 73.3744 | 42756.0 | -95167.9 | -101225.3 | 31.5033 | -195003.4 | 48.9759 |
| 800 | 14.5846 | 10060.2 | 75.3160 | 50192.6 | -93713.8 | -101381.8 | 27.5502 | -195127.6 | 41.3635 |
| 900 | 14.6497 | 11522.1 | 77.0378 | 57811.9 | -92251.9 | -101571.1 | 24.4702 | -195236.6 | 35.4393 |
| 1000 | 14.6969 | 12989.5 | 78.5838 | 65594.3 | -90784.5 | -103934.2 | 21.9623 | -195332.5 | 30.6973 |
| 1100 | 14.7322 | 14461.1 | 79.9863 | 73523.9 | -89312.9 | -104160.4 | 19.8954 | -195417.1 | 26.8158 |
| 1200 | 14.7593 | 15935.7 | 81.2694 | 81587.6 | -87838.3 | -104386.2 | 18.1691 | -195492.1 | 23.5799 |
| 1300 | 14.7804 | 17412.7 | 82.4516 | 89774.4 | -86361.3 | -104612.1 | 16.7051 | -195558.7 | 20.8408 |
| 1400 | 14.7973 | 18891.7 | 83.5476 | 98075.0 | -84882.4 | -104838.2 | 15.4476 | -195618.3 | 18.4922 |
| 1500 | 14.8110 | 20372.1 | 84.5690 | 106481.4 | -83401.9 | -105064.8 | 14.3554 | -195671.8 | 16.4562 |
| 1600 | 14.8222 | 21853.8 | 85.5253 | 114986.7 | -81920.3 | -105292.1 | 13.3977 | -195720.1 | 14.6742 |
| 1700 | 14.8315 | 23336.5 | 86.4241 | 123584.6 | -80437.6 | -105520.0 | 12.5509 | -195763.8 | 13.1015 |
| 1800 | 14.8393 | 24820.0 | 87.2721 | 132269.8 | -78954.0 | -105748.8 | 11.7965 | -195803.6 | 11.7033 |
| 1900 | 14.8459 | 26304.3 | 88.0746 | 141037.5 | -77469.7 | -105978.4 | 11.1200 | -195839.9 | 10.4520 |
| 2000 | 14.8516 | 27789.2 | 88.8363 | 149883.4 | -75984.9 | -106209.0 | 10.5099 | -195873.1 | 9.3256 |
| 2100 | 14.8565 | 29274.6 | 89.5610 | 158803.5 | -74499.4 | -106440.5 | 9.9567 | -195903.7 | 8.3063 |
| 2200 | 14.8607 | 30760.4 | 90.2522 | 167794.4 | -73013.6 | -106673.1 | 9.4525 | -195932.0 | 7.3796 |
| 2300 | 14.8644 | 32246.7 | 90.9129 | 176852.9 | -71527.3 | -106906.6 | 8.9914 | -195958.3 | 6.5333 |
| 2400 | 14.8677 | 33733.3 | 91.5456 | 185976.1 | -70040.7 | -107141.3 | 8.5676 | -195982.9 | 5.7575 |
| 2500 | 14.8706 | 35220.2 | 92.1526 | 195161.2 | -68553.8 | -107377.0 | 8.1771 | -196006.1 | 5.0436 |
| 2600 | 14.8731 | 36707.4 | 92.7359 | 204405.8 | -67066.6 | -107612.7 | - | -196028.2 | 4.3845 |
| 2700 | 14.8754 | 38194.8 | 93.2972 | 213707.7 | -65579.2 | -107848.4 | - | -196049.4 | 3.7743 |
| 2800 | 14.8774 | 39682.5 | 93.8382 | 223064.6 | -64091.5 | -108084.1 | - | -196070.2 | 3.2075 |
| 2900 | 14.8792 | 41170.3 | 94.3603 | 232474.7 | -62603.7 | -108319.8 | - | -196090.8 | 2.6798 |
| 3000 | 14.8809 | 42658.3 | 94.8648 | 241936.1 | -61115.7 | -108555.5 | - | -196111.6 | 2.1872 |
| 3100 | 14.8824 | 44146.5 | 95.3528 | 251447.1 | -59627.5 | -108791.2 | - | -196133.0 | 1.7263 |
| 3200 | 14.8837 | 45634.8 | 95.8253 | 261006.1 | -58139.2 | -109026.9 | - | -196155.4 | 1.2942 |
| 3300 | 14.8850 | 47123.2 | 96.2833 | 270611.6 | -56650.8 | -109262.6 | - | -196179.3 | 0.8882 |
| 3400 | 14.8861 | 48611.8 | 96.7277 | 280262.3 | -55162.2 | -109498.3 | - | -196205.1 | 0.5061 |
| 3500 | 14.8871 | 50100.4 | 97.1592 | 289956.8 | -53673.6 | -109734.0 | - | -196233.4 | 0.1457 |
| 3600 | 14.8881 | 51589.2 | 97.5786 | 299693.7 | -52184.8 | -109969.7 | - | -196264.7 | -0.1946 |
| 3700 | 14.8889 | 53078.1 | 97.9865 | 309472.1 | -50696.0 | -110205.4 | - | -196299.5 | -0.5167 |
| 3800 | 14.8897 | 54567.0 | 98.3836 | 319290.7 | -49207.0 | -110441.1 | - | -196338.3 | -0.8218 |
| 3900 | 14.8905 | 56056.0 | 98.7704 | 329148.5 | -47718.0 | -110676.8 | - | -196381.8 | -1.1114 |
| 4000 | 14.8912 | 57545.1 | 99.1474 | 339044.4 | -46228.9 | -110912.5 | - | -196430.6 | -1.3865 |
| 4100 | 14.8918 | 59034.2 | 99.5151 | 348977.6 | -44739.8 | -111148.2 | - | -196485.1 | -1.6483 |
| 4200 | 14.8924 | 60523.4 | 99.8740 | 358947.2 | -43250.6 | -111383.9 | - | -196546.0 | -1.8977 |
| 4300 | 14.8930 | 62012.7 | 100.2244 | 368952.1 | -41761.3 | -111619.6 | - | -196613.9 | -2.1356 |
| 4400 | 14.8935 | 63502.0 | 100.5668 | 378991.8 | -40272.0 | -111855.3 | - | -196689.4 | -2.3627 |
| 4500 | 14.8940 | 64991.4 | 100.9015 | 389065.2 | -38782.6 | -112091.0 | - | -196772.9 | -2.5799 |
| 4600 | 14.8944 | 66480.8 | 101.2288 | 399171.8 | -37293.2 | -112326.7 | - | -196865.0 | -2.7876 |
| 4700 | 14.8948 | 67970.3 | 101.5492 | 409310.8 | -35803.7 | -112562.4 | - | -196966.4 | -2.9867 |
| 4800 | 14.8952 | 69459.8 | 101.8628 | 419481.4 | -34314.2 | -112798.1 | - | -197077.5 | -3.1775 |
| 4900 | 14.8956 | 70949.3 | 102.1699 | 429683.1 | -32824.7 | -113033.8 | - | -197198.8 | -3.3607 |
| 5000 | 14.8959 | 72438.9 | 102.4708 | 439915.2 | -31335.1 | -113269.5 | - | -197330.8 | -3.5367 |
| 5100 | 14.8963 | 73928.5 | 102.7658 | 450177.1 | -29845.5 | -113505.2 | - | -197473.9 | -3.7059 |
| 5200 | 14.8966 | 75418.2 | 103.0551 | 460468.2 | -28355.9 | -113740.9 | - | -197628.7 | -3.8686 |
| 5300 | 14.8969 | 76907.8 | 103.3388 | 470787.9 | -26866.2 | -113976.6 | - | -197795.3 | -4.0254 |
| 5400 | 14.8972 | 78397.5 | 103.6173 | 481135.8 | -25376.5 | -114212.3 | - | -197974.5 | -4.1765 |
| 5500 | 14.8974 | 79887.3 | 103.8906 | 491511.2 | -23886.7 | -114448.0 | - | -198166.1 | -4.3223 |
| 5600 | 14.8977 | 81377.0 | 104.1591 | 501913.7 | -22397.0 | -114683.7 | - | -198370.9 | -4.4629 |
| 5700 | 14.8979 | 82866.8 | 104.4227 | 512342.8 | -20907.2 | -114919.4 | - | -198589.4 | -4.5988 |
| 5800 | 14.8981 | 84356.6 | 104.6818 | 522798.1 | -19417.4 | -115155.1 | - | -198821.6 | -4.7302 |
| 5900 | 14.8983 | 85846.4 | 104.9365 | 533279.1 | -17927.6 | -115390.8 | - | -199067.9 | -4.8572 |
| 6000 | 14.8985 | 87336.3 | 105.1869 | 543785.3 | -16437.7 | -115626.5 | - | -199328.6 | -4.9802 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Mg, 923° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(128) MgF (gas); molecular weight, 43.32

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -22381.1 | -20136.0 | ----- | -73800.0 | ----- |
| 100 | 6.9655 | 695.2 | 44.9206 | 3796.8 | -21685.8 | -19941.0 | 48.4544 | -74100.1 | 158.1633 |
| 200 | 7.2832 | 1403.7 | 49.8185 | 8560.0 | -20977.4 | -20060.6 | 26.6266 | -74414.3 | 77.0620 |
| 298.15 | 7.7861 | 2143.7 | 52.8222 | 13605.3 | -20237.4 | -20237.4 | 19.3835 | -74695.6 | 50.2490 |
| 300 | 7.7946 | 2158.1 | 52.8704 | 13703.0 | -20223.0 | -20240.9 | 19.2920 | -74700.4 | 49.9114 |
| 400 | 8.1722 | 2957.7 | 55.1682 | 19109.6 | -19423.3 | -20436.3 | 15.5900 | -74937.7 | 36.2870 |
| 500 | 8.4170 | 3788.1 | 57.0201 | 24722.0 | -18593.0 | -20645.1 | 13.3464 | -75136.2 | 28.0883 |
| 600 | 8.5776 | 4638.4 | 58.5699 | 30503.6 | -17742.7 | -20872.5 | 11.8348 | -75307.7 | 22.6089 |
| 700 | 8.6876 | 5501.9 | 59.9009 | 36428.7 | -16879.1 | -21126.4 | 10.7427 | -75460.2 | 18.6865 |
| 800 | 8.7665 | 6374.8 | 61.0664 | 42478.2 | -16006.2 | -21410.9 | 9.9131 | -75599.1 | 15.7391 |
| 900 | 8.8256 | 7254.6 | 62.1025 | 48637.6 | -15126.5 | -21729.2 | 9.2586 | -75728.0 | 13.4425 |
| 1000 | 8.8716 | 8139.5 | 63.0348 | 54895.3 | -14241.5 | -24222.0 | 8.6879 | -75849.2 | 11.6023 |
| 1100 | 8.9087 | 9028.6 | 63.8822 | 61241.8 | -13352.5 | -24577.9 | 8.2033 | -75964.3 | 10.0942 |
| 1200 | 8.9396 | 9921.1 | 64.6587 | 67669.4 | -12460.0 | -24933.2 | 7.7936 | -76074.6 | 8.8357 |
| 1300 | 8.9659 | 10816.4 | 65.3753 | 74171.5 | -11564.7 | -25288.1 | 7.4417 | -76180.7 | 7.7692 |
| 1400 | 8.9889 | 11714.1 | 66.0406 | 80742.7 | -10666.9 | -25642.7 | 7.1360 | -76283.4 | 6.8539 |
| 1500 | 9.0093 | 12614.1 | 66.6615 | 87378.2 | -9767.0 | -25997.0 | 6.8673 | -76383.1 | 6.0595 |
| 1600 | 9.0279 | 13515.9 | 67.2435 | 94073.7 | -8865.1 | -26351.2 | 6.6291 | -76480.2 | 5.3635 |
| 1700 | 9.0449 | 14419.6 | 67.7914 | 100825.7 | -7961.5 | -26705.2 | 6.4160 | -76575.0 | 4.7487 |
| 1800 | 9.0607 | 15324.9 | 68.3088 | 107631.0 | -7056.2 | -27059.0 | 6.2241 | -76667.6 | 4.2015 |
| 1900 | 9.0756 | 16231.7 | 68.7991 | 114486.6 | -6149.4 | -27412.7 | 6.0499 | -76758.2 | 3.7113 |
| 2000 | 9.0898 | 17140.0 | 69.2650 | 121390.0 | -5241.1 | -27766.4 | 5.8914 | -76847.1 | 3.2696 |
| 2100 | 9.1032 | 18049.6 | 69.7088 | 128338.8 | -4331.4 | -28119.9 | 5.7460 | -76934.4 | 2.8695 |
| 2200 | 9.1162 | 18960.6 | 70.1326 | 135331.1 | -3420.5 | -28473.4 | 5.6120 | -77020.1 | 2.5054 |
| 2300 | 9.1288 | 19872.8 | 70.5381 | 142364.7 | -2508.2 | -28826.8 | 5.4884 | -77104.5 | 2.1726 |
| 2400 | 9.1410 | 20786.3 | 70.9269 | 149438.1 | -1594.7 | -29180.2 | 5.3735 | -77187.5 | 1.8671 |
| 2500 | 9.1529 | 21701.0 | 71.3003 | 156549.6 | -680.0 | -29533.5 | 5.2667 | -77269.5 | 1.5858 |
| 2600 | 9.1645 | 22616.9 | 71.6595 | 163697.7 | 235.8 | | | -77350.6 | 1.3259 |
| 2700 | 9.1760 | 23533.9 | 72.0056 | 170881.1 | 1152.9 | | | -77430.9 | 1.0850 |
| 2800 | 9.1874 | 24452.1 | 72.3395 | 178098.4 | 2071.0 | | | -77510.7 | 0.8610 |
| 2900 | 9.1987 | 25371.4 | 72.6621 | 185348.6 | 2990.3 | | | -77590.2 | 0.6523 |
| 3000 | 9.2099 | 26291.8 | 72.9741 | 192630.5 | 3910.8 | | | -77669.7 | 0.4573 |
| 3100 | 9.2211 | 27213.4 | 73.2763 | 199943.1 | 4832.3 | | | -77749.5 | 0.2747 |
| 3200 | 9.2323 | 28136.1 | 73.5692 | 207285.4 | 5755.0 | | | -77830.1 | 0.1034 |
| 3300 | 9.2437 | 29059.9 | 73.8535 | 214656.6 | 6678.8 | | | -77911.6 | -0.0578 |
| 3400 | 9.2552 | 29984.8 | 74.1296 | 222055.8 | 7603.7 | | | -77994.7 | -0.2096 |
| 3500 | 9.2668 | 30910.9 | 74.3981 | 229482.3 | 8529.8 | | | -78079.6 | -0.3529 |
| 3600 | 9.2788 | 31838.2 | 74.6593 | 236935.2 | 9457.1 | | | -78166.9 | -0.4884 |
| 3700 | 9.2910 | 32766.7 | 74.9137 | 244413.9 | 10385.6 | | | -78257.0 | -0.6168 |
| 3800 | 9.3035 | 33696.4 | 75.1616 | 251917.7 | 11315.3 | | | -78350.4 | -0.7385 |
| 3900 | 9.3164 | 34627.4 | 75.4034 | 259446.0 | 12246.3 | | | -78447.7 | -0.8541 |
| 4000 | 9.3298 | 35559.7 | 75.6395 | 266998.2 | 13178.6 | | | -78549.3 | -0.9640 |
| 4100 | 9.3436 | 36493.3 | 75.8700 | 274573.7 | 14112.3 | | | -78655.7 | -1.0688 |
| 4200 | 9.3580 | 37428.4 | 76.0953 | 282172.0 | 15047.3 | | | -78767.4 | -1.1687 |
| 4300 | 9.3729 | 38364.9 | 76.3157 | 289792.6 | 15983.9 | | | -78885.1 | -1.2641 |
| 4400 | 9.3884 | 39303.0 | 76.5314 | 297435.0 | 16921.9 | | | -79009.0 | -1.3553 |
| 4500 | 9.4046 | 40242.7 | 76.7425 | 305098.8 | 17861.6 | | | -79139.7 | -1.4425 |
| 4600 | 9.4215 | 41184.0 | 76.9494 | 312783.4 | 18802.9 | | | -79277.7 | -1.5262 |
| 4700 | 9.4391 | 42127.0 | 77.1522 | 320488.5 | 19745.9 | | | -79423.4 | -1.6064 |
| 4800 | 9.4575 | 43071.8 | 77.3512 | 328213.7 | 20690.7 | | | -79577.3 | -1.6834 |
| 4900 | 9.4767 | 44018.5 | 77.5464 | 335958.6 | 21637.4 | | | -79739.8 | -1.7574 |
| 5000 | 9.4966 | 44967.2 | 77.7380 | 343722.9 | 22586.1 | | | -79911.2 | -1.8286 |
| 5100 | 9.5174 | 45917.9 | 77.9263 | 351506.1 | 23536.8 | | | -80091.9 | -1.8972 |
| 5200 | 9.5390 | 46870.7 | 78.1113 | 359308.0 | 24489.6 | | | -80282.4 | -1.9632 |
| 5300 | 9.5614 | 47825.7 | 78.2932 | 367128.3 | 25444.6 | | | -80482.7 | -2.0270 |
| 5400 | 9.5847 | 48783.0 | 78.4721 | 374966.6 | 26401.9 | | | -80693.4 | -2.0885 |
| 5500 | 9.6089 | 49742.6 | 78.6482 | 382822.6 | 27361.9 | | | -80914.4 | -2.1480 |
| 5600 | 9.6339 | 50704.8 | 78.8216 | 390696.1 | 28323.7 | | | -81146.2 | -2.2054 |
| 5700 | 9.6598 | 51669.5 | 78.9923 | 398586.8 | 29288.4 | | | -81389.3 | -2.2611 |
| 5800 | 9.6865 | 52636.8 | 79.1606 | 406494.5 | 30255.7 | | | -81643.7 | -2.3150 |
| 5900 | 9.7141 | 53606.8 | 79.3264 | 414418.9 | 31225.7 | | | -81909.5 | -2.3672 |
| 6000 | 9.7425 | 54579.6 | 79.4899 | 422359.7 | 32198.5 | | | -82187.1 | -2.4178 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Mg, 923° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(129) MgF₂ (gas); molecular weight, 62.32

| T, °K | C _p ^o , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -180623.8 | -177323.9 | ----- | -249342.9 | ----- |
| 100 | 7.1629 | 698.4 | 45.8372 | 3885.4 | -179925.4 | -177473.2 | 388.4777 | -250138.4 | 536.0580 |
| 200 | 9.2785 | 1510.5 | 51.3805 | 8765.6 | -179113.3 | -177839.2 | 194.3955 | -250874.8 | 262.4091 |
| 298.15 | 11.2354 | 2523.8 | 55.4766 | 14016.5 | -178100.0 | -178100.0 | 130.3808 | -251416.3 | 172.0763 |
| 300 | 11.2645 | 2544.6 | 55.5462 | 14119.2 | -178079.2 | -178104.0 | 129.5757 | -251424.8 | 170.9399 |
| 400 | 12.4848 | 3737.4 | 58.9691 | 19850.3 | -176886.4 | -178291.4 | 97.1240 | -251809.1 | 125.1177 |
| 500 | 13.2157 | 5025.4 | 61.8402 | 25894.7 | -175598.4 | -178445.2 | 77.6340 | -252082.1 | 97.5880 |
| 600 | 13.6716 | 6371.5 | 64.2931 | 32204.4 | -174252.3 | -178592.6 | 64.6300 | -252282.7 | 79.2175 |
| 700 | 13.9698 | 7754.5 | 66.4245 | 38742.6 | -172869.3 | -178752.1 | 55.3335 | -252435.0 | 66.0865 |
| 800 | 14.1739 | 9162.3 | 68.3041 | 45480.9 | -171461.5 | -178933.8 | 48.3544 | -252554.0 | 56.2329 |
| 900 | 14.3188 | 10587.3 | 69.9823 | 52396.8 | -170036.5 | -179144.2 | 42.9202 | -252649.4 | 48.5658 |
| ^a 1000 | 14.4250 | 12024.8 | 71.4967 | 59472.0 | -168599.0 | -181526.0 | 38.5284 | -252727.5 | 42.4300 |
| 1100 | 14.5051 | 13471.5 | 72.8755 | 66691.6 | -167152.3 | -181769.2 | 34.9198 | -252792.4 | 37.4083 |
| 1200 | 14.5669 | 14925.2 | 74.1404 | 74043.3 | -165698.6 | -182011.1 | 31.9085 | -252847.2 | 33.2226 |
| 1300 | 14.6155 | 16384.4 | 75.3084 | 81516.4 | -164239.4 | -182252.3 | 29.3569 | -252894.1 | 29.6802 |
| 1400 | 14.6544 | 17848.0 | 76.3930 | 89102.2 | -162775.8 | -182493.4 | 27.1670 | -252934.6 | 26.6433 |
| 1500 | 14.6859 | 19315.0 | 77.4051 | 96792.6 | -161308.8 | -182734.9 | 25.2666 | -252970.0 | 24.0109 |
| 1600 | 14.7119 | 20785.0 | 78.3538 | 104581.1 | -159838.8 | -182977.0 | 23.6017 | -253001.2 | 21.7073 |
| 1700 | 14.7336 | 22257.3 | 79.2463 | 112461.5 | -158366.5 | -183220.0 | 22.1306 | -253028.9 | 19.6744 |
| 1800 | 14.7518 | 23731.6 | 80.0890 | 120428.7 | -156892.2 | -183463.9 | 20.8213 | -253053.5 | 17.8672 |
| 1900 | 14.7672 | 25207.5 | 80.8870 | 128477.8 | -155416.3 | -183709.1 | 19.6481 | -253075.7 | 16.2501 |
| 2000 | 14.7804 | 26684.9 | 81.6448 | 136604.7 | -153938.9 | -183955.5 | 18.5909 | -253095.8 | 14.7946 |
| 2100 | 14.7918 | 28163.6 | 82.3663 | 144805.6 | -152460.2 | -184203.3 | 17.6332 | -253114.1 | 13.4777 |
| 2200 | 14.8017 | 29643.3 | 83.0546 | 153076.9 | -150980.5 | -184452.5 | 16.7611 | -253130.8 | 12.2803 |
| 2300 | 14.8104 | 31123.9 | 83.7128 | 161415.5 | -149499.9 | -184703.2 | 15.9641 | -253146.3 | 11.1870 |
| 2400 | 14.8180 | 32605.3 | 84.3433 | 169818.5 | -148018.5 | -184955.5 | 15.2322 | -253160.7 | 10.1848 |
| 2500 | 14.8247 | 34087.4 | 84.9483 | 178283.3 | -146536.4 | -185209.3 | 14.5582 | -253174.3 | 9.2627 |
| 2600 | 14.8307 | 35570.2 | 85.5299 | 186807.4 | -145053.6 | -145053.6 | | -253187.4 | 8.4114 |
| 2700 | 14.8360 | 37053.6 | 86.0897 | 195388.5 | -143570.2 | -143570.2 | | -253200.1 | 7.6232 |
| 2800 | 14.8408 | 38537.4 | 86.6293 | 204024.7 | -142086.4 | -142086.4 | | -253212.9 | 6.8913 |
| 2900 | 14.8451 | 40021.7 | 87.1502 | 212713.8 | -140602.1 | -140602.1 | | -253225.9 | 6.2098 |
| 3000 | 14.8490 | 41506.4 | 87.6535 | 221454.1 | -139117.4 | -139117.4 | | -253239.6 | 5.5736 |
| 3100 | 14.8525 | 42991.5 | 88.1405 | 230243.9 | -137632.3 | | | -253254.2 | 4.9785 |
| 3200 | 14.8557 | 44476.9 | 88.6121 | 239081.7 | -136146.9 | | | -253270.2 | 4.4206 |
| 3300 | 14.8586 | 45962.6 | 89.0692 | 247965.9 | -134661.2 | | | -253288.0 | 3.8964 |
| 3400 | 14.8612 | 47448.6 | 89.5129 | 256895.1 | -133175.2 | | | -253308.0 | 3.4031 |
| 3500 | 14.8636 | 48934.9 | 89.9437 | 265868.0 | -131688.9 | | | -253330.8 | 2.9379 |
| 3600 | 14.8659 | 50421.3 | 90.3624 | 274883.4 | -130202.5 | | | -253356.8 | 2.4985 |
| 3700 | 14.8679 | 51908.0 | 90.7698 | 283940.1 | -128715.8 | | | -253386.6 | 2.0828 |
| 3800 | 14.8698 | 53394.9 | 91.1663 | 293037.0 | -127228.9 | | | -253420.7 | 1.6889 |
| 3900 | 14.8716 | 54882.0 | 91.5526 | 302173.0 | -125741.8 | | | -253459.6 | 1.3152 |
| 4000 | 14.8732 | 56369.2 | 91.9291 | 311347.2 | -124254.6 | | | -253504.0 | 0.9601 |
| 4100 | 14.8747 | 57856.6 | 92.2964 | 320558.6 | -122767.2 | | | -253554.4 | 0.6222 |
| 4200 | 14.8761 | 59344.1 | 92.6548 | 329806.2 | -121279.7 | | | -253611.3 | 0.3004 |
| 4300 | 14.8774 | 60831.8 | 93.0049 | 339089.2 | -119792.0 | | | -253675.4 | -0.0065 |
| 4400 | 14.8786 | 62319.6 | 93.3469 | 348406.9 | -118304.2 | | | -253747.2 | -0.2996 |
| 4500 | 14.8797 | 63807.5 | 93.6813 | 357758.4 | -116816.3 | | | -253827.1 | -0.5797 |
| 4600 | 14.8808 | 65295.6 | 94.0084 | 367142.9 | -115328.2 | | | -253915.9 | -0.8477 |
| 4700 | 14.8818 | 66783.7 | 94.3284 | 376559.8 | -113840.1 | | | -254014.0 | -1.1044 |
| 4800 | 14.8827 | 68271.9 | 94.6417 | 386008.4 | -112351.9 | | | -254121.9 | -1.3505 |
| 4900 | 14.8836 | 69760.2 | 94.9486 | 395487.9 | -110863.6 | | | -254240.2 | -1.5867 |
| 5000 | 14.8844 | 71248.6 | 95.2493 | 404997.9 | -109375.2 | | | -254369.3 | -1.8136 |
| 5100 | 14.8852 | 72737.1 | 95.5441 | 414537.6 | -107886.7 | | | -254509.6 | -2.0316 |
| 5200 | 14.8859 | 74225.7 | 95.8331 | 424106.5 | -106398.1 | | | -254661.7 | -2.2414 |
| 5300 | 14.8866 | 75714.3 | 96.1167 | 433704.0 | -104909.5 | | | -254825.7 | -2.4434 |
| 5400 | 14.8873 | 77203.0 | 96.3949 | 443329.7 | -103420.8 | | | -255002.3 | -2.6381 |
| 5500 | 14.8879 | 78691.7 | 96.6681 | 452982.9 | -101932.1 | | | -255191.5 | -2.8258 |
| 5600 | 14.8885 | 80180.6 | 96.9364 | 462663.1 | -100443.2 | | | -255393.9 | -3.0069 |
| 5700 | 14.8890 | 81669.4 | 97.1999 | 472370.0 | -98954.4 | | | -255610.1 | -3.1818 |
| 5800 | 14.8896 | 83158.4 | 97.4588 | 482102.9 | -97465.4 | | | -255840.1 | -3.3509 |
| 5900 | 14.8901 | 84647.3 | 97.7134 | 491861.6 | -95976.5 | | | -256084.3 | -3.5143 |
| 6000 | 14.8905 | 86136.4 | 97.9636 | 501645.5 | -94487.4 | | | -256342.9 | -3.6725 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Mg, 923° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (130) MgF₂ (crystal, liquid); molecular weight, 62.32

| T, °K | C _p , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|-----------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o), cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | 0 | 0 | -265872.0 | -262572.1 | ----- | -334591.1 | ----- |
| 100 | 5.1916 | 182.2 | 2.8709 | 104.8 | -265689.8 | -263237.5 | 566.5167 | -335902.8 | 714.0970 |
| 200 | 11.6669 | 1051.4 | 8.6350 | 675.6 | -264820.7 | -263546.5 | 278.7060 | -336582.1 | 346.7197 |
| 298.15 | 14.9700 | 2372.0 | 13.9635 | 1791.2 | -263500.0 | -263500.0 | 183.9054 | -336816.3 | 225.6010 |
| 300 | 15.0000 | 2410.9 | 14.1013 | 1819.5 | -263461.1 | -263486.0 | 182.7161 | -336806.8 | 224.0803 |
| 400 | 16.5630 | 3997.6 | 18.6454 | 3460.5 | -261874.4 | -263279.4 | 134.7447 | -336797.1 | 162.7384 |
| 500 | 17.3100 | 5694.0 | 22.4277 | 5519.8 | -260178.0 | -263024.8 | 105.9888 | -336661.7 | 125.9427 |
| 600 | 17.8309 | 7452.3 | 25.6320 | 7926.9 | -258419.7 | -262760.0 | 86.8375 | -336450.0 | 101.4250 |
| 700 | 18.2450 | 9256.7 | 28.4127 | 10632.2 | -256615.3 | -262498.1 | 73.1718 | -336181.0 | 83.9248 |
| 800 | 18.6022 | 11099.4 | 30.8727 | 13598.8 | -254772.6 | -262244.9 | 62.9326 | -335865.1 | 70.8111 |
| 900 | 18.9264 | 12976.1 | 33.0827 | 16798.4 | -252896.0 | -262003.7 | 54.9762 | -335508.9 | 60.6218 |
| b1000 | 19.2300 | 14884.0 | 35.0927 | 20208.7 | -250988.0 | -263915.0 | 48.5779 | -335116.4 | 52.4795 |
| 1100 | 19.5202 | 16821.6 | 36.9392 | 23811.5 | -249050.4 | -263667.3 | 43.3371 | -334690.4 | 45.8257 |
| 1200 | 19.8012 | 18787.8 | 38.6498 | 27592.0 | -247084.3 | -263396.7 | 38.9740 | -334232.9 | 40.2882 |
| 1300 | 20.0758 | 20781.6 | 40.2456 | 31537.6 | -245090.4 | -263103.3 | 35.2859 | -333745.1 | 35.6092 |
| 1400 | 20.3458 | 22802.8 | 41.7433 | 35637.8 | -243069.3 | -262786.9 | 32.1285 | -333228.1 | 31.6047 |
| 1500 | 20.6122 | 24850.7 | 43.1561 | 39883.5 | -241021.3 | -262447.5 | 29.3954 | -332682.6 | 28.1397 |
| c1536 | 20.7075 | 25594.4 | 43.6461 | 41445.9 | -240277.6 | -262288.2 | 28.4958 | -332439.4 | 26.9990 |
| 1536 | 22.664 | 39478.4 | 52.6851 | 41445.9 | -226393.6 | -248407.8 | 28.4958 | -318559.6 | 26.9990 |
| 1600 | 22.664 | 40928.9 | 53.6103 | 44847.6 | -224943.1 | -248081.3 | 27.0867 | -318105.5 | 25.1923 |
| 1700 | 22.664 | 43195.3 | 54.9843 | 50278.0 | -222676.7 | -247530.1 | 25.0956 | -317339.0 | 22.6394 |
| 1800 | 22.664 | 45461.7 | 56.2797 | 55841.8 | -220410.3 | -246982.0 | 23.3298 | -316571.6 | 20.3758 |
| 1900 | 22.664 | 47728.1 | 57.5051 | 61531.6 | -218143.9 | -246436.7 | 21.7532 | -315803.4 | 18.3553 |
| 2000 | 22.664 | 49994.5 | 58.6676 | 67340.8 | -215877.5 | -245894.1 | 20.3375 | -315034.5 | 16.5412 |
| 2100 | 22.664 | 52260.9 | 59.7734 | 73263.3 | -213611.1 | -245354.1 | 19.0595 | -314264.9 | 14.9040 |
| 2200 | 22.664 | 54527.3 | 60.8278 | 79293.7 | -211344.7 | -244816.6 | 17.9000 | -313495.0 | 13.4192 |
| 2300 | 22.664 | 56793.7 | 61.8352 | 85427.3 | -209078.3 | -244281.6 | 16.8439 | -312724.6 | 12.0669 |
| 2400 | 22.664 | 59060.1 | 62.7998 | 91659.3 | -206811.9 | -243748.9 | 15.8777 | -311954.1 | 10.8303 |
| 2500 | 22.664 | 61326.5 | 63.7250 | 97985.9 | -204545.5 | -243218.4 | 14.9910 | -311183.5 | 9.6954 |
| 2600 | 22.664 | 63592.9 | 64.6139 | 104403.1 | -202279.1 | -242694.1 | 14.1600 | -310412.9 | 8.6505 |
| 2700 | 22.664 | 65859.3 | 65.4692 | 110907.6 | -200012.7 | -242174.6 | 13.3700 | -309642.6 | 7.6853 |
| 2800 | 22.664 | 68125.7 | 66.2934 | 117495.9 | -197746.3 | -241660.1 | 12.6100 | -308872.8 | 6.7913 |
| 2900 | 22.664 | 70392.1 | 67.0888 | 124165.3 | -195479.9 | -241151.6 | 11.8800 | -308103.7 | 5.9610 |
| 3000 | 22.664 | 72658.5 | 67.8571 | 130912.8 | -193213.5 | -240648.1 | 11.1900 | -307335.7 | 5.1881 |
| 3100 | 22.664 | 74924.9 | 68.6002 | 137735.9 | -190947.1 | -240144.6 | 10.5400 | -306569.0 | 4.4667 |
| 3200 | 22.664 | 77191.3 | 69.3198 | 144632.1 | -188680.7 | -239641.1 | 9.9300 | -305804.0 | 3.7922 |
| 3300 | 22.664 | 79457.7 | 70.0172 | 151599.1 | -186414.3 | -239137.6 | 9.3500 | -305041.1 | 3.1601 |
| 3400 | 22.664 | 81724.1 | 70.6938 | 158634.8 | -184147.9 | -238634.1 | 8.8000 | -304280.8 | 2.5667 |
| 3500 | 22.664 | 83990.5 | 71.3508 | 165737.2 | -181881.5 | -238130.6 | 8.2700 | -303523.4 | 2.0086 |
| 3600 | 22.664 | 86256.9 | 71.9892 | 172904.3 | -179615.1 | -237627.1 | 7.7600 | -302769.5 | 1.4828 |
| 3700 | 22.664 | 88523.3 | 72.6102 | 180134.4 | -177348.7 | -237123.6 | 7.2700 | -302019.5 | 0.9867 |
| 3800 | 22.664 | 90789.7 | 73.2146 | 187425.8 | -175082.3 | -236620.1 | 6.8000 | -301274.1 | 0.5178 |
| 3900 | 22.664 | 93056.1 | 73.8033 | 194776.8 | -172815.9 | -236116.6 | 6.3400 | -300533.7 | 0.0741 |
| 4000 | 22.664 | 95322.5 | 74.3771 | 202186.0 | -170549.5 | -235613.1 | 5.8900 | -299798.9 | -0.3464 |
| 4100 | 22.664 | 97588.9 | 74.9368 | 209651.8 | -168283.1 | -235109.6 | 5.4500 | -299070.3 | -0.7454 |
| 4200 | 22.664 | 99855.3 | 75.4829 | 217172.9 | -166016.7 | -234606.1 | 5.0200 | -298348.4 | -1.1245 |
| 4300 | 22.664 | 102121.7 | 76.0162 | 224748.0 | -163750.3 | -234102.6 | 4.6000 | -297633.7 | -1.4851 |
| 4400 | 22.664 | 104388.1 | 76.5372 | 232375.7 | -161483.9 | -233599.1 | 4.1900 | -296926.9 | -1.8285 |
| 4500 | 22.664 | 106654.5 | 77.0466 | 240055.0 | -159217.5 | -233095.6 | 3.7900 | -296228.3 | -2.1559 |
| 4600 | 22.664 | 108920.9 | 77.5447 | 247784.7 | -156951.1 | -232592.1 | 3.4000 | -295538.8 | -2.4682 |
| 4700 | 22.664 | 111187.3 | 78.0321 | 255563.6 | -154684.7 | -232088.6 | 3.0200 | -294858.6 | -2.7666 |
| 4800 | 22.664 | 113453.7 | 78.5093 | 263390.7 | -152418.3 | -231585.1 | 2.6500 | -294188.3 | -3.0519 |
| 4900 | 22.664 | 115720.1 | 78.9766 | 271265.1 | -150151.9 | -231081.6 | 2.2900 | -293528.5 | -3.3250 |
| 5000 | 22.664 | 117986.5 | 79.4345 | 279185.7 | -147885.5 | -230578.1 | 1.9400 | -292879.6 | -3.5865 |
| 5100 | 22.664 | 120252.9 | 79.8833 | 287151.7 | -145619.1 | -230074.6 | 1.6000 | -292242.0 | -3.8373 |
| 5200 | 22.664 | 122519.3 | 80.3233 | 295162.1 | -143352.7 | -229571.1 | 1.2700 | -291616.2 | -4.0778 |
| 5300 | 22.664 | 124785.7 | 80.7551 | 303216.1 | -141086.3 | -229067.6 | 0.9500 | -291002.5 | -4.3088 |
| 5400 | 22.664 | 127052.1 | 81.1787 | 311312.9 | -138819.9 | -228564.1 | 0.6400 | -290401.4 | -4.5308 |
| 5500 | 22.664 | 129318.5 | 81.5946 | 319451.6 | -136553.5 | -228060.6 | 0.3400 | -289813.0 | -4.7443 |
| 5600 | 22.664 | 131584.9 | 82.0029 | 327631.5 | -134287.1 | -227557.1 | 0.0500 | -289237.8 | -4.9497 |
| 5700 | 22.664 | 133851.3 | 82.4041 | 335851.9 | -132020.7 | -227053.6 | 0.0000 | -288676.4 | -5.1475 |
| 5800 | 22.664 | 136117.7 | 82.7982 | 344112.1 | -129754.3 | -226550.1 | 0.0000 | -288129.0 | -5.3382 |
| 5900 | 22.664 | 138384.1 | 83.1857 | 352411.3 | -127487.9 | -226046.6 | 0.0000 | -287595.7 | -5.5220 |
| 6000 | 22.664 | 140650.5 | 83.5666 | 360749.0 | -125221.5 | -225543.1 | 0.0000 | -287077.0 | -5.6994 |

^aH₀^o refers to crystal state.

^bA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Mg, 923° K.

^cMelting point.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(131) MgFCl (gas); molecular weight, 78.777

| T, °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -142153.5 | -138811.6 | ----- | -221024.1 | ----- |
| 100 | 7.5145 | 704.9 | 49.0587 | 4201.0 | -141448.5 | -138954.9 | 304.5174 | -221811.3 | 474.4541 |
| 200 | 10.2833 | 1594.8 | 55.1136 | 9427.9 | -140558.7 | -139256.0 | 152.5474 | -222443.1 | 231.7938 |
| 298.15 | 12.1246 | 2703.5 | 59.5993 | 15066.1 | -139450.0 | -139450.0 | 102.4225 | -222858.8 | 151.7087 |
| 300 | 12.1496 | 2725.9 | 59.6744 | 15176.4 | -139427.5 | -139453.0 | 101.7921 | -222865.3 | 150.7014 |
| 400 | 13.1494 | 3995.9 | 63.3211 | 21332.5 | -138157.5 | -139592.7 | 76.3837 | -223162.5 | 110.0881 |
| 500 | 13.7084 | 5341.4 | 66.3210 | 27819.2 | -136812.1 | -139713.3 | 61.1241 | -223386.9 | 85.6914 |
| 600 | 14.0437 | 6730.3 | 68.8524 | 34581.2 | -135423.2 | -139836.5 | 50.9423 | -223564.1 | 69.4121 |
| 700 | 14.2579 | 8146.1 | 71.0345 | 41578.0 | -134007.3 | -139977.4 | 43.6629 | -223707.9 | 57.7757 |
| 800 | 14.4022 | 9579.6 | 72.9484 | 48779.1 | -132573.9 | -140144.0 | 38.1973 | -223827.1 | 49.0432 |
| 900 | 14.5035 | 11025.1 | 74.6509 | 56160.7 | -131128.3 | -140341.8 | 33.9407 | -223927.2 | 42.2480 |
| ^a 1000 | 14.5773 | 12479.4 | 76.1830 | 63703.7 | -129674.1 | -142712.5 | 30.4912 | -224012.3 | 36.8095 |
| 1100 | 14.6326 | 13940.0 | 77.5751 | 71392.6 | -128213.5 | -142945.7 | 27.6538 | -224085.6 | 32.3583 |
| 1200 | 14.6751 | 15405.5 | 78.8502 | 79214.8 | -126748.0 | -143178.2 | 25.2853 | -224149.2 | 28.6478 |
| 1300 | 14.7084 | 16874.7 | 80.0262 | 87159.4 | -125278.8 | -143410.6 | 23.2778 | -224204.8 | 25.5073 |
| 1400 | 14.7350 | 18346.9 | 81.1172 | 95217.2 | -123806.5 | -143643.3 | 21.5544 | -224253.9 | 22.8149 |
| 1500 | 14.7565 | 19821.5 | 82.1346 | 103380.4 | -122331.9 | -143876.5 | 20.0584 | -224297.5 | 20.4809 |
| 1600 | 14.7742 | 21298.1 | 83.0875 | 111642.0 | -120855.4 | -144110.4 | 18.7473 | -224336.5 | 18.4383 |
| 1700 | 14.7889 | 22776.3 | 83.9837 | 119960.0 | -119377.2 | -144345.2 | 17.5885 | -224371.5 | 16.6358 |
| 1800 | 14.8013 | 24255.8 | 84.8293 | 128437.0 | -117897.7 | -144580.9 | 16.5569 | -224403.1 | 15.0332 |
| 1900 | 14.8117 | 25736.4 | 85.6299 | 136960.3 | -116417.0 | -144817.8 | 15.6321 | -224431.8 | 13.5992 |
| 2000 | 14.8207 | 27218.1 | 86.3899 | 145561.6 | -114935.4 | -145055.8 | 14.7987 | -224458.0 | 12.3084 |
| 2100 | 14.8284 | 28700.5 | 87.1132 | 154237.1 | -113452.9 | -145295.0 | 14.0434 | -224482.0 | 11.1404 |
| 2200 | 14.8351 | 30183.7 | 87.8031 | 162983.2 | -111969.7 | -145535.4 | 13.3553 | -224504.1 | 10.0785 |
| 2300 | 14.8410 | 31667.5 | 88.4627 | 171796.7 | -110485.9 | -145777.2 | 12.7264 | -224524.6 | 9.1088 |
| 2400 | 14.8462 | 33151.9 | 89.0945 | 180674.8 | -109001.5 | -146020.3 | 12.1487 | -224543.7 | 8.2199 |
| 2500 | 14.8507 | 34636.8 | 89.7006 | 189614.7 | -107516.7 | -146264.8 | 11.6165 | -224561.8 | 7.4020 |
| 2600 | 14.8547 | 36122.0 | 90.2831 | 198614.1 | -106031.4 | -146509.3 | 11.0843 | -224579.1 | 6.6470 |
| 2700 | 14.8583 | 37607.7 | 90.8438 | 207670.6 | -104545.8 | -146754.8 | 10.5521 | -224595.8 | 5.9478 |
| 2800 | 14.8616 | 39093.7 | 91.3842 | 216782.2 | -103059.8 | -147001.3 | 10.0200 | -224612.3 | 5.2985 |
| 2900 | 14.8645 | 40580.0 | 91.9058 | 225946.8 | -101573.5 | -147247.8 | 9.4879 | -224628.9 | 4.6940 |
| 3000 | 14.8671 | 42066.6 | 92.4098 | 235162.8 | -100086.9 | -147494.3 | 8.9558 | -224645.5 | 4.1297 |
| 3100 | 14.8694 | 43553.4 | 92.8973 | 244428.3 | -98600.1 | -147740.8 | 8.4237 | -224663.7 | 3.6018 |
| 3200 | 14.8716 | 45040.4 | 93.3694 | 253741.7 | -97113.0 | -147987.3 | 7.8916 | -224682.1 | 3.1068 |
| 3300 | 14.8735 | 46527.7 | 93.8271 | 263101.7 | -95625.7 | -148233.8 | 7.3595 | -224703.4 | 2.6418 |
| 3400 | 14.8753 | 48015.2 | 94.2711 | 272506.7 | -94138.3 | -148480.3 | 6.8274 | -224726.2 | 2.2041 |
| 3500 | 14.8770 | 49502.8 | 94.7024 | 281955.5 | -92650.7 | -148726.8 | 6.2953 | -224751.5 | 1.7914 |
| 3600 | 14.8785 | 50990.5 | 95.1215 | 291446.7 | -91162.9 | -148973.3 | 5.7632 | -224780.0 | 1.4016 |
| 3700 | 14.8798 | 52478.5 | 95.5291 | 300979.4 | -89675.0 | -149219.8 | 5.2311 | -224812.2 | 1.0328 |
| 3800 | 14.8811 | 53966.5 | 95.9260 | 310552.2 | -88186.9 | -149466.3 | 4.6990 | -224848.5 | 0.6833 |
| 3900 | 14.8823 | 55454.7 | 96.3125 | 320164.2 | -86698.8 | -149712.8 | 4.1669 | -224889.6 | 0.3517 |
| 4000 | 14.8834 | 56943.0 | 96.6893 | 329814.4 | -85210.5 | -150000.0 | 3.6348 | -224936.0 | 0.0366 |
| 4100 | 14.8844 | 58431.4 | 97.0569 | 339501.8 | -83722.1 | -150287.5 | 3.1027 | -224988.3 | -0.2632 |
| 4200 | 14.8853 | 59919.8 | 97.4156 | 349225.5 | -82233.6 | -150575.0 | 2.5706 | -225047.2 | -0.5487 |
| 4300 | 14.8862 | 61408.4 | 97.7658 | 358984.6 | -80745.0 | -150862.5 | 2.0385 | -225113.1 | -0.8211 |
| 4400 | 14.8870 | 62897.1 | 98.1081 | 368778.4 | -79256.4 | -151150.0 | 1.5064 | -225186.6 | -1.0811 |
| 4500 | 14.8878 | 64385.8 | 98.4426 | 378606.0 | -77767.6 | -151437.5 | 0.9743 | -225268.2 | -1.3297 |
| 4600 | 14.8885 | 65874.6 | 98.7698 | 388466.6 | -76278.8 | -151725.0 | 0.4422 | -225358.6 | -1.5676 |
| 4700 | 14.8892 | 67363.5 | 99.0900 | 398359.7 | -74789.9 | -152012.5 | -0.0901 | -225458.2 | -1.7955 |
| 4800 | 14.8898 | 68852.5 | 99.4035 | 408284.4 | -73301.0 | -152300.0 | -0.6180 | -225567.6 | -2.0139 |
| 4900 | 14.8904 | 70341.5 | 99.7105 | 418240.2 | -71812.0 | -152587.5 | -1.1459 | -225687.3 | -2.2236 |
| 5000 | 14.8910 | 71830.6 | 100.0114 | 428226.3 | -70322.9 | -152875.0 | -1.6738 | -225817.8 | -2.4249 |
| 5100 | 14.8915 | 73319.7 | 100.3063 | 438242.3 | -68833.8 | -153162.5 | -2.2017 | -225959.5 | -2.6185 |
| 5200 | 14.8920 | 74808.9 | 100.5954 | 448287.4 | -67344.6 | -153450.0 | -2.7296 | -226112.8 | -2.8048 |
| 5300 | 14.8924 | 76298.1 | 100.8791 | 458361.2 | -65855.4 | -153737.5 | -3.2575 | -226278.0 | -2.9841 |
| 5400 | 14.8929 | 77787.3 | 101.1575 | 468463.0 | -64366.1 | -154025.0 | -3.7854 | -226455.9 | -3.1570 |
| 5500 | 14.8933 | 79276.6 | 101.4308 | 478592.5 | -62876.8 | -154312.5 | -4.3133 | -226646.2 | -3.3237 |
| 5600 | 14.8937 | 80766.0 | 101.6991 | 488749.0 | -61387.5 | -154600.0 | -4.8412 | -226849.8 | -3.4846 |
| 5700 | 14.8941 | 82255.4 | 101.9627 | 498932.2 | -59898.1 | -154887.5 | -5.3691 | -227067.0 | -3.6400 |
| 5800 | 14.8944 | 83744.8 | 102.2218 | 509141.4 | -58408.6 | -155175.0 | -5.8970 | -227298.1 | -3.7901 |
| 5900 | 14.8948 | 85234.3 | 102.4764 | 519376.4 | -56919.2 | -155462.5 | -6.4249 | -227543.2 | -3.9354 |
| 6000 | 14.8951 | 86723.8 | 102.7267 | 529636.6 | -55429.7 | -155750.0 | -6.9528 | -227802.8 | -4.0759 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Mg, 923° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (132) MgH (gas); molecular weight, 25.328

| T, °K | C _p ^o , cal/mole °K | H _f ^o - H ₀ ^o , cal/mole | S _f ^o , cal/mole °K | -(F _f ^o - H ₀ ^o), cal/mole | H _f ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 38635.2 | 40837.4 | ----- | -46100.0 | ----- |
| 100 | 6.9613 | 690.3 | 38.5275 | 3162.4 | 39325.6 | 40995.4 | -84.3307 | -46403.3 | 98.4561 |
| 200 | 6.9739 | 1386.9 | 43.3551 | 7284.2 | 40022.1 | 40912.5 | -39.5511 | -46700.4 | 47.6259 |
| 298.15 | 7.0701 | 2075.0 | 46.1532 | 11685.6 | 40710.2 | 40710.2 | -24.8640 | -46987.5 | 30.7821 |
| 300 | 7.0732 | 2088.1 | 46.1969 | 11771.0 | 40723.3 | 40705.9 | -24.6802 | -46992.8 | 30.5697 |
| 400 | 7.2984 | 2805.9 | 48.2603 | 16498.3 | 41441.1 | 40466.4 | -17.2865 | -47268.7 | 21.9885 |
| 500 | 7.5739 | 3549.4 | 49.9183 | 21409.8 | 42184.6 | 40224.3 | -12.8771 | -47518.8 | 16.8105 |
| 600 | 7.8368 | 4320.2 | 51.3229 | 26473.6 | 42955.4 | 39983.0 | -9.9551 | -47741.6 | 13.3412 |
| 700 | 8.0641 | 5115.5 | 52.5485 | 31668.4 | 43750.8 | 39735.0 | -7.8807 | -47939.9 | 10.8520 |
| 800 | 8.2532 | 5931.7 | 53.6381 | 36978.8 | 44566.9 | 39473.1 | -6.3348 | -48117.3 | 8.9778 |
| 900 | 8.4091 | 6765.1 | 54.6195 | 42392.5 | 45400.3 | 39190.2 | -5.1408 | -48277.6 | 7.5150 |
| ^a 1000 | 8.5383 | 7612.6 | 55.5124 | 47899.7 | 46247.9 | 36742.5 | -4.2316 | -48423.7 | 6.3409 |
| 1100 | 8.6463 | 8472.0 | 56.3313 | 53492.5 | 47107.3 | 36438.7 | -3.5046 | -48557.9 | 5.3776 |
| 1200 | 8.7378 | 9341.3 | 57.0877 | 59163.9 | 47976.6 | 36140.2 | -2.9036 | -48682.2 | 4.5727 |
| 1300 | 8.8164 | 10219.1 | 57.7903 | 64908.2 | 48854.4 | 35845.1 | -2.3994 | -48798.0 | 3.8899 |
| 1400 | 8.8850 | 11104.3 | 58.4462 | 70720.4 | 49739.5 | 35522.2 | -1.9710 | -48906.5 | 3.3033 |
| 1500 | 8.9455 | 11995.9 | 59.0613 | 76596.1 | 50631.1 | 35260.2 | -1.6025 | -49008.6 | 2.7938 |
| 1600 | 8.9997 | 12893.2 | 59.6404 | 82531.5 | 51528.4 | 34968.8 | -1.2825 | -49104.9 | 2.3471 |
| 1700 | 9.0488 | 13795.6 | 60.1875 | 88523.1 | 52430.9 | 34677.7 | -1.0027 | -49196.1 | 1.9522 |
| 1800 | 9.0938 | 14702.8 | 60.7060 | 94568.0 | 53338.1 | 34386.8 | -0.7560 | -49282.5 | 1.6006 |
| 1900 | 9.1354 | 15614.3 | 61.1988 | 100663.5 | 54249.5 | 34095.2 | -0.5372 | -49364.7 | 1.2854 |
| 2000 | 9.1744 | 16529.8 | 61.6684 | 106807.0 | 55165.1 | 33803.1 | -0.3420 | -49442.9 | 1.0013 |
| 2100 | 9.2112 | 17449.1 | 62.1169 | 112996.4 | 56084.3 | 33510.5 | -0.1667 | -49517.3 | 0.7438 |
| 2200 | 9.2463 | 18372.0 | 62.5462 | 119229.7 | 57007.2 | 33217.7 | -0.0092 | -49588.2 | 0.5094 |
| 2300 | 9.2800 | 19298.3 | 62.9580 | 125505.1 | 57933.6 | 32924.4 | 0.1340 | -49655.8 | 0.2951 |
| 2400 | 9.3129 | 20228.0 | 63.3537 | 131820.8 | 58863.2 | 32630.8 | 0.2635 | -49720.3 | 0.0984 |
| 2500 | 9.3450 | 21160.9 | 63.7345 | 138175.3 | 59796.1 | 32337.1 | 0.3820 | -49781.8 | -0.0828 |
| 2600 | 9.3768 | 22097.0 | 64.1016 | 144567.2 | 60732.2 | | | -49840.5 | -0.2503 |
| 2700 | 9.4085 | 23036.2 | 64.4561 | 150995.2 | 61671.5 | | | -49896.6 | -0.4056 |
| 2800 | 9.4403 | 23978.7 | 64.7988 | 157458.1 | 62613.9 | | | -49950.3 | -0.5499 |
| 2900 | 9.4723 | 24924.3 | 65.1307 | 163954.6 | 63559.5 | | | -50001.8 | -0.6844 |
| 3000 | 9.5049 | 25873.1 | 65.4523 | 170483.9 | 64508.4 | | | -50051.3 | -0.8100 |
| 3100 | 9.5381 | 26825.3 | 65.7645 | 177044.8 | 65460.5 | | | -50099.1 | -0.9277 |
| 3200 | 9.5720 | 27780.8 | 66.0679 | 183636.5 | 66416.0 | | | -50145.4 | -1.0381 |
| 3300 | 9.6068 | 28739.7 | 66.3630 | 190258.1 | 67374.9 | | | -50190.5 | -1.1420 |
| 3400 | 9.6425 | 29702.2 | 66.6503 | 196908.8 | 68337.4 | | | -50234.7 | -1.2398 |
| 3500 | 9.6792 | 30668.2 | 66.9303 | 203587.9 | 69303.5 | | | -50278.5 | -1.3320 |
| 3600 | 9.7170 | 31638.0 | 67.2035 | 210294.6 | 70273.3 | | | -50322.2 | -1.4193 |
| 3700 | 9.7559 | 32611.7 | 67.4703 | 217028.4 | 71246.9 | | | -50366.1 | -1.5019 |
| 3800 | 9.7958 | 33589.3 | 67.7310 | 223788.5 | 72224.5 | | | -50410.6 | -1.5802 |
| 3900 | 9.8369 | 34570.9 | 67.9860 | 230574.4 | 73206.1 | | | -50456.3 | -1.6546 |
| 4000 | 9.8789 | 35556.7 | 68.2355 | 237385.5 | 74191.9 | | | -50503.5 | -1.7253 |
| 4100 | 9.9221 | 36546.7 | 68.4800 | 244221.3 | 75182.0 | | | -50552.7 | -1.7926 |
| 4200 | 9.9661 | 37541.1 | 68.7196 | 251081.4 | 76176.4 | | | -50604.3 | -1.8568 |
| 4300 | 10.0111 | 38540.0 | 68.9547 | 257965.1 | 77175.2 | | | -50658.8 | -1.9181 |
| 4400 | 10.0570 | 39543.4 | 69.1853 | 264872.1 | 78178.6 | | | -50716.7 | -1.9766 |
| 4500 | 10.1037 | 40551.4 | 69.4119 | 271802.0 | 79186.6 | | | -50778.2 | -2.0326 |
| 4600 | 10.1511 | 41564.1 | 69.6345 | 278754.4 | 80199.4 | | | -50844.1 | -2.0863 |
| 4700 | 10.1991 | 42581.6 | 69.8533 | 285728.8 | 81216.9 | | | -50914.7 | -2.1377 |
| 4800 | 10.2477 | 43604.0 | 70.0685 | 292724.9 | 82239.2 | | | -50990.4 | -2.1871 |
| 4900 | 10.2968 | 44631.2 | 70.2803 | 299742.4 | 83266.4 | | | -51071.8 | -2.2345 |
| 5000 | 10.3462 | 45663.3 | 70.4888 | 306780.9 | 84298.6 | | | -51159.1 | -2.2801 |
| 5100 | 10.3960 | 46700.4 | 70.6942 | 313840.1 | 85335.7 | | | -51252.9 | -2.3240 |
| 5200 | 10.4461 | 47742.5 | 70.8966 | 320919.6 | 86377.8 | | | -51353.5 | -2.3662 |
| 5300 | 10.4963 | 48789.7 | 71.0960 | 328019.3 | 87424.9 | | | -51461.2 | -2.4070 |
| 5400 | 10.5465 | 49841.8 | 71.2927 | 335138.7 | 88477.0 | | | -51576.6 | -2.4463 |
| 5500 | 10.5968 | 50899.0 | 71.4867 | 342277.7 | 89534.2 | | | -51699.5 | -2.4843 |
| 5600 | 10.6470 | 51961.2 | 71.6781 | 349436.0 | 90596.4 | | | -51830.9 | -2.5211 |
| 5700 | 10.6971 | 53028.4 | 71.8670 | 356613.2 | 91663.6 | | | -51971.0 | -2.5566 |
| 5800 | 10.7469 | 54100.6 | 72.0534 | 363809.3 | 92735.8 | | | -52120.0 | -2.5910 |
| 5900 | 10.7965 | 55177.7 | 72.2376 | 371023.9 | 93813.0 | | | -52278.3 | -2.6243 |
| 6000 | 10.8457 | 56259.9 | 72.4194 | 378256.7 | 94895.1 | | | -52446.2 | -2.6567 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Mg, 923° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(133) MgO (gas); molecular weight, 40.32

| T, °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | (ΔH_f°) , cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 2067.9 | 4295.6 | ----- | -90000.0 | ----- |
| 100 | 6.9612 | 695.1 | 43.1233 | 3617.2 | 2763.0 | 4491.0 | -5.4085 | -90329.2 | 193.1608 |
| 200 | 7.2004 | 1399.6 | 47.9971 | 8199.8 | 3467.5 | 4369.6 | -0.5401 | -90678.9 | 94.3066 |
| 298.15 | 7.6676 | 2129.1 | 50.9586 | 13064.2 | 4197.0 | 4197.0 | 1.0049 | -90959.6 | 61.6425 |
| 300 | 7.6760 | 2143.3 | 51.0061 | 13158.5 | 4211.2 | 4193.7 | 1.0238 | -90964.3 | 61.2314 |
| 400 | 8.0683 | 2931.6 | 53.2712 | 18376.9 | 4999.5 | 4016.9 | 1.7732 | -91190.8 | 44.6459 |
| 500 | 8.3523 | 3753.3 | 55.1035 | 23798.5 | 5821.2 | 3836.7 | 2.2028 | -91376.4 | 34.6718 |
| 600 | 8.5887 | 4600.5 | 56.6475 | 29388.0 | 6668.4 | 3644.2 | 2.4759 | -91532.4 | 28.0099 |
| 700 | 8.8271 | 5471.2 | 57.9892 | 35121.3 | 7539.1 | 3433.6 | 2.6605 | -91662.4 | 23.2439 |
| 800 | 9.0883 | 6366.7 | 59.1846 | 40981.0 | 8434.6 | 3205.0 | 2.7903 | -91765.8 | 19.6647 |
| 900 | 9.3704 | 7289.5 | 60.2712 | 46954.6 | 9357.4 | 2960.1 | 2.8840 | -91840.8 | 16.8782 |
| 1000 | 9.6598 | 8241.0 | 61.2735 | 53032.4 | 10308.9 | 561.6 | 2.9138 | -91886.4 | 14.6475 |
| 1100 | 9.9395 | 9221.2 | 62.2074 | 59207.0 | 11289.1 | 322.3 | 2.9228 | -91902.7 | 12.8218 |
| 1200 | 10.1952 | 10228.1 | 63.0834 | 65472.0 | 12296.0 | 105.0 | 2.9263 | -91891.7 | 11.3003 |
| 1300 | 10.4169 | 11259.1 | 63.9085 | 71822.0 | 13327.0 | -92.4 | 2.9263 | -91856.4 | 10.0132 |
| 1400 | 10.5993 | 12310.2 | 64.6874 | 78252.1 | 14378.1 | -273.3 | 2.9241 | -91800.6 | 8.9106 |
| 1500 | 10.7416 | 13377.6 | 65.4237 | 84758.0 | 15445.5 | -441.3 | 2.9204 | -91728.4 | 7.9556 |
| 1600 | 10.8456 | 14457.2 | 66.1205 | 91335.6 | 16525.1 | -600.1 | 2.9157 | -91643.7 | 7.1207 |
| 1700 | 10.9153 | 15545.6 | 66.7803 | 97980.9 | 17613.5 | -753.2 | 2.9103 | -91550.2 | 6.3847 |
| 1800 | 10.9553 | 16639.3 | 67.4054 | 104690.5 | 18707.2 | -903.8 | 2.9044 | -91451.2 | 5.7312 |
| 1900 | 10.9707 | 17735.8 | 67.9983 | 111460.9 | 19803.7 | -1054.5 | 2.8981 | -91349.3 | 5.1472 |
| 2000 | 10.9664 | 18832.8 | 68.5610 | 118289.1 | 20900.7 | -1207.5 | 2.8917 | -91247.0 | 4.6221 |
| 2100 | 10.9469 | 19928.6 | 69.0956 | 125172.2 | 21996.5 | -1364.5 | 2.8850 | -91145.9 | 4.1476 |
| 2200 | 10.9158 | 21021.8 | 69.6042 | 132107.4 | 23089.7 | -1526.8 | 2.8780 | -91047.5 | 3.7167 |
| 2300 | 10.8765 | 22111.5 | 70.0885 | 139092.2 | 24179.4 | -1695.5 | 2.8712 | -90952.8 | 3.3236 |
| 2400 | 10.8316 | 23196.9 | 70.5505 | 146124.3 | 25264.8 | -1871.0 | 2.8640 | -90862.8 | 2.9637 |
| 2500 | 10.7833 | 24277.7 | 70.9917 | 153201.6 | 26345.6 | -2054.0 | 2.8570 | -90777.3 | 2.6329 |
| 2600 | 10.7333 | 25353.5 | 71.4137 | 160322.0 | 27421.4 | | | -90698.5 | 2.3279 |
| 2700 | 10.6828 | 26424.3 | 71.8178 | 167483.7 | 28492.2 | | | -90625.1 | 2.0456 |
| 2800 | 10.6329 | 27490.1 | 72.2054 | 174685.0 | 29558.0 | | | -90557.8 | 1.7837 |
| 2900 | 10.5842 | 28550.9 | 72.5777 | 181924.3 | 30618.8 | | | -90496.9 | 1.5401 |
| 3000 | 10.5374 | 29607.0 | 72.9357 | 189200.1 | 31674.9 | | | -90442.5 | 1.3129 |
| 3100 | 10.4928 | 30658.5 | 73.2805 | 196511.0 | 32726.4 | | | -90394.8 | 1.1004 |
| 3200 | 10.4507 | 31705.6 | 73.6129 | 203855.8 | 33773.5 | | | -90354.0 | 0.9013 |
| 3300 | 10.4111 | 32748.7 | 73.9339 | 211233.2 | 34816.6 | | | -90320.3 | 0.7143 |
| 3400 | 10.3742 | 33787.9 | 74.2442 | 218642.2 | 35855.8 | | | -90293.8 | 0.5384 |
| 3500 | 10.3400 | 34823.6 | 74.5444 | 226081.7 | 36891.5 | | | -90274.8 | 0.3726 |
| 3600 | 10.3084 | 35856.0 | 74.8352 | 233550.8 | 37923.9 | | | -90263.7 | 0.2161 |
| 3700 | 10.2794 | 36885.4 | 75.1173 | 241048.5 | 38953.3 | | | -90260.5 | 0.0680 |
| 3800 | 10.2530 | 37912.0 | 75.3910 | 248574.0 | 39979.9 | | | -90265.8 | -0.0723 |
| 3900 | 10.2289 | 38936.1 | 75.6571 | 256126.4 | 41004.0 | | | -90279.7 | -0.2054 |
| 4000 | 10.2071 | 39957.9 | 75.9157 | 263705.1 | 42025.8 | | | -90302.7 | -0.3319 |
| 4100 | 10.1875 | 40977.6 | 76.1675 | 271309.3 | 43045.5 | | | -90335.1 | -0.4523 |
| 4200 | 10.1700 | 41995.4 | 76.4128 | 278938.4 | 44063.3 | | | -90377.3 | -0.5669 |
| 4300 | 10.1544 | 43011.6 | 76.6519 | 286591.7 | 45079.5 | | | -90429.6 | -0.6763 |
| 4400 | 10.1406 | 44026.4 | 76.8852 | 294268.6 | 46094.3 | | | -90492.5 | -0.7808 |
| 4500 | 10.1286 | 45039.8 | 77.1130 | 301968.6 | 47107.7 | | | -90566.2 | -0.8807 |
| 4600 | 10.1181 | 46052.1 | 77.3355 | 309691.0 | 48120.0 | | | -90651.2 | -0.9764 |
| 4700 | 10.1092 | 47063.5 | 77.5530 | 317435.5 | 49131.4 | | | -90747.9 | -1.0681 |
| 4800 | 10.1016 | 48074.0 | 77.7657 | 325201.5 | 50141.9 | | | -90856.6 | -1.1560 |
| 4900 | 10.0954 | 49083.9 | 77.9739 | 332988.5 | 51151.8 | | | -90977.8 | -1.2405 |
| 5000 | 10.0903 | 50093.1 | 78.1778 | 340796.1 | 52161.0 | | | -91111.6 | -1.3217 |
| 5100 | 10.0864 | 51102.0 | 78.3776 | 348623.9 | 53169.9 | | | -91258.5 | -1.3999 |
| 5200 | 10.0835 | 52110.4 | 78.5735 | 356471.5 | 54178.3 | | | -91418.7 | -1.4751 |
| 5300 | 10.0816 | 53118.7 | 78.7655 | 364338.5 | 55186.6 | | | -91592.4 | -1.5477 |
| 5400 | 10.0806 | 54126.8 | 78.9539 | 372224.5 | 56194.7 | | | -91780.2 | -1.6177 |
| 5500 | 10.0804 | 55134.8 | 79.1389 | 380129.1 | 57202.7 | | | -91981.8 | -1.6853 |
| 5600 | 10.0810 | 56142.9 | 79.3205 | 388052.1 | 58210.8 | | | -92197.9 | -1.7507 |
| 5700 | 10.0823 | 57151.1 | 79.4990 | 395993.2 | 59219.0 | | | -92428.9 | -1.8139 |
| 5800 | 10.0842 | 58159.4 | 79.6744 | 403951.8 | 60227.3 | | | -92674.7 | -1.8750 |
| 5900 | 10.0868 | 59167.9 | 79.8468 | 411927.9 | 61235.8 | | | -92935.6 | -1.9343 |
| 6000 | 10.0899 | 60176.8 | 80.0163 | 419921.1 | 62244.7 | | | -93211.8 | -1.9918 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Mg, 923° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(134) MgO (crystal); molecular weight, 40.32

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | 0 | 0 | -144966.7 | -142739.1 | ----- | -237034.6 | ----- |
| 100 | 1.9980 | 48.9 | 0.6371 | 14.9 | -144917.9 | -143189.9 | 308.0475 | -238010.1 | 506.6168 |
| 200 | 6.5370 | 492.3 | 3.5289 | 213.5 | -144474.4 | -143572.3 | 151.3974 | -238620.8 | 246.2441 |
| 298.15 | 9.0360 | 1266.7 | 6.6459 | 714.7 | -143700.0 | -143700.0 | 99.7271 | -238856.6 | 160.3647 |
| 300 | 9.0700 | 1289.4 | 6.7257 | 728.3 | -143677.3 | -143694.8 | 99.0784 | -238852.9 | 159.2859 |
| 400 | 9.9510 | 2239.0 | 9.4448 | 1538.9 | -142727.7 | -143710.3 | 72.9059 | -238918.0 | 115.7786 |
| 500 | 10.4580 | 3261.3 | 11.7239 | 2600.6 | -141705.4 | -143689.9 | 57.2034 | -238903.0 | 89.6724 |
| 600 | 10.8129 | 4325.7 | 13.6635 | 3872.4 | -140641.0 | -143665.2 | 46.7370 | -238841.8 | 72.2710 |
| 700 | 11.0960 | 5421.6 | 15.3522 | 5325.0 | -139545.2 | -143650.6 | 39.2622 | -238746.6 | 59.8455 |
| 800 | 11.3407 | 6543.6 | 16.8501 | 6936.5 | -138423.1 | -143652.7 | 33.6563 | -238623.5 | 50.5307 |
| 900 | 11.5633 | 7689.0 | 18.1989 | 8690.0 | -137277.7 | -143675.1 | 29.2957 | -238476.0 | 43.2899 |
| ^a 1000 | 11.7720 | 8855.8 | 19.4281 | 10572.3 | -136110.9 | -145858.2 | 25.7675 | -238306.2 | 37.5012 |
| 1100 | 11.9717 | 10043.1 | 20.5595 | 12572.4 | -134923.7 | -145890.4 | 22.8694 | -238115.4 | 32.7685 |
| 1200 | 12.1652 | 11250.0 | 21.6095 | 14681.5 | -133716.8 | -145907.8 | 20.4539 | -237904.5 | 28.8279 |
| 1300 | 12.3544 | 12476.0 | 22.5908 | 16892.0 | -132490.7 | -145910.1 | 18.4097 | -237674.1 | 25.4967 |
| 1400 | 12.5405 | 13720.8 | 23.5131 | 19197.6 | -131246.0 | -145897.4 | 16.6577 | -237424.7 | 22.6442 |
| 1500 | 12.7242 | 14984.0 | 24.3846 | 21592.9 | -129982.7 | -145869.5 | 15.1396 | -237156.6 | 20.1748 |
| 1600 | 12.89 | 2778.8 | 25.2116 | 37559.7 | -142187.9 | -159313.1 | 15.6536 | -250356.7 | 19.8586 |
| 1700 | 13.04 | 4075.3 | 25.9975 | 40120.5 | -140891.4 | -159258.0 | 14.3738 | -250055.0 | 17.8483 |
| 1800 | 13.19 | 5386.9 | 26.7472 | 42758.0 | -139579.8 | -159190.8 | 13.2367 | -249738.2 | 16.0636 |
| 1900 | 13.33 | 6712.9 | 27.4641 | 45468.8 | -138253.8 | -159112.0 | 12.2196 | -249406.8 | 14.4687 |
| 2000 | 13.47 | 8053.1 | 28.1514 | 48249.8 | -136913.7 | -159021.8 | 11.3049 | -249061.3 | 13.0354 |
| 2100 | 13.59 | 9406.1 | 28.8115 | 51098.2 | -135560.7 | -158921.6 | 10.4778 | -248703.0 | 11.7403 |
| 2200 | 13.71 | 10771.2 | 29.4466 | 54011.3 | -134195.6 | -158812.1 | 9.7261 | -248332.7 | 10.5648 |
| 2300 | 13.82 | 12147.7 | 30.0584 | 56986.7 | -132819.1 | -158693.9 | 9.0406 | -247951.3 | 9.4930 |
| 2400 | 13.93 | 13535.2 | 30.6490 | 60022.3 | -131431.5 | -158567.3 | 8.4124 | -247559.0 | 8.5121 |
| 2500 | 14.03 | 14933.2 | 31.2196 | 63115.8 | -130033.6 | -158433.1 | 7.8353 | -247157.0 | 7.6112 |
| 2600 | 14.14 | 16341.7 | 31.7720 | 66265.6 | -128625.0 | | | -246744.9 | 6.7809 |
| 2700 | 14.24 | 17760.8 | 32.3076 | 69469.7 | -127205.9 | | | -246323.2 | 6.0134 |
| 2800 | 14.33 | 19189.3 | 32.8271 | 72726.5 | -125777.4 | | | -245893.2 | 5.3019 |
| 2900 | 14.42 | 20626.9 | 33.3316 | 76034.6 | -124339.8 | | | -245455.5 | 4.6407 |
| 3000 | 14.50 | 22073.0 | 33.8218 | 79392.4 | -122893.7 | | | -245011.1 | 4.0247 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Mg, 923° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(135) MgOH (gas); molecular weight, 41.328

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -14675.6 | -11436.6 | ----- | -157360.0 | ----- |
| 100 | 7.9542 | 795.0 | 48.7334 | 4078.4 | -13880.7 | -11520.2 | 28.1436 | -158086.1 | 337.6623 |
| 200 | 8.3140 | 1602.5 | 54.3174 | 9261.0 | -13073.1 | -11840.0 | 15.4367 | -158829.6 | 164.6031 |
| 298.15 | 9.1209 | 2457.1 | 57.7831 | 14770.9 | -12218.5 | -12218.5 | 11.1186 | -159472.9 | 107.3668 |
| 300 | 9.1365 | 2474.0 | 57.8395 | 14877.9 | -12201.6 | -12225.5 | 11.0632 | -159484.1 | 106.6460 |
| 400 | 9.8834 | 3426.6 | 60.5750 | 20803.4 | -11249.0 | -12585.2 | 8.8066 | -160043.0 | 77.5540 |
| 500 | 10.4251 | 4443.6 | 62.8422 | 26977.4 | -10232.0 | -12919.5 | 7.4142 | -160530.1 | 60.0410 |
| 600 | 10.8108 | 5506.5 | 64.7789 | 33360.9 | -9169.1 | -13246.3 | 6.4620 | -160967.3 | 48.3318 |
| 700 | 11.1020 | 6602.7 | 66.4681 | 39925.0 | -8072.9 | -13582.4 | 5.7646 | -161368.5 | 39.9461 |
| 800 | 11.3397 | 7725.1 | 67.9665 | 46648.1 | -6950.5 | -13936.9 | 5.2280 | -161741.9 | 33.6416 |
| 900 | 11.5467 | 8869.6 | 69.3144 | 53513.3 | -5806.0 | -14315.7 | 4.7995 | -162092.1 | 28.7272 |
| a1000 | 11.7337 | 10033.8 | 70.5407 | 60507.0 | -4641.8 | -16860.6 | 4.4084 | -162421.8 | 24.7873 |
| 1100 | 11.9056 | 11215.9 | 71.6673 | 67618.1 | -3459.7 | -17261.2 | 4.0695 | -162732.9 | 21.5574 |
| 1200 | 12.0642 | 12414.5 | 72.7101 | 74837.6 | -2261.1 | -17654.7 | 3.7806 | -163027.2 | 18.8609 |
| 1300 | 12.2104 | 13628.3 | 73.6816 | 82157.8 | -1047.3 | -18042.1 | 3.5305 | -163305.8 | 16.5751 |
| 1400 | 12.3446 | 14856.1 | 74.5915 | 89571.9 | 180.5 | -18424.3 | 3.3114 | -163570.1 | 14.6126 |
| 1500 | 12.4674 | 16096.8 | 75.4474 | 97074.3 | 1421.2 | -18802.5 | 3.1178 | -163821.3 | 12.9091 |
| 1600 | 12.5792 | 17349.3 | 76.2556 | 104659.8 | 2673.7 | -19177.3 | 2.9451 | -164060.7 | 11.4163 |
| 1700 | 12.6810 | 18612.3 | 77.0214 | 112324.0 | 3936.7 | -19549.2 | 2.7896 | -164289.3 | 10.0973 |
| 1800 | 12.7735 | 19885.1 | 77.7488 | 120062.8 | 5209.5 | -19918.8 | 2.6487 | -164508.0 | 8.9232 |
| 1900 | 12.8573 | 21166.8 | 78.4418 | 127872.6 | 6491.2 | -20287.5 | 2.5202 | -164717.9 | 7.8713 |
| 2000 | 12.9335 | 22456.4 | 79.1032 | 135750.1 | 7780.8 | -20655.5 | 2.4025 | -164919.7 | 6.9234 |
| 2100 | 13.0026 | 23753.2 | 79.7359 | 143692.3 | 9077.6 | -21023.3 | 2.2942 | -165114.4 | 6.0648 |
| 2200 | 13.0653 | 25056.7 | 80.3423 | 151696.4 | 10381.1 | -21391.1 | 2.1936 | -165302.6 | 5.2833 |
| 2300 | 13.1224 | 26366.1 | 80.9244 | 159759.9 | 11690.5 | -21759.6 | 2.1007 | -165485.0 | 4.5690 |
| 2400 | 13.1744 | 27681.0 | 81.4839 | 167880.5 | 13005.4 | -22129.0 | 2.0136 | -165662.3 | 3.9135 |
| 2500 | 13.2218 | 29000.8 | 82.0227 | 176056.0 | 14325.2 | -22499.4 | 1.9325 | -165835.1 | 3.3098 |
| 2600 | 13.2651 | 30325.2 | 82.5422 | 184284.4 | 15649.6 | | | -166004.0 | 2.7519 |
| 2700 | 13.3046 | 31653.7 | 83.0435 | 192563.8 | 16978.1 | | | -166169.7 | 2.2349 |
| 2800 | 13.3409 | 32986.0 | 83.5281 | 200892.6 | 18310.4 | | | -166332.7 | 1.7543 |
| 2900 | 13.3742 | 34321.8 | 83.9968 | 209268.9 | 19646.2 | | | -166493.7 | 1.3064 |
| 3000 | 13.4048 | 35660.8 | 84.4507 | 217691.4 | 20985.2 | | | -166653.2 | 0.8880 |
| 3100 | 13.4330 | 37002.7 | 84.8907 | 226158.6 | 22327.1 | | | -166811.9 | 0.4962 |
| 3200 | 13.4590 | 38347.3 | 85.3176 | 234669.1 | 23671.7 | | | -166970.4 | 0.1285 |
| 3300 | 13.4830 | 39694.4 | 85.7322 | 243221.7 | 25018.8 | | | -167129.5 | -0.2172 |
| 3400 | 13.5053 | 41043.8 | 86.1350 | 251815.2 | 26368.2 | | | -167289.6 | -0.5429 |
| 3500 | 13.5259 | 42395.4 | 86.5268 | 260448.4 | 27719.8 | | | -167451.6 | -0.8502 |
| 3600 | 13.5450 | 43749.0 | 86.9081 | 269120.2 | 29073.4 | | | -167616.1 | -1.1408 |
| 3700 | 13.5628 | 45104.4 | 87.2795 | 277829.6 | 30428.7 | | | -167783.7 | -1.4159 |
| 3800 | 13.5793 | 46461.5 | 87.6414 | 286575.8 | 31785.9 | | | -167955.3 | -1.6769 |
| 3900 | 13.5948 | 47820.2 | 87.9943 | 295357.6 | 33144.6 | | | -168131.4 | -1.9247 |
| 4000 | 13.6092 | 49180.4 | 88.3387 | 304174.3 | 34504.8 | | | -168312.8 | -2.1603 |
| 4100 | 13.6227 | 50542.0 | 88.6749 | 313025.1 | 35866.4 | | | -168500.1 | -2.3847 |
| 4200 | 13.6353 | 51904.9 | 89.0033 | 321909.1 | 37229.3 | | | -168694.0 | -2.5987 |
| 4300 | 13.6471 | 53269.0 | 89.3243 | 330825.5 | 38593.4 | | | -168895.3 | -2.8030 |
| 4400 | 13.6582 | 54634.3 | 89.6382 | 339773.7 | 39958.7 | | | -169104.4 | -2.9982 |
| 4500 | 13.6686 | 56000.6 | 89.9452 | 348752.9 | 41325.0 | | | -169322.0 | -3.1849 |
| 4600 | 13.6784 | 57368.0 | 90.2458 | 357762.5 | 42692.4 | | | -169548.8 | -3.3638 |
| 4700 | 13.6877 | 58736.3 | 90.5400 | 366801.8 | 44060.7 | | | -169785.4 | -3.5353 |
| 4800 | 13.6964 | 60105.5 | 90.8283 | 375870.3 | 45429.9 | | | -170032.3 | -3.6999 |
| 4900 | 13.7046 | 61475.6 | 91.1108 | 384967.3 | 46799.9 | | | -170290.0 | -3.8580 |
| 5000 | 13.7123 | 62846.4 | 91.3877 | 394092.3 | 48170.8 | | | -170559.1 | -4.0100 |
| 5100 | 13.7197 | 64218.0 | 91.6594 | 403244.7 | 49542.4 | | | -170840.0 | -4.1563 |
| 5200 | 13.7266 | 65590.3 | 91.9258 | 412424.0 | 50914.7 | | | -171133.2 | -4.2972 |
| 5300 | 13.7332 | 66963.3 | 92.1874 | 421629.7 | 52287.7 | | | -171439.0 | -4.4330 |
| 5400 | 13.7394 | 68337.0 | 92.4441 | 430861.3 | 53661.3 | | | -171758.1 | -4.5641 |
| 5500 | 13.7454 | 69711.2 | 92.6963 | 440118.4 | 55035.6 | | | -172090.3 | -4.6906 |
| 5600 | 13.7510 | 71086.0 | 92.9440 | 449400.4 | 56410.4 | | | -172436.5 | -4.8128 |
| 5700 | 13.7563 | 72461.4 | 93.1874 | 458707.0 | 57785.8 | | | -172797.0 | -4.9310 |
| 5800 | 13.7614 | 73837.3 | 93.4267 | 468037.8 | 59161.7 | | | -173172.1 | -5.0453 |
| 5900 | 13.7662 | 75213.7 | 93.6620 | 477392.2 | 60538.0 | | | -173562.0 | -5.1560 |
| 6000 | 13.7709 | 76590.5 | 93.8934 | 486770.0 | 61914.9 | | | -173966.9 | -5.2633 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Mg, 923° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(136) MgS (gas); molecular weight, 56.386

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 32068.5 | 34312.5 | ----- | -66900.0 | ----- |
| 100 | 7.0226 | 696.3 | 45.6800 | 3871.7 | 32764.7 | 34691.1 | -66.9911 | -67199.7 | 142.8097 |
| 200 | 7.6668 | 1428.3 | 50.7276 | 8717.2 | 33496.8 | 34552.6 | -29.1204 | -67501.8 | 69.2519 |
| 298.15 | 8.1926 | 2208.9 | 53.8962 | 13860.2 | 34277.4 | 34277.4 | -16.7322 | -67763.4 | 44.9285 |
| 300 | 8.2090 | 2224.1 | 53.9469 | 13960.0 | 34292.5 | 34271.5 | -16.5774 | -67767.9 | 44.6222 |
| a 400 | 8.4565 | 3060.3 | 56.3506 | 19479.9 | 35128.8 | 33399.4 | -10.3747 | -67989.5 | 32.2618 |
| 500 | 8.6669 | 3919.2 | 58.2665 | 25214.0 | 35987.7 | 32684.0 | -6.7600 | -68176.8 | 24.8228 |
| 600 | 8.7733 | 4791.6 | 59.8567 | 31122.4 | 36860.1 | 32037.6 | -4.4014 | -68339.8 | 19.8507 |
| 700 | 8.8453 | 5672.7 | 61.2149 | 37177.7 | 37741.2 | 31426.5 | -2.7495 | -68485.6 | 16.2911 |
| 800 | 8.8975 | 6560.0 | 62.3996 | 43359.6 | 38628.5 | 30818.1 | -1.5343 | -68618.9 | 13.6159 |
| 900 | 8.9377 | 7451.9 | 63.4500 | 49653.1 | 39520.3 | 30179.9 | -0.6082 | -68742.8 | 11.5313 |
| a 1000 | 8.9702 | 8347.3 | 64.3934 | 56046.1 | 40415.8 | 27369.7 | 0.0778 | -68859.4 | 9.8607 |
| 1100 | 8.9974 | 9245.7 | 65.2496 | 62528.9 | 41314.2 | 26698.8 | 0.6152 | -68970.1 | 8.4916 |
| 1200 | 9.0211 | 10146.7 | 66.0336 | 69093.6 | 42215.1 | 26030.3 | 1.0519 | -69076.2 | 7.3489 |
| 1300 | 9.0422 | 11049.9 | 66.7565 | 75733.6 | 43118.3 | 25364.1 | 1.4119 | -69178.4 | 6.3805 |
| 1400 | 9.0615 | 11955.1 | 67.4273 | 82443.2 | 44023.5 | 24699.9 | 1.7125 | -69277.4 | 5.5493 |
| 1500 | 9.0793 | 12862.1 | 68.0531 | 89217.5 | 44930.6 | 24037.5 | 1.9662 | -69373.8 | 4.8278 |
| 1600 | 9.0961 | 13770.9 | 68.6396 | 96052.5 | 45839.3 | 23376.9 | 2.1822 | -69468.1 | 4.1957 |
| 1700 | 9.1120 | 14681.3 | 69.1915 | 102944.3 | 46749.8 | 22717.9 | 2.3674 | -69560.7 | 3.6372 |
| 1800 | 9.1273 | 15593.3 | 69.7128 | 109889.7 | 47661.7 | 22060.5 | 2.5274 | -69652.1 | 3.1401 |
| 1900 | 9.1421 | 16506.7 | 70.2067 | 116885.9 | 48575.2 | 21404.6 | 2.6662 | -69742.6 | 2.6947 |
| 2000 | 9.1564 | 17421.7 | 70.6760 | 123930.3 | 49490.1 | 20750.1 | 2.7875 | -69832.6 | 2.2934 |
| 2100 | 9.1704 | 18338.0 | 71.1230 | 131020.4 | 50406.5 | 20097.0 | 2.8939 | -69922.2 | 1.9298 |
| 2200 | 9.1841 | 19255.7 | 71.5500 | 138154.2 | 51324.2 | 19445.4 | 2.9873 | -70011.9 | 1.5988 |
| 2300 | 9.1976 | 20174.8 | 71.9585 | 145329.8 | 52243.3 | 18795.1 | 3.0700 | -70101.9 | 1.2962 |
| 2400 | 9.2109 | 21095.2 | 72.3502 | 152545.3 | 53163.7 | 18146.1 | 3.1430 | -70192.4 | 1.0185 |
| 2500 | 9.2240 | 22017.0 | 72.7265 | 159799.3 | 54085.5 | 17498.4 | 3.2081 | -70283.5 | 0.7627 |
| 2600 | 9.2370 | 22940.0 | 73.0885 | 167090.2 | 55008.5 | 16849.5 | 3.2731 | -70375.6 | 0.5262 |
| 2700 | 9.2498 | 23864.4 | 73.4374 | 174416.6 | 55932.8 | 16200.6 | 3.3371 | -70468.9 | 0.3070 |
| 2800 | 9.2626 | 24790.0 | 73.7740 | 181777.2 | 56858.5 | 15551.7 | 3.4001 | -70563.6 | 0.1032 |
| 2900 | 9.2752 | 25716.9 | 74.0993 | 189171.0 | 57785.4 | 14902.8 | 3.4621 | -70659.9 | -0.0869 |
| 3000 | 9.2878 | 26645.0 | 74.4139 | 196596.7 | 58713.5 | 14253.9 | 3.5231 | -70758.2 | -0.2645 |
| 3100 | 9.3003 | 27574.4 | 74.7187 | 204053.4 | 59642.9 | 13605.0 | 3.5831 | -70858.6 | -0.4309 |
| 3200 | 9.3127 | 28505.1 | 75.0141 | 211540.2 | 60573.6 | 12956.1 | 3.6421 | -70961.5 | -0.5871 |
| 3300 | 9.3251 | 29437.0 | 75.3009 | 219056.0 | 61505.5 | 12307.2 | 3.7001 | -71067.3 | -0.7341 |
| 3400 | 9.3375 | 30370.1 | 75.5795 | 226600.1 | 62438.6 | 11658.3 | 3.7571 | -71176.3 | -0.8726 |
| 3500 | 9.3498 | 31304.5 | 75.8503 | 234171.6 | 63372.9 | 11009.4 | 3.8141 | -71288.9 | -1.0034 |
| 3600 | 9.3620 | 32240.1 | 76.1135 | 241769.9 | 64308.5 | 10360.5 | 3.8701 | -71405.5 | -1.1271 |
| 3700 | 9.3743 | 33176.9 | 76.3706 | 249394.2 | 65245.4 | 9711.6 | 3.9251 | -71526.5 | -1.2444 |
| 3800 | 9.3865 | 34114.9 | 76.6207 | 257043.8 | 66183.4 | 9062.7 | 3.9791 | -71652.3 | -1.3557 |
| 3900 | 9.3987 | 35054.2 | 76.8647 | 264718.1 | 67122.6 | 8413.8 | 4.0321 | -71783.5 | -1.4614 |
| 4000 | 9.4108 | 35994.7 | 77.1028 | 272416.5 | 68063.1 | 7764.9 | 4.0851 | -71920.4 | -1.5621 |
| 4100 | 9.4229 | 36936.3 | 77.3353 | 280138.5 | 69004.8 | 7116.0 | 4.1371 | -72063.5 | -1.6580 |
| 4200 | 9.4351 | 37879.2 | 77.5625 | 287883.4 | 69947.7 | 6467.1 | 4.1891 | -72213.4 | -1.7496 |
| 4300 | 9.4471 | 38823.4 | 77.7847 | 295650.8 | 70891.8 | 5818.2 | 4.2411 | -72370.5 | -1.8370 |
| 4400 | 9.4592 | 39768.7 | 78.0020 | 303440.2 | 71837.1 | 5169.3 | 4.2931 | -72535.3 | -1.9207 |
| 4500 | 9.4713 | 40715.2 | 78.2147 | 311251.1 | 72783.7 | 4520.4 | 4.3451 | -72708.0 | -2.0009 |
| 4600 | 9.4833 | 41662.9 | 78.4230 | 319083.0 | 73731.4 | 3871.5 | 4.3971 | -72889.5 | -2.0777 |
| 4700 | 9.4954 | 42611.9 | 78.6271 | 326935.5 | 74680.3 | 3222.6 | 4.4491 | -73079.9 | -2.1515 |
| 4800 | 9.5074 | 43562.0 | 78.8271 | 334808.3 | 75630.5 | 2573.7 | 4.5011 | -73279.8 | -2.2224 |
| 4900 | 9.5194 | 44513.3 | 79.0233 | 342700.8 | 76581.8 | 1924.8 | 4.5531 | -73489.7 | -2.2906 |
| 5000 | 9.5314 | 45465.9 | 79.2157 | 350612.8 | 77534.3 | 1275.9 | 4.6051 | -73709.8 | -2.3562 |
| 5100 | 9.5434 | 46419.6 | 79.4046 | 358543.9 | 78488.1 | 626.0 | 4.6571 | -73940.6 | -2.4195 |
| 5200 | 9.5554 | 47374.6 | 79.5900 | 366493.6 | 79443.0 | 0.0 | 4.7091 | -74182.5 | -2.4805 |
| 5300 | 9.5674 | 48330.7 | 79.7722 | 374461.8 | 80399.2 | 0.0 | 4.7611 | -74435.6 | -2.5394 |
| 5400 | 9.5793 | 49288.0 | 79.9511 | 382448.0 | 81356.5 | 0.0 | 4.8131 | -74700.6 | -2.5964 |
| 5500 | 9.5913 | 50246.6 | 80.1270 | 390451.9 | 82315.0 | 0.0 | 4.8651 | -74977.4 | -2.6514 |
| 5600 | 9.6033 | 51206.3 | 80.2999 | 398473.3 | 83274.8 | 0.0 | 4.9171 | -75266.6 | -2.7047 |
| 5700 | 9.6152 | 52167.2 | 80.4700 | 406511.8 | 84235.7 | 0.0 | 4.9691 | -75568.5 | -2.7564 |
| 5800 | 9.6272 | 53129.3 | 80.6373 | 414567.2 | 85197.8 | 0.0 | 5.0211 | -75883.4 | -2.8064 |
| 5900 | 9.6391 | 54092.7 | 80.8020 | 422639.2 | 86161.1 | 0.0 | 5.0731 | -76211.5 | -2.8550 |
| 6000 | 9.6510 | 55057.2 | 80.9641 | 430727.5 | 87125.6 | 0.0 | 5.1251 | -76553.0 | -2.9022 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K and of Mg, 923° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(137) N (gas); molecular weight, 14.008

| T , °K | C_p^0 , cal/mole °K | $H_f^0 - H_0^0$, cal/mole | S_f^0 , cal/mole °K | $-(F_f^0 - H_0^0)$, cal/mole | H_f^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| 0 | | 0 | | 0 | 111543.3 | 112579.5 | | 0 | |
| 100 | 4.9681 | 496.8 | 31.1872 | 2621.9 | 112040.2 | 112729.5 | -243.7135 | 0 | |
| 200 | 4.9681 | 993.6 | 34.6308 | 5932.5 | 112537.0 | 112878.5 | -120.4715 | 0 | |
| 298.15 | 4.9681 | 1481.3 | 36.6145 | 9435.4 | 113024.6 | 113024.6 | -79.8450 | 0 | |
| 300 | 4.9681 | 1490.4 | 36.6452 | 9503.1 | 113033.8 | 113027.4 | -79.3341 | 0 | |
| 400 | 4.9681 | 1987.3 | 38.0745 | 13242.5 | 113530.6 | 113175.5 | -58.7378 | 0 | |
| 500 | 4.9681 | 2484.1 | 39.1831 | 17107.5 | 114027.4 | 113321.0 | -46.3637 | 0 | |
| 600 | 4.9681 | 2980.9 | 40.0889 | 21072.4 | 114524.2 | 113461.3 | -38.1038 | 0 | |
| 700 | 4.9681 | 3477.7 | 40.8547 | 25120.6 | 115021.1 | 113594.5 | -32.1968 | 0 | |
| 800 | 4.9681 | 3974.5 | 41.5181 | 29240.0 | 115517.9 | 113719.7 | -27.7614 | 0 | |
| 900 | 4.9681 | 4471.3 | 42.1033 | 33421.6 | 116014.7 | 113836.9 | -24.3080 | 0 | |
| 1000 | 4.9681 | 4968.1 | 42.6268 | 37658.6 | 116511.5 | 113946.6 | -21.5425 | 0 | |
| 1100 | 4.9681 | 5465.0 | 43.1003 | 41945.3 | 117008.3 | 114049.3 | -19.2777 | 0 | |
| 1200 | 4.9682 | 5961.8 | 43.5326 | 46277.3 | 117505.1 | 114146.0 | -17.3887 | 0 | |
| 1300 | 4.9682 | 6458.6 | 43.9302 | 50650.7 | 118001.9 | 114237.2 | -15.7890 | 0 | |
| 1400 | 4.9682 | 6955.4 | 44.2984 | 55062.3 | 118498.8 | 114323.7 | -14.4167 | 0 | |
| 1500 | 4.9682 | 7452.2 | 44.6412 | 59509.5 | 118995.6 | 114406.1 | -13.2266 | 0 | |
| 1600 | 4.9682 | 7949.0 | 44.9618 | 63989.8 | 119492.4 | 114484.8 | -12.1845 | 0 | |
| 1700 | 4.9683 | 8445.9 | 45.2630 | 68501.2 | 119989.2 | 114560.4 | -11.2644 | 0 | |
| 1800 | 4.9684 | 8942.7 | 45.5470 | 73041.9 | 120486.0 | 114633.2 | -10.4459 | 0 | |
| 1900 | 4.9687 | 9439.6 | 45.8156 | 77610.1 | 120982.9 | 114703.5 | -9.7132 | 0 | |
| 2000 | 4.9691 | 9936.4 | 46.0705 | 82204.5 | 121479.8 | 114771.7 | -9.0533 | 0 | |
| 2100 | 4.9698 | 10433.4 | 46.3129 | 86823.8 | 121976.7 | 114837.9 | -8.4560 | 0 | |
| 2200 | 4.9709 | 10930.4 | 46.5442 | 91466.8 | 122473.8 | 114902.5 | -7.9126 | 0 | |
| 2300 | 4.9725 | 11427.6 | 46.7652 | 96132.3 | 122970.9 | 114965.7 | -7.4162 | 0 | |
| 2400 | 4.9747 | 11924.9 | 46.9768 | 100819.5 | 123468.3 | 115027.6 | -6.9609 | 0 | |
| 2500 | 4.9777 | 12422.5 | 47.1800 | 105527.4 | 123965.9 | 115088.5 | -6.5419 | 0 | |
| 2600 | 4.9817 | 12920.5 | 47.3753 | 110255.2 | 124463.8 | 115148.5 | -6.1548 | 0 | |
| 2700 | 4.9868 | 13418.9 | 47.5634 | 115002.2 | 124962.3 | 115207.9 | -5.7963 | 0 | |
| 2800 | 4.9932 | 13917.9 | 47.7448 | 119767.7 | 125461.2 | 115266.9 | -5.4631 | 0 | |
| 2900 | 5.0010 | 14417.6 | 47.9202 | 124551.0 | 125960.9 | 115325.8 | -5.1528 | 0 | |
| 3000 | 5.0105 | 14918.2 | 48.0899 | 129351.5 | 126461.5 | 115384.6 | -4.8631 | 0 | |
| 3100 | 5.0216 | 15419.7 | 48.2544 | 134168.8 | 126963.1 | 115443.6 | -4.5919 | 0 | |
| 3200 | 5.0346 | 15922.5 | 48.4140 | 139002.2 | 127465.9 | 115503.2 | -4.3375 | 0 | |
| 3300 | 5.0495 | 16426.7 | 48.5691 | 143851.4 | 127970.1 | 115563.4 | -4.0984 | 0 | |
| 3400 | 5.0665 | 16932.5 | 48.7201 | 148715.9 | 128475.9 | 115624.6 | -3.8732 | 0 | |
| 3500 | 5.0855 | 17440.1 | 48.8673 | 153595.3 | 128983.4 | 115687.0 | -3.6608 | 0 | |
| 3600 | 5.1066 | 17949.7 | 49.0108 | 158489.2 | 129493.0 | 115750.9 | -3.4601 | 0 | |
| 3700 | 5.1299 | 18461.5 | 49.1510 | 163397.4 | 130004.8 | 115816.4 | -3.2702 | 0 | |
| 3800 | 5.1554 | 18975.7 | 49.2882 | 168319.3 | 130519.1 | 115883.8 | -3.0901 | 0 | |
| 3900 | 5.1829 | 19492.6 | 49.4224 | 173254.9 | 131036.0 | 115953.5 | -2.9192 | 0 | |
| 4000 | 5.2126 | 20012.4 | 49.5540 | 178203.7 | 131555.7 | 116025.5 | -2.7567 | 0 | |
| 4100 | 5.2443 | 20535.2 | 49.6831 | 183165.6 | 132078.6 | 116100.1 | -2.6020 | 0 | |
| 4200 | 5.2780 | 21061.3 | 49.8099 | 188140.3 | 132604.7 | 116177.6 | -2.4546 | 0 | |
| 4300 | 5.3136 | 21590.9 | 49.9345 | 193127.5 | 133134.2 | 116258.1 | -2.3140 | 0 | |
| 4400 | 5.3510 | 22124.1 | 50.0571 | 198127.1 | 133667.5 | 116341.9 | -2.1796 | 0 | |
| 4500 | 5.3901 | 22661.1 | 50.1778 | 203138.9 | 134204.5 | 116429.2 | -2.0512 | 0 | |
| 4600 | 5.4308 | 23202.2 | 50.2967 | 208162.6 | 134745.5 | 116520.1 | -1.9282 | 0 | |
| 4700 | 5.4731 | 23747.4 | 50.4139 | 213198.2 | 135290.7 | 116614.7 | -1.8104 | 0 | |
| 4800 | 5.5167 | 24296.8 | 50.5296 | 218245.4 | 135840.2 | 116713.4 | -1.6974 | 0 | |
| 4900 | 5.5615 | 24850.7 | 50.6438 | 223304.1 | 136394.1 | 116816.1 | -1.5889 | 0 | |
| 5000 | 5.6075 | 25409.2 | 50.7567 | 228374.1 | 136952.5 | 116923.0 | -1.4846 | 0 | |
| 5100 | 5.6545 | 25972.3 | 50.8682 | 233455.3 | 137515.6 | 117034.2 | -1.3844 | 0 | |
| 5200 | 5.7023 | 26540.1 | 50.9784 | 238547.7 | 138083.5 | 117149.8 | -1.2879 | 0 | |
| 5300 | 5.7508 | 27112.8 | 51.0875 | 243651.0 | 138656.1 | 117270.0 | -1.1950 | 0 | |
| 5400 | 5.8000 | 27690.3 | 51.1955 | 248765.1 | 139233.6 | 117394.7 | -1.1054 | 0 | |
| 5500 | 5.8495 | 28272.8 | 51.3023 | 253890.0 | 139816.1 | 117524.0 | -1.0189 | 0 | |
| 5600 | 5.8995 | 28860.2 | 51.4082 | 259025.6 | 140403.6 | 117657.9 | -0.9355 | 0 | |
| 5700 | 5.9496 | 29452.7 | 51.5130 | 264171.6 | 140996.0 | 117796.6 | -0.8549 | 0 | |
| 5800 | 5.9997 | 30050.1 | 51.6169 | 269328.1 | 141593.5 | 117939.9 | -0.7770 | 0 | |
| 5900 | 6.0499 | 30652.6 | 51.7199 | 274495.0 | 142196.0 | 118087.9 | -0.7016 | 0 | |
| 6000 | 6.0998 | 31260.1 | 51.8220 | 279672.1 | 142803.5 | 118240.6 | -0.6287 | 0 | |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(138) N₂ (gas); molecular weight, 28.016

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -2072.3 | 0 | ----- | -225159.0 | ----- |
| 100 | 6.9562 | 693.7 | 38.1709 | 3123.4 | -1378.6 | 0 | 0 | -225458.9 | 487.4271 |
| 200 | 6.9571 | 1389.3 | 42.9929 | 7209.2 | -683.0 | 0 | 0 | -225756.9 | 240.9431 |
| 298.15 | 6.9611 | 2072.3 | 45.7711 | 11574.4 | 0 | 0 | 0 | -226049.2 | 159.6899 |
| 300 | 6.9613 | 2085.2 | 45.8142 | 11659.1 | 12.9 | 0 | 0 | -226054.7 | 158.6682 |
| 400 | 6.9910 | 2782.5 | 47.8199 | 16355.5 | 710.1 | 0 | 0 | -226351.1 | 117.4755 |
| 500 | 7.0703 | 3485.1 | 49.5874 | 21208.7 | 1412.8 | 0 | 0 | -226642.1 | 92.7274 |
| 600 | 7.1968 | 4198.1 | 50.6871 | 26214.2 | 2125.8 | 0 | 0 | -226922.7 | 76.2077 |
| 700 | 7.3509 | 4925.3 | 51.8079 | 31340.2 | 2853.0 | 0 | 0 | -227189.1 | 64.3935 |
| 800 | 7.5131 | 5668.5 | 52.8000 | 36571.5 | 3596.2 | 0 | 0 | -227439.5 | 55.5228 |
| 900 | 7.6700 | 6427.8 | 53.6941 | 41896.9 | 4355.5 | 0 | 0 | -227673.9 | 48.6159 |
| 1000 | 7.8148 | 7202.1 | 54.5098 | 47307.7 | 5129.8 | 0 | 0 | -227893.2 | 43.0849 |
| 1100 | 7.9449 | 7990.2 | 55.2609 | 52796.7 | 5917.9 | 0 | 0 | -228098.7 | 38.5553 |
| 1200 | 8.0600 | 8790.6 | 55.9572 | 58358.0 | 6718.3 | 0 | 0 | -228291.9 | 34.7773 |
| 1300 | 8.1610 | 9601.8 | 56.6064 | 63986.6 | 7529.5 | 0 | 0 | -228474.4 | 31.5780 |
| 1400 | 8.2494 | 10422.4 | 57.2145 | 69678.0 | 8350.1 | 0 | 0 | -228647.4 | 28.8335 |
| 1500 | 8.3267 | 11251.3 | 57.7864 | 75428.5 | 9179.0 | 0 | 0 | -228812.2 | 26.4532 |
| 1600 | 8.3945 | 12087.4 | 58.3260 | 81234.2 | 10015.1 | 0 | 0 | -228969.7 | 24.3690 |
| 1700 | 8.4541 | 12929.9 | 58.8367 | 87092.5 | 10857.6 | 0 | 0 | -229120.8 | 22.5287 |
| 1800 | 8.5067 | 13778.0 | 59.3215 | 93000.6 | 11705.7 | 0 | 0 | -229266.4 | 20.8919 |
| 1900 | 8.5533 | 14631.1 | 59.7827 | 98956.0 | 12558.8 | 0 | 0 | -229407.0 | 19.4264 |
| 2000 | 8.5948 | 15488.5 | 60.2225 | 104956.4 | 13416.2 | 0 | 0 | -229543.4 | 18.1067 |
| 2100 | 8.6318 | 16349.9 | 60.6427 | 110999.9 | 14277.6 | 0 | 0 | -229675.9 | 16.9120 |
| 2200 | 8.6650 | 17214.7 | 61.0451 | 117084.4 | 15142.4 | 0 | 0 | -229805.1 | 15.8252 |
| 2300 | 8.6950 | 18082.8 | 61.4307 | 123208.3 | 16010.5 | 0 | 0 | -229931.4 | 14.8324 |
| 2400 | 8.7222 | 18953.6 | 61.8016 | 129370.1 | 16881.3 | 0 | 0 | -230055.2 | 13.9219 |
| 2500 | 8.7468 | 19827.1 | 62.1581 | 135568.2 | 17754.8 | 0 | 0 | -230176.9 | 13.0837 |
| 2600 | 8.7694 | 20702.9 | 62.5016 | 141801.3 | 18630.6 | 0 | 0 | -230297.0 | 12.3096 |
| 2700 | 8.7900 | 21580.9 | 62.8330 | 148068.1 | 19508.6 | 0 | 0 | -230415.9 | 11.5925 |
| 2800 | 8.8090 | 22460.9 | 63.1530 | 154367.5 | 20388.6 | 0 | 0 | -230533.9 | 10.9263 |
| 2900 | 8.8266 | 23342.7 | 63.4624 | 160698.3 | 21270.4 | 0 | 0 | -230651.5 | 10.3057 |
| 3000 | 8.8428 | 24226.2 | 63.7619 | 167059.6 | 22153.9 | 0 | 0 | -230769.1 | 9.7261 |
| 3100 | 8.8580 | 25111.2 | 64.0521 | 173450.4 | 23038.9 | 0 | 0 | -230887.3 | 9.1837 |
| 3200 | 8.8721 | 25997.7 | 64.3336 | 179869.8 | 23925.4 | 0 | 0 | -231006.4 | 8.6749 |
| 3300 | 8.8853 | 26885.6 | 64.6068 | 186316.9 | 24813.3 | 0 | 0 | -231126.9 | 8.1967 |
| 3400 | 8.8977 | 27774.8 | 64.8722 | 192790.9 | 25702.5 | 0 | 0 | -231249.3 | 7.7465 |
| 3500 | 8.9094 | 28665.1 | 65.1303 | 199291.1 | 26592.8 | 0 | 0 | -231374.1 | 7.3217 |
| 3600 | 8.9205 | 29556.6 | 65.3815 | 205816.7 | 27484.3 | 0 | 0 | -231501.7 | 6.9202 |
| 3700 | 8.9309 | 30449.2 | 65.6260 | 212367.1 | 28376.9 | 0 | 0 | -231632.8 | 6.5403 |
| 3800 | 8.9409 | 31342.8 | 65.8643 | 218941.7 | 29270.5 | 0 | 0 | -231767.7 | 6.1802 |
| 3900 | 8.9503 | 32237.4 | 66.0967 | 225539.8 | 30165.1 | 0 | 0 | -231906.9 | 5.8383 |
| 4000 | 8.9594 | 33132.9 | 66.3234 | 232160.9 | 31060.6 | 0 | 0 | -232050.9 | 5.5133 |
| 4100 | 8.9680 | 34029.2 | 66.5448 | 238804.3 | 31956.9 | 0 | 0 | -232200.2 | 5.2040 |
| 4200 | 8.9763 | 34926.5 | 66.7610 | 245469.6 | 32854.1 | 0 | 0 | -232355.2 | 4.9092 |
| 4300 | 8.9843 | 35824.5 | 66.9723 | 252156.3 | 33752.2 | 0 | 0 | -232516.3 | 4.6280 |
| 4400 | 8.9920 | 36723.3 | 67.1789 | 258863.9 | 34651.0 | 0 | 0 | -232683.9 | 4.3593 |
| 4500 | 8.9995 | 37622.9 | 67.3811 | 265592.0 | 35550.6 | 0 | 0 | -232858.4 | 4.1024 |
| 4600 | 9.0067 | 38523.2 | 67.5790 | 272340.0 | 36450.9 | 0 | 0 | -233040.2 | 3.8564 |
| 4700 | 9.0138 | 39424.2 | 67.7727 | 279107.6 | 37351.9 | 0 | 0 | -233229.5 | 3.6208 |
| 4800 | 9.0207 | 40326.0 | 67.9626 | 285894.4 | 38253.7 | 0 | 0 | -233426.7 | 3.3948 |
| 4900 | 9.0274 | 41228.4 | 68.1486 | 292700.0 | 39156.1 | 0 | 0 | -233632.1 | 3.1778 |
| 5000 | 9.0341 | 42131.4 | 68.3311 | 299524.0 | 40059.1 | 0 | 0 | -233845.9 | 2.9693 |
| 5100 | 9.0406 | 43035.2 | 68.5101 | 306366.1 | 40962.9 | 0 | 0 | -234068.4 | 2.7688 |
| 5200 | 9.0471 | 43939.6 | 68.6857 | 313225.9 | 41867.2 | 0 | 0 | -234299.7 | 2.5758 |
| 5300 | 9.0535 | 44844.6 | 68.8581 | 320103.2 | 42772.3 | 0 | 0 | -234539.9 | 2.3899 |
| 5400 | 9.0600 | 45750.3 | 69.0274 | 326997.4 | 43678.0 | 0 | 0 | -234789.3 | 2.2107 |
| 5500 | 9.0664 | 46656.6 | 69.1937 | 333908.5 | 44584.3 | 0 | 0 | -235048.0 | 2.0379 |
| 5600 | 9.0729 | 47563.5 | 69.3571 | 340836.1 | 45491.2 | 0 | 0 | -235315.9 | 1.8710 |
| 5700 | 9.0795 | 48471.2 | 69.5177 | 347779.8 | 46398.9 | 0 | 0 | -235593.2 | 1.7098 |
| 5800 | 9.0862 | 49379.4 | 69.6757 | 354739.5 | 47307.1 | 0 | 0 | -235879.8 | 1.5540 |
| 5900 | 9.0930 | 50288.4 | 69.8311 | 361714.9 | 48216.1 | 0 | 0 | -236175.8 | 1.4032 |
| 6000 | 9.1000 | 51198.0 | 69.9840 | 368705.7 | 49125.7 | 0 | 0 | -236481.2 | 1.2573 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(139) NF (gas); molecular weight, 33.008

| T, °K | C _p , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 63843.5 | 65934.5 | ----- | -65000.0 | ----- |
| 100 | 6.9585 | 694.6 | 43.3923 | 3644.6 | 64538.2 | 65934.9 | -143.2285 | -65300.7 | 136.3565 |
| 200 | 7.0527 | 1393.2 | 48.2311 | 8253.0 | 65236.7 | 65935.6 | -71.1815 | -65624.8 | 66.8682 |
| 298.15 | 7.3828 | 2100.3 | 51.1055 | 13136.1 | 65945.9 | 65943.9 | -47.4628 | -65938.9 | 45.2122 |
| 300 | 7.4901 | 2114.0 | 51.1496 | 13230.7 | 65957.5 | 65944.1 | -47.1647 | -65944.5 | 42.9142 |
| 400 | 7.7708 | 2872.4 | 53.3285 | 18458.9 | 66716.0 | 65968.9 | -35.1535 | -66223.0 | 30.8810 |
| 500 | 8.0780 | 3665.6 | 55.0969 | 23882.9 | 67509.1 | 66008.0 | -27.9432 | -66458.8 | 23.6325 |
| 600 | 8.3055 | 4485.3 | 56.5909 | 29469.2 | 68328.9 | 66055.6 | -23.1531 | -66660.7 | 18.7842 |
| 700 | 8.4727 | 5324.7 | 57.8844 | 35194.4 | 69168.2 | 66106.1 | -19.6948 | -66837.5 | 15.3112 |
| 800 | 8.5977 | 6178.5 | 59.0243 | 41041.0 | 70022.0 | 66156.3 | -17.1141 | -66995.5 | 12.6798 |
| 900 | 8.6735 | 7043.2 | 60.0427 | 46995.2 | 70886.8 | 66204.0 | -15.1054 | -67139.4 | 10.6642 |
| 1000 | 8.7691 | 7916.5 | 60.9627 | 53046.2 | 71760.0 | 66248.6 | -13.4973 | -67272.2 | 9.0323 |
| 1100 | 8.8303 | 8796.6 | 61.8015 | 59185.1 | 72640.1 | 66289.6 | -12.1807 | -67396.4 | 7.6946 |
| 1200 | 8.8810 | 9682.2 | 62.5721 | 65404.3 | 73525.8 | 66327.3 | -11.0829 | -67513.4 | 6.5779 |
| 1300 | 8.9240 | 10572.5 | 63.2874 | 71697.5 | 74416.1 | 66361.8 | -10.1535 | -67624.5 | 5.6513 |
| 1400 | 8.9613 | 11466.8 | 63.9474 | 78059.5 | 75310.4 | 66393.5 | -9.3564 | -67730.7 | 4.8187 |
| 1500 | 8.9942 | 12364.6 | 64.5668 | 84485.6 | 76208.2 | 66422.6 | -8.6654 | -67832.6 | 4.1153 |
| 1600 | 9.0236 | 13265.6 | 65.1482 | 90971.6 | 77109.1 | 66449.4 | -8.0604 | -67930.6 | 3.4752 |
| 1700 | 9.0504 | 14169.3 | 65.6961 | 97514.1 | 78012.8 | 66474.2 | -7.5264 | -68025.3 | 2.9470 |
| 1800 | 9.0750 | 15075.6 | 66.2141 | 104109.8 | 78919.1 | 66497.3 | -7.0516 | -68116.9 | 2.4629 |
| 1900 | 9.0978 | 15984.2 | 66.7054 | 110756.0 | 79827.7 | 66518.9 | -6.6266 | -68205.8 | 2.0273 |
| 2000 | 9.1193 | 16895.1 | 67.1726 | 117450.1 | 80738.6 | 66539.1 | -6.2440 | -68292.1 | 1.6348 |
| 2100 | 9.1396 | 17808.0 | 67.6180 | 124189.8 | 81651.6 | 66558.2 | -5.8977 | -68376.1 | 1.2793 |
| 2200 | 9.1590 | 18723.0 | 68.0437 | 130973.1 | 82566.5 | 66576.3 | -5.5828 | -68457.9 | 0.9556 |
| 2300 | 9.1776 | 19639.8 | 68.4512 | 137798.0 | 83483.3 | 66593.4 | -5.2953 | -68537.7 | 0.6598 |
| 2400 | 9.1954 | 20558.5 | 68.8422 | 144662.8 | 84402.0 | 66609.8 | -5.0316 | -68616.4 | 0.3883 |
| 2500 | 9.2128 | 21478.9 | 69.2179 | 151565.9 | 85322.4 | 66625.5 | -4.7889 | -68691.9 | 0.1382 |
| 2600 | 9.2296 | 22401.0 | 69.5796 | 158505.9 | 86244.5 | 66640.6 | -4.5649 | -68766.7 | -0.0928 |
| 2700 | 9.2460 | 23324.8 | 69.9282 | 165481.4 | 87168.3 | 66655.1 | -4.3574 | -68840.1 | -0.3070 |
| 2800 | 9.2621 | 24250.2 | 70.2647 | 172491.1 | 88093.7 | 66669.2 | -4.1647 | -68912.3 | -0.5061 |
| 2900 | 9.2778 | 25177.2 | 70.5900 | 179533.9 | 89020.7 | 66682.9 | -3.9855 | -68983.5 | -0.6917 |
| 3000 | 9.2932 | 26105.7 | 70.9048 | 186608.8 | 89949.3 | 66696.2 | -3.8178 | -69054.6 | -0.8651 |
| 3100 | 9.3085 | 27035.8 | 71.2098 | 193714.6 | 90879.4 | 66709.3 | -3.6610 | -69123.8 | -1.0274 |
| 3200 | 9.3235 | 27967.4 | 71.5056 | 200850.4 | 91811.0 | 66722.0 | -3.5140 | -69193.2 | -1.1798 |
| 3300 | 9.3383 | 28900.5 | 71.7927 | 208015.4 | 92744.1 | 66734.6 | -3.3759 | -69262.4 | -1.3230 |
| 3400 | 9.3530 | 29835.1 | 72.0717 | 215208.7 | 93678.6 | 66746.9 | -3.2459 | -69331.7 | -1.4580 |
| 3500 | 9.3675 | 30771.1 | 72.3430 | 222429.5 | 94614.6 | 66759.1 | -3.1234 | -69401.2 | -1.5854 |
| 3600 | 9.3819 | 31708.6 | 72.6071 | 229677.1 | 95552.1 | 66771.2 | -3.0076 | -69471.3 | -1.7058 |
| 3700 | 9.3962 | 32647.5 | 72.8644 | 236950.7 | 96491.0 | 66783.1 | -2.8980 | -69541.1 | -1.8199 |
| 3800 | 9.4103 | 33587.8 | 73.1151 | 244249.7 | 97431.3 | 66794.9 | -2.7942 | -69611.8 | -1.9280 |
| 3900 | 9.4244 | 34529.5 | 73.3598 | 251573.5 | 98373.1 | 66806.7 | -2.6957 | -69682.6 | -2.0307 |
| 4000 | 9.4384 | 35472.7 | 73.5985 | 258921.5 | 99316.2 | 66818.4 | -2.6021 | -69753.1 | -2.1284 |
| 4100 | 9.4523 | 36417.2 | 73.8318 | 266293.0 | 100260.8 | 66830.1 | -2.5130 | -69823.1 | -2.2214 |
| 4200 | 9.4661 | 37363.1 | 74.0597 | 273687.6 | 101206.7 | 66841.7 | -2.4282 | -69893.4 | -2.3101 |
| 4300 | 9.4799 | 38310.4 | 74.2826 | 281104.8 | 102154.0 | 66853.3 | -2.3473 | -69964.7 | -2.3947 |
| 4400 | 9.4936 | 39259.1 | 74.5007 | 288544.0 | 103102.7 | 66864.9 | -2.2701 | -70036.8 | -2.4750 |
| 4500 | 9.5073 | 40209.2 | 74.7142 | 296004.8 | 104052.7 | 66876.6 | -2.1963 | -70109.1 | -2.5530 |
| 4600 | 9.5209 | 41160.6 | 74.9233 | 303486.7 | 105004.1 | 66888.2 | -2.1257 | -70181.5 | -2.6271 |
| 4700 | 9.5345 | 42113.3 | 75.1282 | 310989.3 | 105956.9 | 66899.9 | -2.0581 | -70254.4 | -2.6982 |
| 4800 | 9.5480 | 43067.5 | 75.3291 | 318512.2 | 106911.0 | 66911.6 | -1.9932 | -70327.2 | -2.7664 |
| 4900 | 9.5615 | 44022.9 | 75.5261 | 326055.0 | 107866.5 | 66923.3 | -1.9311 | -70400.0 | -2.8319 |
| 5000 | 9.5750 | 44979.8 | 75.7194 | 333617.3 | 108823.3 | 66935.1 | -1.8714 | -70472.1 | -2.8948 |
| 5100 | 9.5884 | 45937.9 | 75.9092 | 341198.8 | 109781.5 | 66946.9 | -1.8140 | -70544.4 | -2.9554 |
| 5200 | 9.6018 | 46897.4 | 76.0955 | 348799.0 | 110741.0 | 66958.8 | -1.7588 | -70616.8 | -3.0137 |
| 5300 | 9.6152 | 47858.3 | 76.2785 | 356417.8 | 111701.8 | 66970.7 | -1.7057 | -70689.3 | -3.0699 |
| 5400 | 9.6285 | 48820.5 | 76.4584 | 364054.6 | 112664.0 | 66982.6 | -1.6546 | -70761.8 | -3.1241 |
| 5500 | 9.6418 | 49784.0 | 76.6351 | 371709.3 | 113627.5 | 66994.6 | -1.6053 | -70834.1 | -3.1765 |
| 5600 | 9.6552 | 50748.8 | 76.8090 | 379381.6 | 114592.4 | 67006.7 | -1.5578 | -70906.0 | -3.2270 |
| 5700 | 9.6684 | 51715.0 | 76.9800 | 387071.0 | 115558.6 | 67018.7 | -1.5119 | -70977.5 | -3.2759 |
| 5800 | 9.6817 | 52682.5 | 77.1485 | 394777.5 | 116526.1 | 67030.8 | -1.4676 | -71048.7 | -3.3231 |
| 5900 | 9.6949 | 53651.4 | 77.3159 | 402500.6 | 117494.9 | 67043.0 | -1.4248 | -71119.6 | -3.3688 |
| 6000 | 9.7082 | 54621.5 | 77.4769 | 410240.2 | 118465.1 | 67055.1 | -1.3834 | -71190.2 | -3.4131 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(140) NF_2 (gas); molecular weight, 52.008

| T , °K | C_p^0 , cal/mole °K | $H_f^0 - H_0^0$, cal/mole | S_f^0 , cal/mole °K | $-(F_f^0 - H_0^0)$, cal/mole | H_f^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| 0 | ----- | C | ----- | 0 | 6472.3 | 9618.C | ----- | -135671.5 | ----- |
| 100 | 7.985C | 755.3 | 50.3447 | 4239.1 | 7267.6 | 9371.8 | -22.5433 | -14C370.0 | 296.9132 |
| 200 | 8.6777 | 1621.4 | 56.0436 | 9587.3 | 8C92.7 | 9149.9 | -12.4C12 | -141C92.4 | 143.2266 |
| 298.15 | 9.8C43 | 2527.7 | 59.7154 | 15276.4 | 900C.0 | 900C.0 | -9.1354 | -141740.9 | 92.3697 |
| 300 | 9.8255 | 2545.9 | 59.7762 | 15386.9 | 9018.2 | 8957.9 | -9.0548 | -141752.1 | 91.7290 |
| 400 | 10.8562 | 3582.1 | 62.7499 | 21517.9 | 10054.3 | 8915.3 | -7.4638 | -142293.0 | 65.8673 |
| 500 | 11.6224 | 47C8.1 | 65.2595 | 27921.6 | 1118C.4 | 8884.6 | -6.4516 | -142727.9 | 50.2961 |
| 600 | 12.1643 | 5859.1 | 67.4293 | 34558.5 | 12371.3 | 8887.6 | -5.8445 | -143C83.6 | 39.8864 |
| 700 | 12.5478 | 7135.8 | 69.3349 | 41398.7 | 13608.C | 891C.4 | -5.3815 | -143382.3 | 32.4337 |
| 800 | 12.8239 | 84C5.1 | 71.0294 | 48418.5 | 14877.3 | 8943.9 | -5.0332 | -143639.8 | 26.8333 |
| 900 | 13.0271 | 9698.1 | 72.5522 | 55598.8 | 16170.4 | 8982.6 | -4.7612 | -143867.2 | 22.4701 |
| 1000 | 13.1799 | 110C8.8 | 73.9330 | 62924.2 | 17481.1 | 9023.0 | -4.5426 | -144C72.0 | 18.9742 |
| 1100 | 13.2973 | 12332.9 | 75.1949 | 70381.5 | 18805.2 | 9063.2 | -4.3629 | -144259.5 | 16.1101 |
| 1200 | 13.3890 | 13667.4 | 76.3560 | 77959.8 | 20139.7 | 91C2.0 | -4.2125 | -144433.5 | 13.7203 |
| 1300 | 13.462C | 1501C.1 | 77.4307 | 85649.8 | 21482.4 | 9138.6 | -4.0848 | -144596.9 | 11.6958 |
| 1400 | 13.5209 | 16359.4 | 78.4306 | 93443.5 | 22831.6 | 9172.9 | -3.9749 | -144751.8 | 9.9586 |
| 1500 | 13.5691 | 17713.9 | 79.3651 | 101333.8 | 24186.2 | 9204.4 | -3.8752 | -144899.7 | 8.4515 |
| 1600 | 13.6C9C | 15072.9 | 80.2422 | 109314.6 | 25545.2 | 9233.3 | -3.7553 | -145041.8 | 7.1314 |
| 1700 | 13.6423 | 20435.5 | 81.0682 | 117380.5 | 26907.8 | 9259.4 | -3.721C | -145179.2 | 5.9655 |
| 1800 | 13.6705 | 218C1.2 | 81.8488 | 125526.7 | 28273.4 | 9282.8 | -3.6548 | -145312.5 | 4.9282 |
| 1900 | 13.6945 | 23169.5 | 82.5886 | 133748.9 | 29641.7 | 9303.4 | -3.5954 | -145442.4 | 3.9993 |
| 2000 | 13.7151 | 2454C.0 | 83.2916 | 142043.2 | 31C12.2 | 9321.4 | -3.5418 | -145569.4 | 3.1625 |
| 2100 | 13.7329 | 25912.4 | 83.9612 | 150406.1 | 32384.6 | 9336.7 | -3.4933 | -145693.9 | 2.4047 |
| 2200 | 13.7484 | 27286.5 | 84.6004 | 158834.4 | 33758.7 | 9345.5 | -3.4491 | -145816.3 | 1.7152 |
| 2300 | 13.7619 | 28662.0 | 85.2119 | 167325.3 | 35134.3 | 9359.7 | -3.4C87 | -145936.9 | 1.0852 |
| 2400 | 13.7739 | 30C38.8 | 85.7978 | 175876.0 | 36511.1 | 9367.3 | -3.3716 | -146056.0 | 0.5072 |
| 2500 | 13.7845 | 31416.7 | 86.3603 | 184484.0 | 37889.0 | 9372.5 | -3.3375 | -146173.8 | -0.0250 |
| 2600 | 13.7939 | 32795.6 | 86.9011 | 193147.3 | 39267.9 | 9375.3 | -3.306C | -146290.7 | -0.5166 |
| 2700 | 13.8C23 | 34175.5 | 87.4219 | 201863.6 | 40647.7 | 9375.6 | -3.2768 | -1464C6.9 | -0.9722 |
| 2800 | 13.8C98 | 35556.1 | 87.924C | 210631.0 | 42028.3 | 9373.6 | -3.2497 | -146522.5 | -1.3956 |
| 2900 | 13.8165 | 36937.4 | 88.4087 | 219447.8 | 43409.7 | 9369.2 | -3.2245 | -146637.9 | -1.7901 |
| 3000 | 13.8227 | 38319.4 | 88.8772 | 228312.2 | 44791.6 | 9362.5 | -3.20C9 | -146753.3 | -2.1586 |
| 3100 | 13.8282 | 397C1.9 | 89.3305 | 237222.7 | 46174.2 | 9353.5 | -3.179C | -146869.0 | -2.5036 |
| 3200 | 13.8332 | 41C85.0 | 89.7696 | 246177.9 | 47557.2 | 9342.1 | -3.1584 | -146985.2 | -2.8273 |
| 3300 | 13.8378 | 42468.5 | 90.1954 | 255176.2 | 4894C.8 | 9328.5 | -3.139C | -1471C2.1 | -3.1316 |
| 3400 | 13.8420 | 43852.5 | 90.6085 | 264216.5 | 50324.8 | 9312.7 | -3.1209 | -147220.0 | -3.4182 |
| 3500 | 13.8459 | 45236.9 | 91.0099 | 273297.5 | 51709.2 | 9294.6 | -3.1038 | -147339.1 | -3.6887 |
| 3600 | 13.8494 | 46621.7 | 91.400C | 282418.1 | 53094.C | 9274.2 | -3.0877 | -147459.8 | -3.9444 |
| 3700 | 13.8527 | 480C6.8 | 91.7795 | 291577.2 | 54475.1 | 9251.7 | -3.0725 | -147582.3 | -4.1864 |
| 3800 | 13.8557 | 49392.2 | 92.1489 | 300773.7 | 55864.5 | 9226.9 | -3.0581 | -147706.7 | -4.4159 |
| 3900 | 13.8584 | 50777.9 | 92.5089 | 310006.6 | 5725C.2 | 920C.C | -3.0446 | -147833.5 | -4.6338 |
| 4000 | 13.8610 | 52163.9 | 92.8598 | 319275.2 | 58636.2 | 917C.8 | -3.0317 | -147962.7 | -4.8410 |
| 4100 | 13.8634 | 5355C.1 | 93.2021 | 328578.3 | 60022.4 | 9135.5 | -3.0155 | -148094.7 | -5.0382 |
| 4200 | 13.8656 | 54936.6 | 93.5362 | 337915.3 | 61408.8 | 91C6.C | -3.0C79 | -148229.6 | -5.2263 |
| 4300 | 13.8677 | 56323.2 | 93.8624 | 347285.3 | 62795.5 | 9070.3 | -2.9969 | -148367.7 | -5.4057 |
| 4400 | 13.8696 | 57710.1 | 94.1813 | 356687.5 | 64182.4 | 9032.5 | -2.9865 | -148509.2 | -5.5772 |
| 4500 | 13.8714 | 59097.2 | 94.4930 | 366121.3 | 65565.4 | 8992.5 | -2.9765 | -148654.2 | -5.7412 |
| 4600 | 13.8731 | 60484.4 | 94.7979 | 375585.9 | 66956.6 | 8950.3 | -2.967C | -1488C3.0 | -5.8982 |
| 4700 | 13.8747 | 61871.8 | 95.0963 | 385080.7 | 68344.0 | 8906.0 | -2.958C | -148955.8 | -6.0487 |
| 4800 | 13.8762 | 63259.3 | 95.3884 | 394604.9 | 69731.6 | 8859.5 | -2.9494 | -149112.6 | -6.1930 |
| 4900 | 13.8776 | 64647.0 | 95.6745 | 404158.1 | 71115.2 | 881C.9 | -2.9412 | -149273.7 | -6.3317 |
| 5000 | 13.8789 | 66034.8 | 95.9549 | 413739.7 | 72507.1 | 8760.2 | -2.9334 | -149439.1 | -6.4649 |
| 5100 | 13.8801 | 67422.8 | 96.2297 | 423348.9 | 73895.C | 87C7.3 | -2.9259 | -1496C9.0 | -6.5930 |
| 5200 | 13.8813 | 68810.8 | 96.4993 | 432985.4 | 75282.1 | 8652.3 | -2.9187 | -149783.5 | -6.7164 |
| 5300 | 13.8824 | 70199.0 | 96.7637 | 442648.6 | 76671.3 | 8595.1 | -2.9119 | -149962.6 | -6.8352 |
| 5400 | 13.8834 | 71587.3 | 97.0232 | 452338.0 | 78059.6 | 8535.8 | -2.9053 | -150146.5 | -6.9498 |
| 5500 | 13.8844 | 72975.7 | 97.2780 | 462053.1 | 79448.C | 8474.3 | -2.8991 | -150335.2 | -7.0604 |
| 5600 | 13.8853 | 74364.2 | 97.5282 | 471793.5 | 80836.4 | 8410.6 | -2.8931 | -150528.7 | -7.1671 |
| 5700 | 13.8862 | 75752.8 | 97.7739 | 481558.6 | 82225.C | 8344.8 | -2.8874 | -150727.1 | -7.2702 |
| 5800 | 13.8871 | 77141.4 | 98.0154 | 491348.1 | 83613.7 | 8276.8 | -2.8815 | -150930.4 | -7.3699 |
| 5900 | 13.8878 | 78530.2 | 98.2528 | 501161.5 | 85002.4 | 8206.6 | -2.8766 | -151138.6 | -7.4664 |
| 6000 | 13.8886 | 79919.0 | 98.4863 | 510998.5 | 86391.3 | 8134.2 | -2.8716 | -151351.7 | -7.5597 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(141) NF_3 (gas); molecular weight, 71.008

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -32527.3 | -28326.7 | ----- | -195971.2 | ----- |
| 100 | 8.1268 | 797.3 | 51.5514 | 4357.8 | -31730.0 | -28918.4 | 56.9527 | -197166.3 | 414.2806 |
| 200 | 10.1963 | 1699.4 | 57.7211 | 9844.9 | -30827.9 | -29414.4 | 25.1279 | -198358.5 | 178.5339 |
| 298.15 | 12.7322 | 2827.3 | 62.2758 | 15740.2 | -29700.0 | -29700.0 | 14.4969 | -199299.1 | 126.8521 |
| 300 | 12.7756 | 2850.9 | 62.3547 | 15855.5 | -29676.4 | -29703.6 | 14.3627 | -199314.9 | 125.9312 |
| 400 | 14.7682 | 4233.9 | 66.3195 | 22293.9 | -28293.4 | -29824.5 | 8.9411 | -200049.1 | 89.5690 |
| 500 | 16.1371 | 5783.6 | 69.7719 | 29102.4 | -26743.7 | -29834.2 | 5.6809 | -200592.5 | 67.6807 |
| 600 | 17.0634 | 7446.6 | 72.8013 | 36234.2 | -25080.7 | -29774.9 | 3.5093 | -201001.0 | 53.0536 |
| 700 | 17.7013 | 9186.7 | 75.4825 | 43651.0 | -23340.6 | -29673.8 | 1.9624 | -201315.5 | 42.5868 |
| 800 | 18.1526 | 10980.7 | 77.8773 | 51321.2 | -21546.6 | -29547.7 | 0.8067 | -201563.4 | 34.7257 |
| 900 | 18.4807 | 12813.2 | 80.0353 | 59218.6 | -19714.1 | -29406.9 | -0.0882 | -201763.2 | 28.6047 |
| 1000 | 18.7254 | 14674.0 | 81.9957 | 67321.7 | -17853.3 | -29257.9 | -0.8005 | -201927.1 | 23.7034 |
| 1100 | 18.9120 | 16556.3 | 83.7896 | 75612.2 | -15971.0 | -29104.5 | -1.3803 | -202063.8 | 19.6904 |
| 1200 | 19.0573 | 18455.1 | 85.4416 | 84074.9 | -14072.2 | -28949.2 | -1.8609 | -202179.5 | 16.3440 |
| 1300 | 19.1725 | 20366.8 | 86.9718 | 92696.5 | -12160.5 | -28793.8 | -2.2654 | -202278.5 | 13.5110 |
| 1400 | 19.2651 | 22288.8 | 88.3961 | 101465.7 | -10238.5 | -28639.1 | -2.6102 | -202364.2 | 11.0816 |
| 1500 | 19.3407 | 24219.2 | 89.7279 | 110372.6 | -8308.1 | -28485.9 | -2.9075 | -202439.1 | 8.9753 |
| 1600 | 19.4032 | 26156.5 | 90.9782 | 119408.6 | -6370.8 | -28334.8 | -3.1662 | -202505.1 | 7.1316 |
| 1700 | 19.4553 | 28099.5 | 92.1561 | 128565.9 | -4427.8 | -28185.9 | -3.3933 | -202563.6 | 5.5044 |
| 1800 | 19.4993 | 30047.3 | 93.2694 | 137837.6 | -2480.0 | -28039.6 | -3.5941 | -202615.9 | 4.0575 |
| 1900 | 19.5368 | 31999.2 | 94.3247 | 147217.8 | -528.1 | -27895.9 | -3.7728 | -202662.9 | 2.7626 |
| 2000 | 19.5689 | 33954.5 | 95.3277 | 156700.8 | 1427.2 | -27755.0 | -3.9328 | -202705.3 | 1.5970 |
| 2100 | 19.5966 | 35912.8 | 96.2831 | 166281.8 | 3385.5 | -27617.0 | -4.0769 | -202743.9 | 0.5421 |
| 2200 | 19.6207 | 37873.7 | 97.1953 | 175956.0 | 5346.4 | -27481.9 | -4.2072 | -202779.2 | -0.4170 |
| 2300 | 19.6418 | 39836.9 | 98.0680 | 185719.5 | 7309.5 | -27349.7 | -4.3256 | -202811.7 | -1.2928 |
| 2400 | 19.6604 | 41802.0 | 98.9043 | 195568.4 | 9274.7 | -27220.6 | -4.4336 | -202841.7 | -2.0958 |
| 2500 | 19.6768 | 43768.9 | 99.7073 | 205499.3 | 11241.6 | -27094.4 | -4.5325 | -202869.9 | -2.8347 |
| 2600 | 19.6914 | 45737.3 | 100.4793 | 215508.8 | 13210.0 | -26971.3 | -4.6234 | -202896.0 | -3.5168 |
| 2700 | 19.7045 | 47707.1 | 101.2227 | 225594.2 | 15179.8 | -26851.2 | -4.7072 | -202920.9 | -4.1485 |
| 2800 | 19.7161 | 49678.1 | 101.9395 | 235752.5 | 17150.8 | -26734.1 | -4.7847 | -202944.8 | -4.7351 |
| 2900 | 19.7266 | 51650.3 | 102.6316 | 245981.2 | 19123.0 | -26620.1 | -4.8565 | -202967.9 | -5.2814 |
| 3000 | 19.7361 | 53623.4 | 103.3005 | 256278.0 | 21096.1 | -26509.1 | -4.9232 | -202990.6 | -5.7912 |
| 3100 | 19.7447 | 55597.5 | 103.9478 | 266640.6 | 23070.2 | -26401.2 | -4.9854 | -203013.0 | -6.2683 |
| 3200 | 19.7525 | 57572.4 | 104.5748 | 277066.9 | 25045.0 | -26296.3 | -5.0434 | -203035.6 | -6.7155 |
| 3300 | 19.7596 | 59548.0 | 105.1827 | 287554.9 | 27020.7 | -26194.4 | -5.0977 | -203058.6 | -7.1357 |
| 3400 | 19.7661 | 61524.3 | 105.7727 | 298102.8 | 29096.9 | -26095.6 | -5.1486 | -203082.3 | -7.5313 |
| 3500 | 19.7721 | 63501.2 | 106.3457 | 308708.9 | 30973.9 | -25999.9 | -5.1965 | -203106.9 | -7.9042 |
| 3600 | 19.7776 | 65478.7 | 106.9028 | 319371.5 | 32951.3 | -25907.2 | -5.2415 | -203132.8 | -8.2565 |
| 3700 | 19.7826 | 67456.7 | 107.4448 | 330089.0 | 34929.4 | -25817.5 | -5.2839 | -203160.2 | -8.5898 |
| 3800 | 19.7873 | 69435.2 | 107.9724 | 340859.9 | 36907.9 | -25730.9 | -5.3240 | -203189.4 | -8.9056 |
| 3900 | 19.7916 | 71414.1 | 108.4864 | 351683.0 | 38886.8 | -25647.3 | -5.3619 | -203220.7 | -9.2053 |
| 4000 | 19.7955 | 73393.5 | 108.9876 | 362556.8 | 40866.2 | -25566.7 | -5.3977 | -203254.3 | -9.4900 |
| 4100 | 19.7992 | 75373.2 | 109.4764 | 373480.1 | 42845.9 | -25489.2 | -5.4318 | -203290.4 | -9.7609 |
| 4200 | 19.8027 | 77353.3 | 109.9536 | 384451.7 | 44826.0 | -25414.8 | -5.4641 | -203329.3 | -10.0189 |
| 4300 | 19.8059 | 79333.7 | 110.4196 | 395470.4 | 46806.4 | -25343.3 | -5.4948 | -203371.2 | -10.2650 |
| 4400 | 19.8089 | 81314.5 | 110.8749 | 406535.2 | 48787.2 | -25275.0 | -5.5240 | -203416.4 | -10.4999 |
| 4500 | 19.8116 | 83295.5 | 111.3201 | 417645.1 | 50768.2 | -25209.6 | -5.5519 | -203465.0 | -10.7244 |
| 4600 | 19.8143 | 85276.8 | 111.7556 | 428798.9 | 52749.5 | -25147.3 | -5.5785 | -203517.3 | -10.9393 |
| 4700 | 19.8167 | 87258.4 | 112.1818 | 439995.9 | 54731.0 | -25088.0 | -5.6038 | -203573.3 | -11.1450 |
| 4800 | 19.8190 | 89240.1 | 112.5990 | 451235.0 | 56712.8 | -25031.8 | -5.6281 | -203633.4 | -11.3423 |
| 4900 | 19.8212 | 91222.1 | 113.0077 | 462515.4 | 58694.8 | -24978.6 | -5.6514 | -203697.5 | -11.5315 |
| 5000 | 19.8232 | 93204.4 | 113.4081 | 473836.3 | 60677.1 | -24928.5 | -5.6736 | -203766.0 | -11.7132 |
| 5100 | 19.8251 | 95186.8 | 113.8007 | 485196.8 | 62659.5 | -24881.4 | -5.6950 | -203838.8 | -11.8879 |
| 5200 | 19.8269 | 97169.4 | 114.1857 | 496596.1 | 64642.1 | -24837.4 | -5.7154 | -203916.1 | -12.0559 |
| 5300 | 19.8286 | 99152.2 | 114.5634 | 508033.7 | 66624.8 | -24796.4 | -5.7351 | -203997.9 | -12.2176 |
| 5400 | 19.8302 | 101135.1 | 114.9340 | 519508.6 | 68607.8 | -24758.5 | -5.7540 | -204084.5 | -12.3734 |
| 5500 | 19.8317 | 103118.2 | 115.2979 | 531020.2 | 70590.9 | -24723.6 | -5.7722 | -204175.8 | -12.5236 |
| 5600 | 19.8332 | 105101.5 | 115.6553 | 542567.9 | 72574.1 | -24691.8 | -5.7898 | -204271.8 | -12.6685 |
| 5700 | 19.8346 | 107084.8 | 116.0063 | 554151.1 | 74557.5 | -24663.1 | -5.8067 | -204372.7 | -12.8084 |
| 5800 | 19.8359 | 109068.4 | 116.3513 | 565769.0 | 76541.0 | -24637.5 | -5.8230 | -204478.4 | -12.9436 |
| 5900 | 19.8371 | 111052.0 | 116.6904 | 577421.1 | 78524.7 | -24615.0 | -5.8387 | -204588.9 | -13.0742 |
| 6000 | 19.8383 | 113035.8 | 117.0238 | 589106.9 | 80508.5 | -24595.6 | -5.8539 | -204704.3 | -13.2005 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(142) N_2F_2 (gas); molecular weight, 66.016

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 16477.2 | 20659.1 | ----- | -241209.9 | ----- |
| 100 | 8.4534 | 803.9 | 51.5069 | 4346.8 | 17281.1 | 20074.6 | -49.8501 | -242396.7 | 513.3199 |
| 200 | 10.7737 | 1763.1 | 58.0621 | 9849.3 | 18240.3 | 19638.0 | -28.1183 | -243482.7 | 247.9811 |
| 298.15 | 12.7792 | 2922.8 | 62.7530 | 15787.0 | 19400.0 | 19400.0 | -21.0961 | -244365.5 | 160.2540 |
| 300 | 12.8126 | 2946.5 | 62.8321 | 15903.2 | 19423.7 | 19396.9 | -21.0084 | -244380.4 | 159.1494 |
| 400 | 14.5918 | 4310.3 | 66.7446 | 22387.6 | 20787.5 | 19293.3 | -17.4861 | -245090.5 | 114.5828 |
| 500 | 15.5833 | 5811.9 | 70.0905 | 29233.4 | 22289.1 | 19286.9 | -15.3790 | -245646.6 | 87.7724 |
| 600 | 16.4732 | 7416.9 | 73.0145 | 36391.7 | 23894.1 | 19347.4 | -13.9723 | -246085.1 | 69.8623 |
| 700 | 17.1389 | 9099.1 | 75.6061 | 43825.2 | 25576.3 | 19452.1 | -12.9632 | -246435.0 | 57.0488 |
| 800 | 17.6415 | 10839.3 | 77.9290 | 51503.9 | 27316.5 | 19584.9 | -12.2016 | -246718.6 | 47.4262 |
| 900 | 18.0257 | 12623.4 | 80.0300 | 59403.6 | 29100.7 | 19735.1 | -11.6050 | -246951.6 | 39.9341 |
| 1000 | 18.3235 | 14441.5 | 81.9453 | 67503.8 | 30918.7 | 19895.8 | -11.1240 | -247145.8 | 33.9353 |
| 1100 | 18.5577 | 16286.0 | 83.7031 | 75787.4 | 32763.2 | 20062.3 | -10.7271 | -247309.7 | 29.0236 |
| 1200 | 18.7445 | 18151.5 | 85.3262 | 84239.9 | 34628.7 | 20231.8 | -10.3936 | -247449.6 | 24.9279 |
| 1300 | 18.8953 | 20033.7 | 86.8327 | 92848.8 | 36510.9 | 20402.5 | -10.1090 | -247570.3 | 21.4606 |
| 1400 | 19.0187 | 21929.6 | 88.2376 | 101603.1 | 38406.8 | 20573.0 | -9.8630 | -247675.5 | 18.4872 |
| 1500 | 19.1206 | 23836.8 | 89.5534 | 110493.3 | 40314.0 | 20742.7 | -9.6480 | -247767.5 | 15.9093 |
| 1600 | 19.2056 | 25753.2 | 90.7902 | 119511.1 | 42230.4 | 20911.0 | -9.4584 | -247849.0 | 13.6528 |
| 1700 | 19.2773 | 27677.4 | 91.9567 | 128649.0 | 44154.6 | 21077.5 | -9.2897 | -247921.5 | 11.6611 |
| 1800 | 19.3382 | 29608.3 | 93.0604 | 137900.4 | 46085.5 | 21242.0 | -9.1386 | -247986.5 | 9.8903 |
| 1900 | 19.3904 | 31544.8 | 94.1074 | 147259.2 | 48022.0 | 21404.3 | -9.0024 | -248045.0 | 8.3055 |
| 2000 | 19.4354 | 33486.1 | 95.1031 | 156720.1 | 49963.3 | 21564.4 | -8.8788 | -248098.0 | 6.8788 |
| 2100 | 19.4744 | 35431.7 | 96.0524 | 166278.3 | 51908.9 | 21722.2 | -8.7662 | -248146.4 | 5.5878 |
| 2200 | 19.5085 | 37380.9 | 96.9591 | 175929.2 | 53858.1 | 21877.6 | -8.6631 | -248190.7 | 4.4138 |
| 2300 | 19.5385 | 39333.2 | 97.8270 | 185668.8 | 55810.5 | 22030.6 | -8.5683 | -248231.6 | 3.3418 |
| 2400 | 19.5649 | 41288.4 | 98.6591 | 195493.4 | 57765.6 | 22181.2 | -8.4808 | -248269.6 | 2.3590 |
| 2500 | 19.5884 | 43246.1 | 99.4583 | 205399.5 | 59723.3 | 22329.5 | -8.3997 | -248305.4 | 1.4546 |
| 2600 | 19.6092 | 45206.0 | 100.2269 | 215384.0 | 61683.2 | 22475.3 | -8.3244 | -248339.2 | 0.6198 |
| 2700 | 19.6279 | 47167.9 | 100.9674 | 225444.0 | 63645.1 | 22618.7 | -8.2542 | -248371.7 | -0.1534 |
| 2800 | 19.6447 | 49131.6 | 101.6815 | 235576.6 | 65608.8 | 22759.7 | -8.1886 | -248403.3 | -0.8714 |
| 2900 | 19.6598 | 51096.8 | 102.3711 | 245779.4 | 67574.0 | 22898.4 | -8.1272 | -248434.5 | -1.5400 |
| 3000 | 19.6735 | 53063.5 | 103.0379 | 256050.1 | 69540.7 | 23034.6 | -8.0695 | -248465.8 | -2.1641 |
| 3100 | 19.6859 | 55031.4 | 103.6831 | 266386.3 | 71508.7 | 23168.5 | -8.0152 | -248497.6 | -2.7480 |
| 3200 | 19.6972 | 57000.6 | 104.3083 | 276786.0 | 73477.8 | 23300.0 | -7.9640 | -248530.5 | -3.2955 |
| 3300 | 19.7075 | 58970.9 | 104.9146 | 287247.3 | 75448.1 | 23429.1 | -7.9157 | -248564.9 | -3.8099 |
| 3400 | 19.7169 | 60942.1 | 105.5031 | 297768.4 | 77419.3 | 23555.9 | -7.8699 | -248601.3 | -4.2940 |
| 3500 | 19.7256 | 62914.2 | 106.0747 | 308347.4 | 79391.4 | 23680.4 | -7.8265 | -248640.4 | -4.7506 |
| 3600 | 19.7335 | 64887.2 | 106.6305 | 318982.8 | 81364.4 | 23802.5 | -7.7854 | -248682.5 | -5.1819 |
| 3700 | 19.7408 | 66860.9 | 107.1713 | 329673.0 | 83338.1 | 23922.3 | -7.7462 | -248728.1 | -5.5899 |
| 3800 | 19.7476 | 68835.3 | 107.6979 | 340416.6 | 85312.5 | 24039.7 | -7.7089 | -248777.8 | -5.9766 |
| 3900 | 19.7538 | 70810.4 | 108.2109 | 351212.1 | 87287.6 | 24154.8 | -7.6734 | -248832.1 | -6.3435 |
| 4000 | 19.7596 | 72786.1 | 108.7111 | 362058.3 | 89263.3 | 24267.6 | -7.6395 | -248891.3 | -6.6921 |
| 4100 | 19.7650 | 74762.3 | 109.1991 | 372953.9 | 91239.5 | 24378.1 | -7.6071 | -248956.1 | -7.0238 |
| 4200 | 19.7700 | 76739.1 | 109.6754 | 383897.8 | 93216.3 | 24486.3 | -7.5761 | -249026.8 | -7.3398 |
| 4300 | 19.7747 | 78716.3 | 110.1407 | 394888.7 | 95193.5 | 24592.2 | -7.5464 | -249103.9 | -7.6412 |
| 4400 | 19.7791 | 80694.0 | 110.5953 | 405925.6 | 97171.2 | 24695.8 | -7.5179 | -249187.8 | -7.9290 |
| 4500 | 19.7831 | 82672.1 | 111.0399 | 417007.4 | 99149.3 | 24797.0 | -7.4906 | -249278.8 | -8.2041 |
| 4600 | 19.7869 | 84650.6 | 111.4747 | 428133.2 | 101127.8 | 24896.0 | -7.4644 | -249377.4 | -8.4673 |
| 4700 | 19.7905 | 86629.5 | 111.9003 | 439302.0 | 103106.7 | 24992.7 | -7.4392 | -249483.9 | -8.7194 |
| 4800 | 19.7939 | 88608.7 | 112.3170 | 450513.0 | 105085.9 | 25087.1 | -7.4149 | -249598.5 | -8.9612 |
| 4900 | 19.7970 | 90588.2 | 112.7252 | 461765.1 | 107065.5 | 25179.1 | -7.3915 | -249721.6 | -9.1931 |
| 5000 | 19.8000 | 92568.1 | 113.1252 | 473057.7 | 109045.3 | 25268.9 | -7.3691 | -249853.4 | -9.4159 |
| 5100 | 19.8028 | 94548.2 | 113.5173 | 484389.9 | 111025.4 | 25356.3 | -7.3474 | -249994.2 | -9.6301 |
| 5200 | 19.8054 | 96528.7 | 113.9018 | 495760.9 | 113005.9 | 25441.4 | -7.3264 | -250144.2 | -9.8362 |
| 5300 | 19.8079 | 98509.3 | 114.2791 | 507170.0 | 114986.5 | 25524.2 | -7.3062 | -250303.5 | -10.0346 |
| 5400 | 19.8103 | 100490.2 | 114.6494 | 518616.5 | 116967.4 | 25604.6 | -7.2867 | -250472.3 | -10.2258 |
| 5500 | 19.8125 | 102471.4 | 115.0129 | 530099.7 | 118948.6 | 25682.7 | -7.2678 | -250650.7 | -10.4102 |
| 5600 | 19.8146 | 104452.7 | 115.3699 | 541618.9 | 120929.9 | 25758.5 | -7.2496 | -250838.8 | -10.5881 |
| 5700 | 19.8166 | 106434.3 | 115.7207 | 553173.5 | 122911.5 | 25831.8 | -7.2319 | -251036.6 | -10.7599 |
| 5800 | 19.8186 | 108416.1 | 116.0653 | 564762.8 | 124893.3 | 25902.8 | -7.2148 | -251244.3 | -10.9259 |
| 5900 | 19.8204 | 110398.0 | 116.4041 | 576386.4 | 126875.2 | 25971.3 | -7.1983 | -251461.8 | -11.0864 |
| 6000 | 19.8221 | 112380.1 | 116.7373 | 588043.5 | 128857.3 | 26037.4 | -7.1822 | -251689.1 | -11.2417 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(143) NH (gas); molecular weight, 15.016

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| C | ----- | C | ----- | 0 | 76855.5 | 78907.5 | ----- | -85300.0 | ----- |
| 100 | 6.9616 | 679.9 | 35.6886 | 2889.0 | 77535.7 | 78861.5 | -171.3757 | -85613.7 | 183.2832 |
| 200 | 6.9630 | 1376.1 | 40.5142 | 6726.8 | 78235.5 | 78908.5 | -85.1834 | -85911.2 | 89.6078 |
| 298.15 | 6.9662 | 2059.6 | 43.2950 | 10848.7 | 78919.5 | 78919.5 | -56.7966 | -86202.9 | 58.6590 |
| 300 | 6.9663 | 2072.5 | 43.3380 | 10928.9 | 78932.4 | 78919.6 | -56.44CC | -86208.3 | 58.2693 |
| 400 | 6.9729 | 2769.4 | 45.3429 | 15367.7 | 79625.3 | 78920.5 | -42.0675 | -86505.1 | 42.5450 |
| 500 | 6.9937 | 3467.6 | 46.9007 | 19982.7 | 80327.4 | 78918.1 | -33.4439 | -86800.6 | 33.0776 |
| 600 | 7.0411 | 4169.1 | 48.1795 | 24738.6 | 81028.9 | 78913.1 | -27.6951 | -87092.7 | 26.7445 |
| 700 | 7.1191 | 4876.8 | 49.2704 | 29612.4 | 81736.7 | 78906.1 | -23.5892 | -87378.6 | 22.2057 |
| 800 | 7.2227 | 5593.8 | 50.2275 | 34588.3 | 82453.6 | 78898.7 | -20.5101 | -87655.3 | 18.7906 |
| 900 | 7.3431 | 6321.9 | 51.0851 | 39654.6 | 83181.8 | 78891.7 | -18.1153 | -87920.7 | 16.1261 |
| 1000 | 7.4716 | 7062.6 | 51.8653 | 44802.7 | 83922.5 | 78886.1 | -16.1955 | -88173.7 | 13.9882 |
| 1100 | 7.6014 | 7816.3 | 52.5836 | 50025.6 | 84676.2 | 78882.5 | -14.6325 | -88413.6 | 12.2341 |
| 1200 | 7.7278 | 8582.8 | 53.2504 | 55317.7 | 85442.7 | 78881.0 | -13.3265 | -88640.8 | 10.7685 |
| 1300 | 7.8481 | 9361.7 | 53.8738 | 60674.3 | 86221.5 | 78881.4 | -12.2214 | -88855.5 | 9.5252 |
| 1400 | 7.9608 | 10152.2 | 54.4596 | 66091.2 | 87012.0 | 78883.6 | -11.2744 | -89058.6 | 8.4571 |
| 1500 | 8.0654 | 10953.6 | 55.0124 | 71565.1 | 87813.4 | 78886.9 | -10.4534 | -89250.9 | 7.5293 |
| 1600 | 8.1620 | 11765.0 | 55.5361 | 77092.7 | 88624.8 | 78891.6 | -9.7350 | -89433.1 | 6.7158 |
| 1700 | 8.2510 | 12585.7 | 56.0336 | 82671.4 | 89445.6 | 78897.5 | -9.1011 | -89606.0 | 5.9965 |
| 1800 | 8.3329 | 13415.0 | 56.5076 | 88298.7 | 90274.8 | 78904.6 | -8.5376 | -89770.4 | 5.3560 |
| 1900 | 8.4085 | 14252.1 | 56.9602 | 93972.2 | 91111.9 | 78912.1 | -8.0333 | -89926.9 | 4.7819 |
| 2000 | 8.4784 | 15096.5 | 57.3933 | 99690.0 | 91956.3 | 78920.2 | -7.5796 | -90076.3 | 4.2643 |
| 2100 | 8.5434 | 15947.6 | 57.8085 | 105450.3 | 92807.5 | 78928.8 | -7.1688 | -90218.9 | 3.7952 |
| 2200 | 8.6041 | 16805.0 | 58.2074 | 111251.2 | 93664.9 | 78936.0 | -6.7955 | -90355.3 | 3.3681 |
| 2300 | 8.6610 | 17668.3 | 58.5911 | 117091.2 | 94528.1 | 78947.6 | -6.4544 | -90486.0 | 2.9776 |
| 2400 | 8.7148 | 18537.1 | 58.9609 | 122968.9 | 95397.0 | 78957.8 | -6.1420 | -90611.4 | 2.6191 |
| 2500 | 8.7659 | 19411.2 | 59.3177 | 128883.0 | 96271.0 | 78968.5 | -5.8543 | -90731.7 | 2.2889 |
| 2600 | 8.8147 | 20290.2 | 59.6624 | 134832.1 | 97150.1 | 78979.7 | -5.5885 | -90847.5 | 1.9836 |
| 2700 | 8.8616 | 21174.1 | 59.9960 | 140815.1 | 98033.9 | 78991.7 | -5.3429 | -90958.9 | 1.7006 |
| 2800 | 8.9070 | 22062.5 | 60.3191 | 146830.9 | 98922.4 | 79004.1 | -5.1146 | -91066.2 | 1.4375 |
| 2900 | 8.9510 | 22955.4 | 60.6324 | 152878.6 | 99815.3 | 79017.4 | -4.9020 | -91169.8 | 1.1923 |
| 3000 | 8.9939 | 23852.7 | 60.9366 | 158957.1 | 100712.5 | 79031.3 | -4.7034 | -91269.9 | 0.9632 |
| 3100 | 9.0360 | 24754.2 | 61.2322 | 165065.6 | 101614.0 | 79045.7 | -4.5177 | -91366.8 | 0.7486 |
| 3200 | 9.0774 | 25659.8 | 61.5197 | 171203.3 | 102515.7 | 79060.9 | -4.3436 | -91460.8 | 0.5472 |
| 3300 | 9.1182 | 26569.6 | 61.7997 | 177369.3 | 103429.5 | 79077.5 | -4.1799 | -91552.0 | 0.3578 |
| 3400 | 9.1585 | 27483.5 | 62.0725 | 183563.0 | 104343.3 | 79094.3 | -4.0259 | -91640.8 | 0.1794 |
| 3500 | 9.1985 | 28401.3 | 62.3385 | 189783.6 | 105261.2 | 79111.7 | -3.8806 | -91727.3 | 0.0111 |
| 3600 | 9.2382 | 29323.2 | 62.5982 | 196030.5 | 106183.0 | 79130.9 | -3.7433 | -91811.9 | -0.1481 |
| 3700 | 9.2777 | 30248.9 | 62.8519 | 202303.0 | 107108.8 | 79151.2 | -3.6135 | -91894.7 | -0.2988 |
| 3800 | 9.3171 | 31178.7 | 63.0998 | 208600.6 | 108038.5 | 79171.6 | -3.4955 | -91976.0 | -0.4417 |
| 3900 | 9.3564 | 32112.4 | 63.3424 | 214922.8 | 108972.2 | 79194.4 | -3.3795 | -92056.1 | -0.5774 |
| 4000 | 9.3956 | 33050.0 | 63.5797 | 221268.9 | 109909.8 | 79217.9 | -3.2627 | -92135.0 | -0.7064 |
| 4100 | 9.4348 | 33991.5 | 63.8122 | 227638.6 | 110851.3 | 79243.4 | -3.1573 | -92213.1 | -0.8292 |
| 4200 | 9.4741 | 34936.9 | 64.0400 | 234031.2 | 111796.8 | 79269.6 | -3.0565 | -92290.6 | -0.9463 |
| 4300 | 9.5133 | 35886.3 | 64.2634 | 240446.4 | 112746.2 | 79297.6 | -2.9606 | -92367.6 | -1.0581 |
| 4400 | 9.5526 | 36839.6 | 64.4826 | 246883.8 | 113699.5 | 79326.5 | -2.8690 | -92444.4 | -1.1648 |
| 4500 | 9.5920 | 37796.8 | 64.6977 | 253342.8 | 114656.7 | 79357.8 | -2.7815 | -92521.0 | -1.2669 |
| 4600 | 9.6314 | 38758.0 | 64.9090 | 259823.2 | 115617.8 | 79390.2 | -2.6977 | -92597.7 | -1.3646 |
| 4700 | 9.6709 | 39723.1 | 65.1165 | 266324.5 | 116583.0 | 79424.2 | -2.6174 | -92674.6 | -1.4582 |
| 4800 | 9.7105 | 40692.2 | 65.3205 | 272846.4 | 117552.0 | 79459.4 | -2.5404 | -92751.8 | -1.5480 |
| 4900 | 9.7502 | 41665.2 | 65.5212 | 279388.5 | 118525.1 | 79496.4 | -2.4666 | -92829.5 | -1.6342 |
| 5000 | 9.7900 | 42642.2 | 65.7185 | 285950.5 | 119502.1 | 79535.7 | -2.3958 | -92907.7 | -1.7171 |
| 5100 | 9.8298 | 43623.2 | 65.9128 | 292532.1 | 120483.1 | 79576.4 | -2.3275 | -92986.6 | -1.7967 |
| 5200 | 9.8698 | 44608.2 | 66.1041 | 299133.0 | 121468.0 | 79619.1 | -2.2620 | -93066.3 | -1.8734 |
| 5300 | 9.9098 | 45597.2 | 66.2924 | 305752.8 | 122457.0 | 79663.4 | -2.1989 | -93146.8 | -1.9472 |
| 5400 | 9.9499 | 46590.2 | 66.4781 | 312391.4 | 123450.0 | 79707.7 | -2.1375 | -93228.1 | -2.0184 |
| 5500 | 9.9900 | 47587.2 | 66.6610 | 319048.3 | 124447.0 | 79757.6 | -2.0793 | -93310.4 | -2.0870 |
| 5600 | 10.0302 | 48588.2 | 66.8414 | 325723.5 | 125448.0 | 79807.7 | -2.0227 | -93393.7 | -2.1533 |
| 5700 | 10.0704 | 49593.2 | 67.0192 | 332416.5 | 126453.0 | 79860.1 | -1.9680 | -93477.9 | -2.2172 |
| 5800 | 10.1106 | 50602.2 | 67.1947 | 339127.2 | 127462.1 | 79914.2 | -1.9153 | -93563.2 | -2.2790 |
| 5900 | 10.1509 | 51615.3 | 67.3679 | 345855.4 | 128475.2 | 79970.1 | -1.8641 | -93649.4 | -2.3388 |
| 6000 | 10.1911 | 52632.4 | 67.5389 | 352600.7 | 129492.3 | 80028.4 | -1.8145 | -93736.6 | -2.3967 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(144) NH₃ (gas); molecular weight, 17.032

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -13438.6 | -9366.7 | ----- | -276831.4 | ----- |
| 100 | 7.9555 | 789.5 | 37.2217 | 2932.7 | -12649.1 | -10062.5 | 17.9594 | -278029.2 | 594.5212 |
| 200 | 8.0653 | 1588.3 | 42.7546 | 6962.6 | -11850.3 | -10515.7 | 6.7867 | -279217.6 | 290.2172 |
| 298.15 | 8.4975 | 2398.6 | 46.0451 | 11329.8 | -11040.0 | -11040.0 | 2.9232 | -280357.9 | 189.6000 |
| 300 | 8.5034 | 2414.3 | 46.0977 | 11415.0 | -11024.3 | -11049.8 | 2.8729 | -280378.9 | 188.3327 |
| 400 | 9.1846 | 3297.7 | 48.6346 | 16156.1 | -10140.8 | -11556.9 | 0.8175 | -281482.7 | 137.1793 |
| 500 | 9.9359 | 4253.6 | 50.7645 | 21128.6 | -9184.9 | -12000.2 | -0.4682 | -282514.1 | 106.3689 |
| 600 | 10.6840 | 5284.9 | 52.6426 | 26300.7 | -8153.7 | -12375.5 | -1.3554 | -283470.1 | 85.7556 |
| 700 | 11.4633 | 6389.5 | 54.3439 | 31651.3 | -7049.1 | -12687.8 | -2.0075 | -284352.7 | 70.9837 |
| 800 | 12.0913 | 7564.5 | 55.9119 | 37165.0 | -5874.1 | -12942.7 | -2.5076 | -285165.0 | 59.8715 |
| 900 | 12.7450 | 8806.6 | 57.3742 | 42830.1 | -4631.9 | -13146.9 | -2.9032 | -285910.1 | 51.2049 |
| 1000 | 13.3599 | 10112.2 | 58.7492 | 48636.9 | -3326.3 | -13305.7 | -3.2240 | -286591.8 | 44.2543 |
| 1100 | 13.9318 | 11477.2 | 60.0497 | 54577.5 | -1961.4 | -13424.4 | -3.4899 | -287214.1 | 38.5544 |
| 1200 | 14.4562 | 12897.0 | 61.2846 | 60644.7 | -541.5 | -13508.1 | -3.7129 | -287781.5 | 33.7947 |
| 1300 | 14.9389 | 14367.3 | 62.4613 | 66832.5 | 928.7 | -13562.2 | -3.9023 | -288298.5 | 29.7596 |
| 1400 | 15.3750 | 15883.3 | 63.5847 | 73135.2 | 2444.8 | -13590.5 | -4.0660 | -288769.7 | 26.2950 |
| 1500 | 15.7690 | 17440.9 | 64.6591 | 79547.8 | 4002.3 | -13598.2 | -4.2073 | -289199.4 | 23.2877 |
| 1600 | 16.1240 | 19035.8 | 65.6883 | 86065.5 | 5597.3 | -13587.4 | -4.3308 | -289591.7 | 20.6525 |
| 1700 | 16.4436 | 20664.5 | 66.6756 | 92684.0 | 7225.9 | -13560.7 | -4.4398 | -289950.3 | 18.3243 |
| 1800 | 16.7312 | 22323.5 | 67.6238 | 99399.3 | 8884.9 | -13519.9 | -4.5365 | -290278.6 | 16.2524 |
| 1900 | 16.9902 | 24009.8 | 68.5355 | 106207.6 | 10571.2 | -13469.5 | -4.6225 | -290579.6 | 14.3965 |
| 2000 | 17.2236 | 25720.7 | 69.4130 | 113105.3 | 12252.1 | -13410.1 | -4.7002 | -290856.1 | 12.7246 |
| 2100 | 17.4343 | 27453.7 | 70.2585 | 120089.1 | 14015.2 | -13343.3 | -4.7697 | -291110.4 | 11.2105 |
| 2200 | 17.6249 | 29206.9 | 71.0740 | 127156.0 | 15768.3 | -13269.7 | -4.8329 | -291344.7 | 9.8329 |
| 2300 | 17.7976 | 30978.1 | 71.8614 | 134303.0 | 17533.6 | -13191.5 | -4.8895 | -291561.1 | 8.5742 |
| 2400 | 17.9545 | 32765.9 | 72.6222 | 141527.4 | 19327.3 | -13108.9 | -4.9421 | -291761.1 | 7.4195 |
| 2500 | 18.0973 | 34568.6 | 73.3581 | 148826.6 | 21130.0 | -13022.7 | -4.9895 | -291946.5 | 6.3565 |
| 2600 | 18.2276 | 36384.9 | 74.0704 | 156198.2 | 22946.3 | -12934.0 | -5.0333 | -292118.6 | 5.3746 |
| 2700 | 18.3468 | 38213.7 | 74.7606 | 163639.9 | 24775.2 | -12842.9 | -5.0732 | -292278.6 | 4.4650 |
| 2800 | 18.4561 | 40053.9 | 75.4298 | 171149.6 | 26615.4 | -12750.7 | -5.1105 | -292427.8 | 3.6198 |
| 2900 | 18.5565 | 41904.6 | 76.0793 | 178725.2 | 28466.1 | -12657.1 | -5.1447 | -292567.3 | 2.8326 |
| 3000 | 18.6490 | 43765.0 | 76.7099 | 186364.9 | 30326.4 | -12563.5 | -5.1759 | -292697.4 | 2.0975 |
| 3100 | 18.7344 | 45634.2 | 77.3228 | 194066.6 | 32195.6 | -12470.3 | -5.2055 | -292820.8 | 1.4096 |
| 3200 | 18.8134 | 47511.6 | 77.9189 | 201828.9 | 34073.1 | -12377.9 | -5.2330 | -292936.6 | 0.7644 |
| 3300 | 18.8867 | 49396.7 | 78.4990 | 209649.9 | 35958.1 | -12284.5 | -5.2584 | -293046.1 | 0.1580 |
| 3400 | 18.9547 | 51288.8 | 79.0638 | 217528.1 | 37850.2 | -12194.3 | -5.2823 | -293150.3 | -0.4129 |
| 3500 | 19.0182 | 53187.5 | 79.6142 | 225462.2 | 39748.9 | -12106.6 | -5.3047 | -293249.6 | -0.9513 |
| 3600 | 19.0773 | 55092.3 | 80.1508 | 233450.5 | 41653.7 | -12018.3 | -5.3253 | -293344.8 | -1.4600 |
| 3700 | 19.1326 | 57002.8 | 80.6742 | 241491.9 | 43564.2 | -11931.8 | -5.3452 | -293436.6 | -1.9414 |
| 3800 | 19.1845 | 58918.7 | 81.1852 | 249584.9 | 45480.1 | -11850.3 | -5.3636 | -293525.4 | -2.3975 |
| 3900 | 19.2331 | 60839.6 | 81.6841 | 257728.5 | 47401.0 | -11767.3 | -5.3815 | -293611.8 | -2.8304 |
| 4000 | 19.2789 | 62765.2 | 82.1716 | 265921.4 | 49326.7 | -11688.5 | -5.3974 | -293696.4 | -3.2418 |
| 4100 | 19.3220 | 64695.3 | 82.6482 | 274162.5 | 51256.7 | -11610.3 | -5.4134 | -293779.6 | -3.6332 |
| 4200 | 19.3626 | 66629.5 | 83.1143 | 282450.7 | 53191.0 | -11536.3 | -5.4274 | -293861.9 | -4.0061 |
| 4300 | 19.4011 | 68567.7 | 83.5704 | 290785.0 | 55129.2 | -11464.3 | -5.4414 | -293943.7 | -4.3618 |
| 4400 | 19.4375 | 70509.7 | 84.0168 | 299164.4 | 57071.1 | -11396.6 | -5.4546 | -294025.4 | -4.7013 |
| 4500 | 19.4720 | 72455.1 | 84.4540 | 307588.1 | 59016.6 | -11329.4 | -5.4674 | -294107.4 | -5.0259 |
| 4600 | 19.5047 | 74404.0 | 84.8824 | 316055.0 | 60965.4 | -11266.6 | -5.4794 | -294190.0 | -5.3365 |
| 4700 | 19.5359 | 76356.0 | 85.3022 | 324564.3 | 62917.5 | -11206.9 | -5.4907 | -294273.6 | -5.6339 |
| 4800 | 19.5656 | 78311.1 | 85.7138 | 333115.1 | 64872.6 | -11151.6 | -5.5014 | -294358.5 | -5.9190 |
| 4900 | 19.5940 | 80269.1 | 86.1175 | 341706.8 | 66830.6 | -11099.4 | -5.5119 | -294444.8 | -6.1925 |
| 5000 | 19.6210 | 82229.9 | 86.5137 | 350338.4 | 68791.3 | -11048.6 | -5.5219 | -294532.9 | -6.4552 |
| 5100 | 19.6469 | 84193.3 | 86.9025 | 359009.2 | 70754.7 | -11002.3 | -5.5312 | -294623.1 | -6.7077 |
| 5200 | 19.6717 | 86159.2 | 87.2842 | 367718.6 | 72720.7 | -10958.8 | -5.5404 | -294715.4 | -6.9505 |
| 5300 | 19.6955 | 88127.6 | 87.6591 | 376465.9 | 74689.0 | -10919.7 | -5.5494 | -294810.1 | -7.1842 |
| 5400 | 19.7183 | 90098.3 | 88.0275 | 385250.2 | 76659.7 | -10883.3 | -5.5572 | -294907.4 | -7.4094 |
| 5500 | 19.7403 | 92071.2 | 88.3895 | 394071.1 | 78632.7 | -10851.3 | -5.5654 | -295007.4 | -7.6264 |
| 5600 | 19.7615 | 94046.3 | 88.7454 | 402927.9 | 80607.8 | -10821.9 | -5.5730 | -295110.2 | -7.8358 |
| 5700 | 19.7818 | 96023.5 | 89.0954 | 411820.0 | 82585.0 | -10795.0 | -5.5805 | -295215.9 | -8.0379 |
| 5800 | 19.8015 | 98002.7 | 89.4396 | 420746.8 | 84564.1 | -10772.3 | -5.5879 | -295324.7 | -8.2330 |
| 5900 | 19.8205 | 99983.3 | 89.7782 | 429707.8 | 86545.2 | -10753.8 | -5.5944 | -295436.5 | -8.4217 |
| 6000 | 19.8388 | 101966.7 | 90.1115 | 438702.3 | 88526.2 | -10737.6 | -5.6015 | -295551.5 | -8.6041 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
(145) NO (gas); molecular weight, 30.008

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 19403.0 | 21476.5 | ----- | -150089.5 | ----- |
| 100 | 7.7205 | 745.6 | 42.2850 | 3482.9 | 20148.6 | 21528.5 | -46.5016 | -150368.2 | 323.9439 |
| 200 | 7.2709 | 1491.8 | 47.4753 | 8003.3 | 20894.7 | 21578.9 | -22.9522 | -150676.3 | 159.5088 |
| 298.15 | 7.1333 | 2197.0 | 50.3462 | 12813.7 | 21600.0 | 21600.0 | -15.1862 | -150981.2 | 105.2609 |
| 300 | 7.1325 | 2210.2 | 50.3903 | 12906.9 | 21613.2 | 21600.3 | -15.0886 | -150986.9 | 104.5785 |
| 400 | 7.1570 | 2923.6 | 52.4424 | 18053.4 | 22326.6 | 21609.9 | -11.1539 | -151288.3 | 77.0563 |
| 500 | 7.2867 | 3645.2 | 54.0519 | 23380.8 | 23048.1 | 21614.6 | -8.7923 | -151574.1 | 60.5105 |
| 600 | 7.4664 | 4382.6 | 55.3960 | 28855.0 | 23785.5 | 21617.9 | -7.2177 | -151839.8 | 49.4596 |
| 700 | 7.6553 | 5138.7 | 56.5612 | 34454.1 | 24541.7 | 21621.4 | -6.0928 | -152084.3 | 41.5528 |
| 800 | 7.8321 | 5913.2 | 57.5951 | 40162.9 | 25316.2 | 21625.5 | -5.2489 | -152308.8 | 35.6135 |
| 900 | 7.9887 | 6704.5 | 58.5269 | 45969.7 | 26107.4 | 21630.1 | -4.5924 | -152515.4 | 30.9874 |
| 1000 | 8.1237 | 7510.3 | 59.3757 | 51865.5 | 26913.2 | 21634.9 | -4.0672 | -152706.7 | 27.2818 |
| 1100 | 8.2389 | 8328.5 | 60.1556 | 57842.6 | 27731.5 | 21639.6 | -3.6573 | -152884.8 | 24.2462 |
| 1200 | 8.3368 | 9157.5 | 60.8767 | 63894.6 | 28560.4 | 21644.1 | -3.2790 | -153051.9 | 21.7136 |
| 1300 | 8.4201 | 9995.4 | 61.5474 | 70016.2 | 29398.4 | 21648.2 | -2.9758 | -153209.6 | 19.5685 |
| 1400 | 8.4914 | 10841.1 | 62.1741 | 76202.7 | 30244.0 | 21651.5 | -2.7158 | -153359.3 | 17.7279 |
| 1500 | 8.5528 | 11693.4 | 62.7621 | 82449.8 | 31096.3 | 21654.0 | -2.4905 | -153502.1 | 16.1312 |
| 1600 | 8.6059 | 12551.4 | 63.3158 | 88753.9 | 31954.3 | 21655.5 | -2.2933 | -153639.1 | 14.7328 |
| 1700 | 8.6521 | 13414.3 | 63.8390 | 95111.9 | 32817.3 | 21655.7 | -2.1193 | -153771.0 | 13.4979 |
| 1800 | 8.6927 | 14281.6 | 64.3347 | 101520.8 | 33684.6 | 21654.6 | -1.9646 | -153898.4 | 12.3392 |
| 1900 | 8.7286 | 15152.7 | 64.8056 | 107978.0 | 34555.7 | 21652.0 | -1.8263 | -154022.0 | 11.4154 |
| 2000 | 8.7605 | 16027.2 | 65.2542 | 114481.2 | 35430.1 | 21647.8 | -1.7017 | -154142.2 | 10.5293 |
| 2100 | 8.7891 | 16904.7 | 65.6823 | 121028.2 | 36307.7 | 21641.8 | -1.5891 | -154259.4 | 9.7270 |
| 2200 | 8.8148 | 17784.9 | 66.0918 | 127617.0 | 37187.9 | 21634.0 | -1.4868 | -154374.0 | 8.9970 |
| 2300 | 8.8382 | 18667.6 | 66.4842 | 134246.0 | 38070.5 | 21624.4 | -1.3933 | -154486.4 | 8.3500 |
| 2400 | 8.8594 | 19552.5 | 66.8608 | 140913.3 | 38955.4 | 21612.8 | -1.3078 | -154597.0 | 7.7182 |
| 2500 | 8.8789 | 20439.4 | 67.2228 | 147617.6 | 39842.4 | 21599.3 | -1.2291 | -154705.9 | 7.1549 |
| 2600 | 8.8969 | 21328.2 | 67.5714 | 154357.5 | 40731.2 | 21583.9 | -1.1565 | -154813.5 | 6.6346 |
| 2700 | 8.9135 | 22218.7 | 67.9075 | 161131.5 | 41621.7 | 21566.5 | -1.0893 | -154920.2 | 6.1525 |
| 2800 | 8.9290 | 23110.9 | 68.2320 | 167938.6 | 42513.8 | 21547.2 | -1.0270 | -155026.3 | 5.7045 |
| 2900 | 8.9434 | 24004.5 | 68.5455 | 174777.5 | 43407.5 | 21526.0 | -0.9690 | -155132.0 | 5.2871 |
| 3000 | 8.9570 | 24899.5 | 68.8490 | 181647.3 | 44302.5 | 21502.9 | -0.9150 | -155237.7 | 4.8973 |
| 3100 | 8.9698 | 25795.9 | 69.1429 | 188547.0 | 45198.8 | 21478.0 | -0.8645 | -155343.6 | 4.5324 |
| 3200 | 8.9819 | 26693.5 | 69.4278 | 195475.6 | 46096.4 | 21451.4 | -0.8172 | -155450.2 | 4.1900 |
| 3300 | 8.9933 | 27592.2 | 69.7044 | 202432.3 | 46995.2 | 21423.0 | -0.7728 | -155557.7 | 3.8682 |
| 3400 | 9.0042 | 28492.1 | 69.9730 | 209416.2 | 47895.1 | 21393.1 | -0.7311 | -155666.5 | 3.5651 |
| 3500 | 9.0146 | 29393.1 | 70.2342 | 216426.7 | 48796.0 | 21361.5 | -0.6919 | -155776.8 | 3.2792 |
| 3600 | 9.0246 | 30295.0 | 70.4883 | 223462.8 | 49698.0 | 21328.5 | -0.6548 | -155889.0 | 3.0089 |
| 3700 | 9.0342 | 31198.0 | 70.7357 | 230524.1 | 50600.9 | 21294.0 | -0.6199 | -156003.4 | 2.7530 |
| 3800 | 9.0434 | 32101.9 | 70.9767 | 237609.8 | 51504.8 | 21258.1 | -0.5868 | -156120.3 | 2.5104 |
| 3900 | 9.0523 | 33006.7 | 71.2118 | 244719.2 | 52409.6 | 21220.9 | -0.5555 | -156239.9 | 2.2801 |
| 4000 | 9.0609 | 33912.3 | 71.4411 | 251851.9 | 53315.3 | 21182.5 | -0.5258 | -156362.6 | 2.0612 |
| 4100 | 9.0693 | 34818.8 | 71.6649 | 259007.3 | 54221.8 | 21142.8 | -0.4976 | -156488.6 | 1.8527 |
| 4200 | 9.0774 | 35726.2 | 71.8835 | 266184.7 | 55129.1 | 21102.1 | -0.4708 | -156618.2 | 1.6541 |
| 4300 | 9.0853 | 36634.3 | 72.0972 | 273383.8 | 56037.2 | 21060.3 | -0.4453 | -156751.7 | 1.4645 |
| 4400 | 9.0929 | 37543.2 | 72.3062 | 280604.0 | 56946.2 | 21017.4 | -0.4210 | -156889.1 | 1.2833 |
| 4500 | 9.1004 | 38452.9 | 72.5106 | 287844.9 | 57855.8 | 20973.6 | -0.3978 | -157030.9 | 1.1101 |
| 4600 | 9.1078 | 39363.3 | 72.7107 | 295106.0 | 58766.2 | 20928.8 | -0.3757 | -157177.0 | 0.9442 |
| 4700 | 9.1149 | 40274.4 | 72.9067 | 302386.9 | 59677.4 | 20883.2 | -0.3545 | -157327.9 | 0.7853 |
| 4800 | 9.1220 | 41186.3 | 73.0986 | 309687.2 | 60589.2 | 20836.7 | -0.3343 | -157483.5 | 0.6328 |
| 4900 | 9.1289 | 42098.8 | 73.2868 | 317006.5 | 61501.8 | 20789.5 | -0.3150 | -157644.1 | 0.4864 |
| 5000 | 9.1357 | 43012.0 | 73.4713 | 324344.4 | 62415.0 | 20741.4 | -0.2965 | -157809.7 | 0.3457 |
| 5100 | 9.1423 | 43925.9 | 73.6523 | 331700.7 | 63328.9 | 20692.6 | -0.2787 | -157980.5 | 0.2104 |
| 5200 | 9.1489 | 44840.5 | 73.8299 | 339074.8 | 64243.5 | 20643.2 | -0.2617 | -158156.6 | 0.0801 |
| 5300 | 9.1554 | 45755.7 | 74.0042 | 346466.5 | 65158.7 | 20593.0 | -0.2453 | -158338.1 | -0.0454 |
| 5400 | 9.1617 | 46671.6 | 74.1754 | 353875.5 | 66074.5 | 20542.2 | -0.2296 | -158524.9 | -0.1663 |
| 5500 | 9.1680 | 47588.1 | 74.3436 | 361301.5 | 66991.0 | 20490.7 | -0.2145 | -158717.2 | -0.2831 |
| 5600 | 9.1743 | 48505.2 | 74.5088 | 368744.1 | 67908.1 | 20438.6 | -0.2000 | -158915.0 | -0.3957 |
| 5700 | 9.1804 | 49422.9 | 74.6712 | 376203.2 | 68825.9 | 20385.9 | -0.1860 | -159118.4 | -0.5046 |
| 5800 | 9.1865 | 50341.3 | 74.8310 | 383678.3 | 69744.2 | 20332.6 | -0.1726 | -159327.2 | -0.6099 |
| 5900 | 9.1925 | 51260.2 | 74.9880 | 391169.3 | 70663.2 | 20278.7 | -0.1596 | -159541.5 | -0.7117 |
| 6000 | 9.1985 | 52179.8 | 75.1426 | 398675.8 | 71582.7 | 20224.2 | -0.1471 | -159761.3 | -0.8102 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (146) NO₂ (gas); molecular weight, 46.008

| T, °K | C _p , cal/mole °K | H _f ⁰ - H ₀ ⁰ , cal/mole | S _f ⁰ , cal/mole °K | -(F _f ⁰ - H ₀ ⁰), cal/mole | H _f ⁰ , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ⁰) _f , cal/mole | log ₁₀ K _f | ΔH _f ⁰ , cal/mole | log ₁₀ K |
| G | ----- | 0 | ----- | 0 | 5570.3 | 8681.2 | ----- | -221871.3 | ----- |
| 100 | 7.9538 | 794.6 | 48.3828 | 4043.7 | 6364.9 | 8435.4 | -21.0789 | -222628.5 | 476.0985 |
| 200 | 8.2302 | 1599.5 | 53.9520 | 9190.9 | 7169.9 | 8196.8 | -11.9645 | -223435.2 | 232.4859 |
| 298.15 | 8.8749 | 2437.1 | 57.3509 | 14662.0 | 8007.5 | 8007.5 | -9.0473 | -224130.4 | 152.0020 |
| 300 | 8.8888 | 2453.6 | 57.4058 | 14768.2 | 8023.9 | 8004.5 | -9.0111 | -224142.6 | 150.9889 |
| 400 | 9.6703 | 3381.3 | 60.0693 | 20646.4 | 8951.6 | 7873.4 | -7.5651 | -224747.5 | 110.1176 |
| 500 | 10.4190 | 4386.4 | 62.3091 | 26768.1 | 9956.8 | 7796.1 | -6.7091 | -225260.2 | 85.5329 |
| 600 | 11.0632 | 5461.5 | 64.2674 | 33098.9 | 11031.9 | 7759.4 | -6.1426 | -225694.6 | 69.1082 |
| 700 | 11.5900 | 6595.1 | 66.0138 | 39614.6 | 12165.5 | 7751.4 | -5.7392 | -226065.5 | 57.3551 |
| 800 | 12.0124 | 7776.0 | 67.5901 | 46296.0 | 13346.4 | 7763.1 | -5.4365 | -226385.8 | 48.5269 |
| 900 | 12.3502 | 8994.8 | 69.0252 | 53127.9 | 14565.1 | 7788.2 | -5.2005 | -226665.9 | 41.6513 |
| 1000 | 12.6218 | 10243.9 | 70.3410 | 60097.1 | 15814.2 | 7822.4 | -5.0110 | -226914.1 | 36.1444 |
| 1100 | 12.8422 | 11517.4 | 71.5547 | 67192.7 | 17087.8 | 7863.0 | -4.8552 | -227136.6 | 31.6340 |
| 1200 | 13.0232 | 12811.0 | 72.6801 | 72.6801 | 18381.3 | 7907.9 | -4.7247 | -227338.2 | 27.8719 |
| 1300 | 13.1735 | 14121.1 | 73.7286 | 81726.1 | 19691.4 | 7955.7 | -4.6136 | -227522.6 | 24.6859 |
| 1400 | 13.2999 | 15444.9 | 74.7096 | 89148.6 | 21015.3 | 8005.2 | -4.5178 | -227692.6 | 21.9528 |
| 1500 | 13.4075 | 16780.4 | 75.6310 | 96666.1 | 22350.8 | 8055.6 | -4.4342 | -227850.6 | 19.5825 |
| 1600 | 13.5000 | 18125.9 | 76.4993 | 104273.0 | 23696.2 | 8106.1 | -4.3606 | -227998.2 | 17.5071 |
| 1700 | 13.5805 | 19480.0 | 77.3202 | 111964.4 | 25050.4 | 8156.1 | -4.2953 | -228136.9 | 15.6747 |
| 1800 | 13.6512 | 20841.7 | 78.0985 | 119735.6 | 26412.0 | 8205.0 | -4.2369 | -228267.9 | 14.0449 |
| 1900 | 13.7139 | 22210.0 | 78.8383 | 127582.8 | 27780.3 | 8252.4 | -4.1843 | -228392.1 | 12.5859 |
| 2000 | 13.7700 | 23584.2 | 79.5432 | 135502.1 | 29154.6 | 8297.9 | -4.1367 | -228510.3 | 11.2720 |
| 2100 | 13.8207 | 24963.8 | 80.2163 | 143490.3 | 30534.2 | 8341.2 | -4.0934 | -228623.2 | 10.0827 |
| 2200 | 13.8667 | 26348.2 | 80.8603 | 151544.4 | 31918.6 | 8382.1 | -4.0539 | -228731.5 | 9.0010 |
| 2300 | 13.9089 | 27737.0 | 81.4776 | 159661.5 | 33307.4 | 8420.3 | -4.0176 | -228835.7 | 8.0129 |
| 2400 | 13.9478 | 29129.9 | 82.0704 | 167839.1 | 34700.2 | 8455.7 | -3.9842 | -228936.3 | 7.1068 |
| 2500 | 13.9840 | 30526.5 | 82.6405 | 176074.8 | 36096.9 | 8488.2 | -3.9533 | -229033.8 | 6.2727 |
| 2600 | 14.0177 | 31926.6 | 83.1897 | 184366.5 | 37497.0 | 8517.7 | -3.9247 | -229128.6 | 5.5025 |
| 2700 | 14.0493 | 33330.0 | 83.7193 | 192712.1 | 38900.3 | 8544.2 | -3.8982 | -229221.3 | 4.7891 |
| 2800 | 14.0792 | 34736.4 | 84.2308 | 201109.8 | 40306.8 | 8567.7 | -3.8735 | -229312.2 | 4.1263 |
| 2900 | 14.1074 | 36145.8 | 84.7253 | 209557.7 | 41716.1 | 8588.3 | -3.8504 | -229401.8 | 3.5091 |
| 3000 | 14.1343 | 37557.9 | 85.2041 | 218054.3 | 43128.2 | 8605.9 | -3.8288 | -229490.6 | 2.9327 |
| 3100 | 14.1600 | 38972.6 | 85.6679 | 226598.0 | 44542.9 | 8620.7 | -3.8085 | -229578.9 | 2.3933 |
| 3200 | 14.1847 | 40389.8 | 86.1179 | 235187.4 | 45960.2 | 8632.8 | -3.7895 | -229667.2 | 1.8875 |
| 3300 | 14.2084 | 41809.5 | 86.5548 | 243921.2 | 47379.8 | 8642.2 | -3.7717 | -229755.9 | 1.4121 |
| 3400 | 14.2313 | 43231.5 | 86.9793 | 252498.0 | 48801.8 | 8649.1 | -3.7548 | -229845.4 | 0.9645 |
| 3500 | 14.2534 | 44655.7 | 87.3921 | 261216.6 | 50226.1 | 8653.5 | -3.7389 | -229936.2 | 0.5423 |
| 3600 | 14.2749 | 46082.1 | 87.7939 | 269976.0 | 51652.5 | 8655.6 | -3.7239 | -230028.5 | 0.1434 |
| 3700 | 14.2957 | 47510.7 | 88.1853 | 278775.1 | 53081.0 | 8655.6 | -3.7097 | -230122.8 | -0.2341 |
| 3800 | 14.3161 | 48941.3 | 88.5669 | 287612.8 | 54511.6 | 8653.4 | -3.6963 | -230219.5 | -0.5918 |
| 3900 | 14.3359 | 50373.9 | 88.9390 | 296488.1 | 55944.2 | 8649.4 | -3.6835 | -230318.8 | -0.9314 |
| 4000 | 14.3554 | 51808.4 | 89.3022 | 305400.3 | 57378.8 | 8643.5 | -3.6714 | -230421.2 | -1.2541 |
| 4100 | 14.3744 | 53244.9 | 89.6569 | 314348.3 | 58815.3 | 8635.9 | -3.6599 | -230527.0 | -1.5613 |
| 4200 | 14.3931 | 54683.3 | 90.0035 | 323331.4 | 60253.7 | 8626.7 | -3.6489 | -230636.4 | -1.8539 |
| 4300 | 14.4114 | 56123.5 | 90.3424 | 332348.7 | 61693.9 | 8616.0 | -3.6385 | -230749.7 | -2.1330 |
| 4400 | 14.4294 | 57565.6 | 90.6739 | 341399.6 | 63135.9 | 8603.9 | -3.6285 | -230867.2 | -2.3996 |
| 4500 | 14.4472 | 59009.4 | 90.9984 | 350483.3 | 64579.8 | 8590.6 | -3.6191 | -230989.1 | -2.6545 |
| 4600 | 14.4647 | 60455.0 | 91.3161 | 359599.1 | 66025.4 | 8576.0 | -3.6100 | -231115.7 | -2.8984 |
| 4700 | 14.4820 | 61902.4 | 91.6274 | 368746.3 | 67472.7 | 8560.3 | -3.6013 | -231247.1 | -3.1321 |
| 4800 | 14.4991 | 63351.4 | 91.9324 | 377924.3 | 68921.8 | 8543.6 | -3.5930 | -231383.5 | -3.3562 |
| 4900 | 14.5160 | 64802.2 | 92.2316 | 387132.6 | 70372.5 | 8525.9 | -3.5851 | -231525.0 | -3.5713 |
| 5000 | 14.5327 | 66254.6 | 92.5250 | 396370.5 | 71824.9 | 8507.4 | -3.5775 | -231671.9 | -3.7778 |
| 5100 | 14.5492 | 67708.7 | 92.8130 | 405637.4 | 73279.0 | 8488.0 | -3.5702 | -231824.1 | -3.9765 |
| 5200 | 14.5656 | 69164.4 | 93.0956 | 414932.9 | 74734.8 | 8467.8 | -3.5633 | -231981.9 | -4.1676 |
| 5300 | 14.5819 | 70621.8 | 93.3732 | 424256.4 | 76192.2 | 8446.9 | -3.5565 | -232145.2 | -4.3516 |
| 5400 | 14.5980 | 72080.8 | 93.6460 | 433607.4 | 77651.2 | 8425.4 | -3.5501 | -232314.1 | -4.5289 |
| 5500 | 14.6140 | 73541.4 | 93.9140 | 442985.4 | 79111.8 | 8403.2 | -3.5439 | -232488.6 | -4.6999 |
| 5600 | 14.6299 | 75003.6 | 94.1774 | 452390.0 | 80573.9 | 8380.5 | -3.5380 | -232668.9 | -4.8649 |
| 5700 | 14.6457 | 76467.4 | 94.4365 | 461820.7 | 82037.7 | 8357.2 | -3.5322 | -232854.7 | -5.0243 |
| 5800 | 14.6613 | 77932.7 | 94.6914 | 471277.2 | 83503.1 | 8333.4 | -3.5267 | -233046.2 | -5.1783 |
| 5900 | 14.6769 | 79399.6 | 94.9421 | 480758.9 | 84970.0 | 8309.1 | -3.5214 | -233243.4 | -5.3272 |
| 6000 | 14.6924 | 80868.1 | 95.1889 | 490265.5 | 86438.5 | 8284.4 | -3.5163 | -233446.0 | -5.4712 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(147) N₂O (gas); molecular weight, 44.016

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| C | ----- | 0 | ----- | 0 | 17200.4 | 20310.C | ----- | -263835.5 | ----- |
| 100 | 7.0154 | 655.5 | 42.9981 | 3703.9 | 17896.2 | 19965.5 | -46.8823 | -264660.7 | 567.2767 |
| 200 | 8.0234 | 1440.4 | 45.1181 | 8383.2 | 18640.8 | 19666.5 | -25.2013 | -265467.2 | 277.7312 |
| 298.15 | 9.2304 | 2289.6 | 52.5567 | 13380.1 | 19490.0 | 19490.0 | -18.1575 | -266115.9 | 182.1342 |
| 300 | 9.2504 | 2306.7 | 52.6138 | 13477.4 | 19507.1 | 19487.7 | -18.0698 | -266126.8 | 180.9313 |
| 400 | 10.2040 | 3281.4 | 55.4112 | 18883.1 | 20481.8 | 19410.1 | -14.5285 | -266663.7 | 132.4195 |
| 500 | 10.5624 | 4341.1 | 57.7727 | 24545.3 | 21541.4 | 19401.5 | -12.4085 | -267108.2 | 103.2580 |
| 600 | 11.5857 | 5469.4 | 59.8282 | 30427.5 | 22669.8 | 19439.2 | -10.9941 | -267479.8 | 83.7870 |
| 700 | 12.1050 | 6654.7 | 61.6944 | 36503.3 | 23855.1 | 19508.2 | -9.9810 | -267791.9 | 69.8613 |
| 800 | 12.5289 | 7887.6 | 63.2999 | 42752.4 | 25088.0 | 19599.1 | -9.2181 | -268054.9 | 59.4057 |
| 900 | 12.9016 | 9160.2 | 64.7984 | 49158.4 | 26360.5 | 19705.4 | -8.6217 | -268277.0 | 51.2662 |
| 1000 | 13.2055 | 10466.0 | 66.1735 | 55707.9 | 27666.3 | 19823.1 | -8.1418 | -268465.1 | 44.7496 |
| 1100 | 13.4612 | 11759.7 | 67.4449 | 62385.7 | 29000.0 | 19949.2 | -7.7468 | -268624.6 | 39.4143 |
| 1200 | 13.6778 | 13156.9 | 68.6257 | 69193.9 | 30357.3 | 20081.8 | -7.4155 | -268760.2 | 34.9659 |
| 1300 | 13.8625 | 14534.2 | 69.7280 | 76112.2 | 31734.5 | 20219.6 | -7.1332 | -268875.4 | 31.2000 |
| 1400 | 14.0213 | 15928.5 | 70.7612 | 83137.2 | 33128.9 | 20361.3 | -6.8896 | -268973.2 | 27.9709 |
| 1500 | 14.1591 | 17337.7 | 71.7334 | 90262.4 | 34538.1 | 20506.3 | -6.6770 | -269055.9 | 25.1713 |
| 1600 | 14.2798 | 18759.8 | 72.6512 | 97482.1 | 35960.2 | 20653.8 | -6.4896 | -269125.6 | 22.7210 |
| 1700 | 14.3864 | 20193.2 | 73.5201 | 104791.0 | 37393.6 | 20803.2 | -6.3230 | -269183.9 | 20.5585 |
| 1800 | 14.4814 | 21626.7 | 74.3452 | 112184.6 | 38837.1 | 20954.3 | -6.1759 | -269232.0 | 18.6359 |
| 1900 | 14.5668 | 23089.2 | 75.1305 | 119658.7 | 40285.5 | 21106.5 | -6.0396 | -269271.0 | 16.9153 |
| 2000 | 14.6442 | 24549.8 | 75.8797 | 127209.5 | 41750.1 | 21259.7 | -5.9177 | -269302.0 | 15.3667 |
| 2100 | 14.7150 | 26017.8 | 76.5959 | 134833.6 | 43218.2 | 21413.5 | -5.8067 | -269325.6 | 13.9653 |
| 2200 | 14.7803 | 27492.6 | 77.2820 | 142527.7 | 44693.0 | 21567.9 | -5.7051 | -269342.7 | 12.6913 |
| 2300 | 14.8409 | 28973.7 | 77.9402 | 150289.0 | 46174.1 | 21722.7 | -5.6116 | -269353.8 | 11.5280 |
| 2400 | 14.8975 | 30460.6 | 78.5732 | 158114.9 | 47661.0 | 21877.7 | -5.5253 | -269359.6 | 10.4616 |
| 2500 | 14.9509 | 31953.1 | 79.1824 | 166002.9 | 49153.5 | 22033.0 | -5.4453 | -269360.7 | 9.4805 |
| 2600 | 15.0014 | 33450.7 | 79.7698 | 173950.7 | 50651.1 | 22188.5 | -5.3710 | -269357.5 | 8.5749 |
| 2700 | 15.0495 | 34953.2 | 80.3368 | 181956.7 | 52153.7 | 22344.1 | -5.3017 | -269350.5 | 7.7363 |
| 2800 | 15.0956 | 36460.6 | 80.8850 | 190017.4 | 53660.9 | 22500.0 | -5.2369 | -269340.4 | 6.9577 |
| 2900 | 15.1400 | 37972.4 | 81.4155 | 198132.6 | 55172.7 | 22656.0 | -5.1761 | -269327.7 | 6.2329 |
| 3000 | 15.1826 | 39488.5 | 81.9295 | 206300.0 | 56688.9 | 22812.3 | -5.1190 | -269312.8 | 5.5563 |
| 3100 | 15.2247 | 41008.9 | 82.4280 | 214518.0 | 58209.3 | 22969.0 | -5.0652 | -269296.3 | 4.9235 |
| 3200 | 15.2653 | 42533.4 | 82.9120 | 222785.1 | 59732.8 | 23126.0 | -5.0144 | -269278.8 | 4.3303 |
| 3300 | 15.3052 | 44061.9 | 83.3824 | 231099.9 | 61262.3 | 23283.5 | -4.9664 | -269260.7 | 3.7730 |
| 3400 | 15.3442 | 45594.4 | 83.8399 | 239461.1 | 62794.8 | 23441.6 | -4.9209 | -269242.6 | 3.2486 |
| 3500 | 15.3827 | 47130.8 | 84.2852 | 247867.5 | 64331.1 | 23600.2 | -4.8777 | -269225.1 | 2.7541 |
| 3600 | 15.4208 | 48670.9 | 84.7191 | 256317.8 | 65871.3 | 23759.6 | -4.8367 | -269208.7 | 2.2872 |
| 3700 | 15.4584 | 50214.9 | 85.1421 | 264810.9 | 67415.3 | 23919.9 | -4.7975 | -269193.9 | 1.8455 |
| 3800 | 15.4957 | 51762.6 | 85.5545 | 273345.9 | 68963.0 | 24081.0 | -4.7602 | -269181.2 | 1.4271 |
| 3900 | 15.5328 | 53314.0 | 85.9575 | 281921.6 | 70514.4 | 24242.2 | -4.7246 | -269171.1 | 1.0302 |
| 4000 | 15.5698 | 54869.2 | 86.3516 | 290537.1 | 72069.5 | 24403.5 | -4.6905 | -269164.1 | 0.6531 |
| 4100 | 15.6066 | 56428.0 | 86.7365 | 299191.6 | 73628.4 | 24571.0 | -4.6579 | -269160.6 | 0.2944 |
| 4200 | 15.6434 | 57990.5 | 87.1130 | 307884.1 | 75190.9 | 24736.8 | -4.6266 | -269161.2 | -0.0472 |
| 4300 | 15.6802 | 59556.7 | 87.4815 | 316613.9 | 76757.0 | 24904.0 | -4.5966 | -269166.1 | -0.3729 |
| 4400 | 15.7171 | 61126.5 | 87.8424 | 325380.2 | 78326.9 | 25072.7 | -4.5677 | -269175.8 | -0.6838 |
| 4500 | 15.7540 | 62700.1 | 88.1961 | 334182.2 | 79900.5 | 25242.9 | -4.5400 | -269190.7 | -0.9809 |
| 4600 | 15.7911 | 64277.2 | 88.5427 | 343019.2 | 81477.7 | 25414.9 | -4.5132 | -269211.1 | -1.2651 |
| 4700 | 15.8283 | 65858.2 | 88.8827 | 351890.5 | 83058.7 | 25588.5 | -4.4874 | -269237.3 | -1.5372 |
| 4800 | 15.8657 | 67443.0 | 89.2164 | 360795.5 | 84643.4 | 25764.1 | -4.4626 | -269269.5 | -1.7981 |
| 4900 | 15.9033 | 69031.5 | 89.5435 | 369733.6 | 86231.8 | 25941.5 | -4.4385 | -269308.1 | -2.0483 |
| 5000 | 15.9412 | 70623.7 | 89.8656 | 378704.1 | 87824.1 | 26120.9 | -4.4153 | -269353.2 | -2.2885 |
| 5100 | 15.9793 | 72219.7 | 90.1816 | 387706.5 | 89420.1 | 26302.4 | -4.3929 | -269405.0 | -2.5194 |
| 5200 | 16.0176 | 73819.5 | 90.4923 | 396740.2 | 91019.9 | 26486.0 | -4.3711 | -269463.6 | -2.7414 |
| 5300 | 16.0563 | 75423.2 | 90.7977 | 405804.8 | 92623.6 | 26671.8 | -4.3500 | -269529.2 | -2.9551 |
| 5400 | 16.0953 | 77030.8 | 91.0982 | 414899.6 | 94231.2 | 26859.8 | -4.3296 | -269601.9 | -3.1609 |
| 5500 | 16.1346 | 78642.3 | 91.3935 | 424024.3 | 95842.7 | 27050.2 | -4.3098 | -269681.7 | -3.3594 |
| 5600 | 16.1742 | 80257.7 | 91.6850 | 433178.2 | 97458.1 | 27242.9 | -4.2905 | -269768.6 | -3.5507 |
| 5700 | 16.2142 | 81877.2 | 91.9716 | 442361.1 | 99077.5 | 27438.1 | -4.2718 | -269862.7 | -3.7355 |
| 5800 | 16.2546 | 83500.6 | 92.2540 | 451572.4 | 100701.0 | 27635.8 | -4.2536 | -269963.9 | -3.9139 |
| 5900 | 16.2954 | 85128.1 | 92.5322 | 460811.8 | 102328.5 | 27835.9 | -4.2359 | -270072.1 | -4.0863 |
| 6000 | 16.3365 | 86759.7 | 92.8064 | 470078.7 | 103960.1 | 28038.7 | -4.2186 | -270187.4 | -4.2531 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(148) N_2O_4 (gas); molecular weight, 92.016

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| C | ----- | 0 | ----- | 0 | -1569.3 | 4652.5 | ----- | -456452.6 | ----- |
| 100 | 11.0363 | 956.2 | 57.1248 | 4756.3 | -613.1 | 3527.9 | -21.6614 | -458599.9 | 972.6934 |
| 200 | 15.1093 | 2262.6 | 66.0163 | 10940.6 | 693.3 | 2747.1 | -18.1718 | -460516.7 | 470.7290 |
| 298.15 | 18.4750 | 3918.1 | 72.7063 | 17759.2 | 2348.8 | 2348.8 | -17.2552 | -461927.0 | 304.8435 |
| 300 | 18.5302 | 3952.4 | 72.8207 | 17893.8 | 2383.1 | 2344.2 | -17.2446 | -461949.9 | 302.7555 |
| 400 | 21.1646 | 5942.5 | 78.5278 | 25468.6 | 4373.2 | 2216.7 | -16.8316 | -463025.1 | 218.5338 |
| 500 | 23.2360 | 8166.7 | 83.4823 | 33574.5 | 6597.4 | 2276.0 | -16.5877 | -463836.6 | 167.8961 |
| 600 | 24.8608 | 10574.9 | 87.8684 | 42146.2 | 9005.5 | 2460.7 | -16.4162 | -464447.5 | 134.0853 |
| 700 | 26.1267 | 13126.9 | 91.7999 | 51133.0 | 11557.6 | 2729.5 | -16.2819 | -464904.4 | 109.9068 |
| 800 | 27.1120 | 15790.8 | 95.3556 | 60493.7 | 14221.5 | 3055.0 | -16.1694 | -465242.7 | 91.7573 |
| 900 | 27.8826 | 18542.1 | 98.5953 | 70193.6 | 16972.8 | 3418.9 | -16.0715 | -465489.2 | 77.6321 |
| 1000 | 28.4905 | 21362.0 | 101.5657 | 80203.8 | 19792.6 | 3809.1 | -15.9839 | -465663.9 | 66.3269 |
| 1100 | 28.9750 | 24236.1 | 104.3047 | 90499.1 | 22666.8 | 4217.3 | -15.9043 | -465781.9 | 57.0742 |
| 1200 | 29.3652 | 27153.8 | 106.8432 | 101058.0 | 25584.5 | 4637.7 | -15.8312 | -465854.6 | 49.3621 |
| 1300 | 29.6830 | 30106.8 | 109.2066 | 111861.9 | 28537.5 | 5066.1 | -15.7633 | -465890.5 | 42.8357 |
| 1400 | 29.9444 | 33088.5 | 111.4163 | 122894.2 | 31519.2 | 5499.2 | -15.6999 | -465896.6 | 37.2414 |
| 1500 | 30.1616 | 36094.2 | 113.4899 | 134140.6 | 34524.9 | 5934.6 | -15.6405 | -465877.8 | 32.3930 |
| 1600 | 30.3438 | 39119.7 | 115.4424 | 145588.2 | 37550.4 | 6370.1 | -15.5845 | -465838.5 | 28.1510 |
| 1700 | 30.4978 | 42162.0 | 117.2867 | 157225.5 | 40592.7 | 6804.1 | -15.5316 | -465781.9 | 24.4084 |
| 1800 | 30.6290 | 45218.5 | 119.0338 | 169042.3 | 43649.2 | 7235.1 | -15.4815 | -465710.6 | 21.0821 |
| 1900 | 30.7417 | 48287.2 | 120.6929 | 181029.3 | 46717.9 | 7662.0 | -15.4339 | -465627.0 | 18.1065 |
| 2000 | 30.8391 | 51366.3 | 122.2723 | 193178.2 | 49797.0 | 8083.7 | -15.3887 | -465532.7 | 15.4289 |
| 2100 | 30.9239 | 54454.6 | 123.7790 | 205481.3 | 52885.3 | 8499.4 | -15.3455 | -465429.5 | 13.0068 |
| 2200 | 30.9980 | 57550.8 | 125.2193 | 217931.8 | 55981.4 | 8908.5 | -15.3044 | -465318.7 | 10.8055 |
| 2300 | 31.0631 | 60653.9 | 126.5987 | 230523.2 | 59084.6 | 9310.4 | -15.2650 | -465201.6 | 8.7960 |
| 2400 | 31.1207 | 63763.1 | 127.9220 | 243249.7 | 62193.8 | 9704.7 | -15.2274 | -465079.2 | 6.9545 |
| 2500 | 31.1719 | 66877.8 | 129.1935 | 256105.8 | 65308.5 | 10091.1 | -15.1914 | -464952.7 | 5.2608 |
| 2600 | 31.2175 | 69997.3 | 130.4170 | 269086.8 | 68428.0 | 10469.5 | -15.1568 | -464823.1 | 3.6977 |
| 2700 | 31.2583 | 73121.2 | 131.5959 | 282187.8 | 71551.8 | 10839.6 | -15.1236 | -464691.4 | 2.2509 |
| 2800 | 31.2950 | 76248.8 | 132.7334 | 295404.5 | 74679.5 | 11201.5 | -15.0918 | -464558.4 | 0.9078 |
| 2900 | 31.3281 | 79380.0 | 133.8321 | 308733.1 | 77810.7 | 11555.1 | -15.0612 | -464425.2 | -0.3423 |
| 3000 | 31.3581 | 82514.4 | 134.8947 | 322169.8 | 80945.1 | 11900.5 | -15.0317 | -464292.5 | -1.5088 |
| 3100 | 31.3852 | 85651.6 | 135.9234 | 335710.9 | 84082.2 | 12237.8 | -15.0034 | -464161.5 | -2.5997 |
| 3200 | 31.4100 | 88791.3 | 136.9202 | 349353.4 | 87222.0 | 12567.2 | -14.9760 | -464032.8 | -3.6221 |
| 3300 | 31.4326 | 91935.5 | 137.8871 | 363094.0 | 90364.2 | 12888.9 | -14.9497 | -463907.3 | -4.5823 |
| 3400 | 31.4532 | 95077.8 | 138.8258 | 376929.9 | 93508.5 | 13202.9 | -14.9243 | -463786.0 | -5.4857 |
| 3500 | 31.4722 | 98224.1 | 139.7378 | 390858.3 | 96654.8 | 13509.6 | -14.8998 | -463669.7 | -6.3373 |
| 3600 | 31.4897 | 101372.2 | 140.6247 | 404876.6 | 99802.9 | 13809.1 | -14.8761 | -463559.1 | -7.1415 |
| 3700 | 31.5058 | 104522.0 | 141.4877 | 418982.4 | 102952.6 | 14101.7 | -14.8532 | -463455.0 | -7.9019 |
| 3800 | 31.5206 | 107673.3 | 142.3281 | 433173.4 | 106104.0 | 14387.6 | -14.8310 | -463358.2 | -8.6222 |
| 3900 | 31.5344 | 110826.0 | 143.1470 | 447447.3 | 109256.7 | 14667.0 | -14.8096 | -463269.4 | -9.3054 |
| 4000 | 31.5471 | 113980.1 | 143.9456 | 461802.1 | 112410.8 | 14940.2 | -14.7889 | -463189.2 | -9.9544 |
| 4100 | 31.5590 | 117135.4 | 144.7247 | 476235.8 | 115566.1 | 15207.3 | -14.7688 | -463118.4 | -10.5715 |
| 4200 | 31.5700 | 120291.9 | 145.4853 | 490746.4 | 118722.6 | 15468.6 | -14.7493 | -463057.4 | -11.1592 |
| 4300 | 31.5803 | 123449.4 | 146.2283 | 505332.2 | 121880.1 | 15724.3 | -14.7305 | -463007.0 | -11.7195 |
| 4400 | 31.5898 | 126607.9 | 146.9544 | 519991.5 | 125038.6 | 15974.6 | -14.7121 | -462967.6 | -12.2543 |
| 4500 | 31.5988 | 129767.4 | 147.6644 | 534722.6 | 128198.0 | 16219.6 | -14.6944 | -462939.7 | -12.7653 |
| 4600 | 31.6072 | 132927.7 | 148.3590 | 549523.9 | 131358.3 | 16459.6 | -14.6771 | -462923.7 | -13.2540 |
| 4700 | 31.6151 | 136088.8 | 149.0389 | 564393.9 | 134519.5 | 16694.7 | -14.6604 | -462920.1 | -13.7220 |
| 4800 | 31.6225 | 139250.7 | 149.7046 | 579331.2 | 137681.3 | 16925.0 | -14.6441 | -462929.1 | -14.1704 |
| 4900 | 31.6294 | 142413.3 | 150.3567 | 594334.4 | 140844.0 | 17150.8 | -14.6283 | -462951.1 | -14.6006 |
| 5000 | 31.6360 | 145576.5 | 150.9957 | 609402.1 | 144007.2 | 17372.1 | -14.6129 | -462986.4 | -15.0135 |
| 5100 | 31.6421 | 148740.5 | 151.6223 | 624533.1 | 147171.1 | 17589.0 | -14.5979 | -463035.2 | -15.4103 |
| 5200 | 31.6480 | 151905.0 | 152.2367 | 639726.1 | 150335.6 | 17801.7 | -14.5833 | -463097.7 | -15.7919 |
| 5300 | 31.6535 | 155070.0 | 152.8396 | 654980.0 | 153500.7 | 18010.3 | -14.5691 | -463173.9 | -16.1592 |
| 5400 | 31.6587 | 158235.6 | 153.4314 | 670293.7 | 156666.3 | 18214.8 | -14.5553 | -463264.2 | -16.5129 |
| 5500 | 31.6636 | 161401.8 | 154.0123 | 685665.9 | 159832.4 | 18415.4 | -14.5418 | -463368.3 | -16.8538 |
| 5600 | 31.6682 | 164568.4 | 154.5829 | 701095.8 | 162999.0 | 18612.1 | -14.5287 | -463486.6 | -17.1826 |
| 5700 | 31.6727 | 167735.4 | 155.1434 | 716582.2 | 166166.1 | 18805.0 | -14.5159 | -463618.8 | -17.5000 |
| 5800 | 31.6769 | 170902.9 | 155.6943 | 732124.2 | 169333.6 | 18994.2 | -14.5034 | -463765.1 | -17.8065 |
| 5900 | 31.6808 | 174070.8 | 156.2358 | 747720.7 | 172501.4 | 19179.6 | -14.4912 | -463925.3 | -18.1027 |
| 6000 | 31.6846 | 177239.0 | 156.7683 | 763371.0 | 175669.7 | 19361.5 | -14.4793 | -464099.3 | -18.3892 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(149) NS (gas); molecular weight, 46.074

| T, °K | C _p , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| C | ----- | C | ----- | C | 61393.1 | 63482.5 | ----- | -115000.0 | ----- |
| 100 | 7.7204 | 719.6 | 44.6222 | 3742.6 | 62112.7 | 63651.0 | -134.2748 | -115276.3 | 247.4022 |
| 200 | 7.6567 | 1457.5 | 50.0191 | 8505.9 | 62851.0 | 63728.9 | -64.6495 | -115532.2 | 121.3370 |
| 298.15 | 7.5559 | 2246.1 | 53.0642 | 13575.0 | 63635.2 | 63639.2 | -41.7369 | -115826.2 | 79.7333 |
| 300 | 7.6009 | 2260.2 | 53.1112 | 13673.2 | 63653.2 | 63636.8 | -41.4494 | -115831.8 | 79.2098 |
| 400 | 7.7433 | 3026.2 | 55.2135 | 19099.4 | 64419.3 | 62955.8 | -29.8834 | -116123.6 | 58.0905 |
| 500 | 7.9527 | 3810.5 | 57.0641 | 24721.1 | 65204.0 | 62451.3 | -23.0284 | -116385.1 | 45.3882 |
| 600 | 8.1472 | 4616.2 | 58.5317 | 30502.8 | 66009.2 | 62043.2 | -18.4535 | -116615.2 | 36.9019 |
| 700 | 8.3071 | 5439.2 | 59.8001 | 36420.9 | 66832.3 | 61702.7 | -15.2739 | -116819.2 | 30.8289 |
| 800 | 8.4340 | 6276.5 | 60.9175 | 42457.9 | 67669.6 | 61398.1 | -12.8716 | -117002.4 | 26.2666 |
| 900 | 8.5342 | 7125.1 | 61.9173 | 48600.5 | 68518.2 | 61097.7 | -11.0124 | -117169.5 | 22.7128 |
| 1000 | 8.6140 | 7982.7 | 62.8208 | 54838.1 | 69375.7 | 60798.7 | -9.5323 | -117324.0 | 19.8658 |
| 1100 | 8.6783 | 8847.4 | 63.6445 | 61162.0 | 70240.5 | 60500.0 | -8.3273 | -117468.4 | 17.5335 |
| 1200 | 8.7209 | 9717.9 | 64.4024 | 67564.9 | 71111.0 | 60200.5 | -7.3281 | -117604.9 | 15.5876 |
| 1300 | 8.7446 | 10593.3 | 65.1030 | 74040.6 | 71986.4 | 59901.3 | -6.4868 | -117734.9 | 13.9392 |
| 1400 | 8.8114 | 11472.6 | 65.7546 | 80583.9 | 72865.7 | 59600.9 | -5.7692 | -117859.8 | 12.5247 |
| 1500 | 8.8429 | 12355.4 | 66.3637 | 87190.1 | 73748.5 | 59299.8 | -5.1505 | -117980.5 | 11.2976 |
| 1600 | 8.8701 | 13241.1 | 66.9352 | 93855.3 | 74634.1 | 58998.0 | -4.6119 | -118097.9 | 10.2227 |
| 1700 | 8.8540 | 14129.3 | 67.4737 | 100576.0 | 75522.4 | 58695.6 | -4.1391 | -118212.7 | 9.2734 |
| 1800 | 8.9151 | 15019.8 | 67.9827 | 107349.1 | 76412.8 | 58392.6 | -3.7209 | -118325.6 | 8.4288 |
| 1900 | 8.9241 | 15912.2 | 68.4652 | 114171.7 | 77305.3 | 58085.2 | -3.3488 | -118437.1 | 7.6723 |
| 2000 | 8.9513 | 16806.5 | 68.9235 | 121041.4 | 78199.6 | 57785.4 | -3.0155 | -118547.8 | 6.9909 |
| 2100 | 8.9670 | 17702.4 | 69.3611 | 127955.8 | 79095.5 | 57481.2 | -2.7156 | -118657.9 | 6.3738 |
| 2200 | 8.9814 | 18599.9 | 69.7785 | 134912.9 | 79992.9 | 57176.8 | -2.4445 | -118767.9 | 5.8122 |
| 2300 | 8.9548 | 19458.7 | 70.1781 | 141910.9 | 80891.8 | 56872.2 | -2.1982 | -118878.2 | 5.2990 |
| 2400 | 9.0073 | 20358.8 | 70.5612 | 148948.0 | 81791.9 | 56567.5 | -1.9736 | -118989.0 | 4.8282 |
| 2500 | 9.0191 | 21300.1 | 70.9291 | 156022.6 | 82693.2 | 56262.7 | -1.7681 | -119100.6 | 4.3946 |
| 2600 | 9.0302 | 22202.6 | 71.2831 | 163123.3 | 83595.7 | 55958.0 | ----- | -119213.3 | 3.9939 |
| 2700 | 9.0408 | 23106.2 | 71.6241 | 170278.8 | 84499.2 | 55653.6 | ----- | -119327.2 | 3.6227 |
| 2800 | 9.0509 | 24010.8 | 71.9530 | 177457.7 | 85403.8 | 55349.2 | ----- | -119442.6 | 3.2775 |
| 2900 | 9.0606 | 24916.3 | 72.2706 | 184669.0 | 86309.4 | 55044.8 | ----- | -119559.6 | 2.9559 |
| 3000 | 9.0699 | 25822.5 | 72.5781 | 191911.6 | 87215.9 | 54740.4 | ----- | -119678.5 | 2.6555 |
| 3100 | 9.0790 | 26730.3 | 72.8757 | 199184.3 | 88123.4 | 54436.0 | ----- | -119799.4 | 2.3741 |
| 3200 | 9.0877 | 27638.7 | 73.1641 | 206486.4 | 89031.7 | 54131.6 | ----- | -119922.5 | 2.1100 |
| 3300 | 9.0962 | 28547.5 | 73.4435 | 213816.9 | 89940.9 | 53827.2 | ----- | -120047.9 | 1.8617 |
| 3400 | 9.1045 | 29457.9 | 73.7155 | 221174.9 | 90851.0 | 53522.8 | ----- | -120175.9 | 1.6278 |
| 3500 | 9.1125 | 30368.7 | 73.9796 | 228555.7 | 91761.8 | 53218.4 | ----- | -120306.5 | 1.4070 |
| 3600 | 9.1205 | 31280.4 | 74.2364 | 235970.6 | 92673.5 | 52914.0 | ----- | -120440.0 | 1.1982 |
| 3700 | 9.1283 | 32192.8 | 74.4864 | 243406.7 | 93585.9 | 52609.6 | ----- | -120576.4 | 1.0005 |
| 3800 | 9.1359 | 33106.0 | 74.7295 | 250867.6 | 94499.1 | 52305.2 | ----- | -120716.0 | 0.8129 |
| 3900 | 9.1435 | 34020.0 | 74.9673 | 258352.5 | 95413.1 | 52000.8 | ----- | -120858.9 | 0.6348 |
| 4000 | 9.1509 | 34934.7 | 75.1985 | 265860.9 | 96327.8 | 51696.4 | ----- | -121005.1 | 0.4654 |
| 4100 | 9.1583 | 35850.2 | 75.4250 | 273392.1 | 97243.3 | 51392.0 | ----- | -121155.0 | 0.3041 |
| 4200 | 9.1656 | 36766.4 | 75.6457 | 280945.7 | 98159.5 | 51087.6 | ----- | -121308.4 | 0.1502 |
| 4300 | 9.1729 | 37683.3 | 75.8615 | 288521.1 | 99076.4 | 50783.2 | ----- | -121465.7 | 0.0033 |
| 4400 | 9.1802 | 38601.0 | 76.0725 | 296117.8 | 99994.0 | 50478.8 | ----- | -121626.9 | -0.1371 |
| 4500 | 9.1874 | 39519.3 | 76.2786 | 303735.4 | 100912.4 | 50174.4 | ----- | -121792.1 | -0.2714 |
| 4600 | 9.1947 | 40438.5 | 76.4809 | 311373.5 | 101831.5 | 49870.0 | ----- | -121961.4 | -0.4001 |
| 4700 | 9.2020 | 41358.3 | 76.6787 | 319031.5 | 102751.4 | 49565.6 | ----- | -122134.8 | -0.5234 |
| 4800 | 9.2093 | 42278.9 | 76.8725 | 326709.1 | 103671.9 | 49261.2 | ----- | -122312.5 | -0.6418 |
| 4900 | 9.2167 | 43200.2 | 77.0624 | 334405.8 | 104593.2 | 48956.8 | ----- | -122494.6 | -0.7556 |
| 5000 | 9.2241 | 44122.2 | 77.2487 | 342121.4 | 105515.3 | 48652.4 | ----- | -122681.0 | -0.8649 |
| 5100 | 9.2317 | 45045.0 | 77.4315 | 349855.5 | 106438.1 | 48348.0 | ----- | -122871.7 | -0.9701 |
| 5200 | 9.2393 | 45968.5 | 77.6106 | 357607.6 | 107361.6 | 48043.6 | ----- | -123066.9 | -1.0715 |
| 5300 | 9.2470 | 46892.8 | 77.7869 | 365377.5 | 108285.9 | 47739.2 | ----- | -123266.6 | -1.1691 |
| 5400 | 9.2549 | 47817.9 | 77.9598 | 373164.9 | 109211.0 | 47434.8 | ----- | -123470.7 | -1.2633 |
| 5500 | 9.2629 | 48743.8 | 78.1297 | 380969.4 | 110136.9 | 47130.4 | ----- | -123679.2 | -1.3543 |
| 5600 | 9.2711 | 49670.5 | 78.2967 | 388790.7 | 111063.6 | 46826.0 | ----- | -123892.2 | -1.4421 |
| 5700 | 9.2795 | 50598.1 | 78.4606 | 396628.6 | 111991.1 | 46521.6 | ----- | -124109.5 | -1.5270 |
| 5800 | 9.2881 | 51526.4 | 78.6223 | 404482.8 | 112919.5 | 46217.2 | ----- | -124331.2 | -1.6091 |
| 5900 | 9.2968 | 52455.7 | 78.7811 | 412353.0 | 113848.7 | 45912.8 | ----- | -124557.1 | -1.6886 |
| 6000 | 9.3058 | 53385.8 | 78.9375 | 420238.9 | 114778.9 | 45608.4 | ----- | -124787.3 | -1.7655 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (150) Na (gas); molecular weight, 22.991

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 24115.6 | 25649.9 | ----- | 0 | ----- |
| 100 | 4.9681 | 496.8 | 31.2867 | 2631.9 | 24612.4 | 25833.7 | -50.8518 | 0 | 0 |
| 200 | 4.9681 | 993.6 | 34.7303 | 5952.4 | 25109.2 | 25743.8 | -22.6540 | 0 | 0 |
| 298.15 | 4.9681 | 1481.3 | 36.7140 | 9465.0 | 25596.9 | 25596.9 | -13.4151 | 0 | 0 |
| 300 | 4.9681 | 1490.4 | 36.7447 | 9533.0 | 25606.0 | 25593.5 | -13.2994 | 0 | 0 |
| 400 | 4.9681 | 1987.3 | 38.1740 | 13282.3 | 26102.9 | 24688.3 | -8.6866 | 0 | 0 |
| 500 | 4.9681 | 2484.1 | 39.2826 | 17157.2 | 26599.7 | 24442.9 | -6.0016 | 0 | 0 |
| 600 | 4.9681 | 2980.9 | 40.1884 | 21132.1 | 27096.5 | 24219.4 | -4.2288 | 0 | 0 |
| 700 | 4.9681 | 3477.7 | 40.9542 | 25190.3 | 27593.3 | 24013.8 | -2.9737 | 0 | 0 |
| 800 | 4.9681 | 3974.5 | 41.6176 | 29319.6 | 28090.1 | 23818.0 | -2.0403 | 0 | 0 |
| 900 | 4.9681 | 4471.3 | 42.2026 | 33511.2 | 28586.9 | 23625.8 | -1.3200 | 0 | 0 |
| 1000 | 4.9681 | 4968.1 | 42.7262 | 37758.1 | 29083.7 | 23431.9 | -0.7487 | 0 | 0 |
| 1100 | 4.9682 | 5465.0 | 43.1998 | 42054.8 | 29580.6 | 23232.0 | -0.2850 | 0 | 0 |
| 1200 | 4.9682 | 5961.8 | 43.6320 | 46396.7 | 30077.4 | 23022.5 | 0.0980 | 0 | 0 |
| 1300 | 4.9682 | 6458.6 | 44.0297 | 50780.0 | 30574.2 | 22804.5 | 0.4191 | 0 | 0 |
| 1400 | 4.9682 | 6955.4 | 44.3979 | 55201.6 | 31071.0 | 22580.3 | 0.6926 | 0 | 0 |
| 1500 | 4.9683 | 7452.2 | 44.7407 | 59658.8 | 31567.8 | 22351.1 | 0.9244 | 0 | 0 |
| 1600 | 4.9685 | 7949.1 | 45.0613 | 64149.0 | 32064.7 | 22116.0 | 1.1274 | 0 | 0 |
| 1700 | 4.9689 | 8445.9 | 45.3625 | 68670.4 | 32561.5 | 21878.8 | 1.3053 | 0 | 0 |
| 1800 | 4.9696 | 8942.9 | 45.6466 | 73221.0 | 33058.5 | 21637.8 | 1.4611 | 0 | 0 |
| 1900 | 4.9707 | 9439.9 | 45.9153 | 77799.2 | 33555.5 | 21394.8 | 1.5986 | 0 | 0 |
| 2000 | 4.9726 | 9937.0 | 46.1703 | 82403.6 | 34052.6 | 21149.9 | 1.7189 | 0 | 0 |
| 2100 | 4.9754 | 10434.4 | 46.4130 | 87032.8 | 34550.0 | 20904.3 | 1.8289 | 0 | 0 |
| 2200 | 4.9793 | 10932.1 | 46.6445 | 91685.8 | 35047.7 | 20657.0 | 1.9286 | 0 | 0 |
| 2300 | 4.9848 | 11430.3 | 46.8660 | 96361.4 | 35545.9 | 20408.2 | 2.0156 | 0 | 0 |
| 2400 | 4.9919 | 11929.2 | 47.0783 | 101058.7 | 36044.8 | 20160.1 | 2.0976 | 0 | 0 |
| 2500 | 5.0012 | 12428.8 | 47.2822 | 105776.8 | 36544.4 | 19910.7 | 2.1696 | 0 | 0 |
| 2600 | 5.0128 | 12929.5 | 47.4786 | 110514.9 | 37045.1 | | 0 | 0 | 0 |
| 2700 | 5.0270 | 13431.4 | 47.6680 | 115272.3 | 37547.0 | | 0 | 0 | 0 |
| 2800 | 5.0442 | 13935.0 | 47.8512 | 120048.3 | 38050.6 | | 0 | 0 | 0 |
| 2900 | 5.0645 | 14440.4 | 48.0285 | 124842.3 | 38556.0 | | 0 | 0 | 0 |
| 3000 | 5.0883 | 14948.0 | 48.2006 | 129653.8 | 39063.6 | | 0 | 0 | 0 |
| 3100 | 5.1157 | 15458.1 | 48.3679 | 134482.3 | 39573.7 | | 0 | 0 | 0 |
| 3200 | 5.1471 | 15971.3 | 48.5308 | 139327.2 | 40086.9 | | 0 | 0 | 0 |
| 3300 | 5.1817 | 16487.5 | 48.6896 | 144188.3 | 40603.1 | | 0 | 0 | 0 |
| 3400 | 5.2213 | 17007.6 | 48.8449 | 149065.0 | 41123.2 | | 0 | 0 | 0 |
| 3500 | 5.2654 | 17531.9 | 48.9969 | 153957.1 | 41647.5 | | 0 | 0 | 0 |
| 3600 | 5.3143 | 18060.9 | 49.1459 | 158864.3 | 42176.5 | | 0 | 0 | 0 |
| 3700 | 5.3683 | 18594.9 | 49.2922 | 163786.2 | 42710.5 | | 0 | 0 | 0 |
| 3800 | 5.4277 | 19134.7 | 49.4361 | 168722.7 | 43250.3 | | 0 | 0 | 0 |
| 3900 | 5.4927 | 19680.7 | 49.5780 | 173673.4 | 43796.3 | | 0 | 0 | 0 |
| 4000 | 5.5637 | 20233.4 | 49.7179 | 178638.2 | 44349.0 | | 0 | 0 | 0 |
| 4100 | 5.6411 | 20793.6 | 49.8562 | 183616.9 | 44909.2 | | 0 | 0 | 0 |
| 4200 | 5.7232 | 21361.3 | 49.9930 | 188609.3 | 45476.9 | | 0 | 0 | 0 |
| 4300 | 5.8136 | 21938.1 | 50.1287 | 193615.4 | 46053.7 | | 0 | 0 | 0 |
| 4400 | 5.9023 | 22514.0 | 50.2610 | 198634.2 | 46639.6 | | 0 | 0 | 0 |
| 4500 | 5.9733 | 23104.0 | 50.3936 | 203666.8 | 47220.2 | | 0 | 0 | 0 |
| 4600 | 6.0758 | 23707.0 | 50.5260 | 208712.8 | 47822.6 | | 0 | 0 | 0 |
| 4700 | 6.1847 | 24319.9 | 50.6579 | 213772.0 | 48435.5 | | 0 | 0 | 0 |
| 4800 | 6.3000 | 24944.1 | 50.7893 | 218844.3 | 49059.7 | | 0 | 0 | 0 |
| 4900 | 6.4218 | 25580.2 | 50.9204 | 223929.8 | 49695.8 | | 0 | 0 | 0 |
| 5000 | 6.5461 | 26226.8 | 51.0510 | 229028.2 | 50342.4 | | 0 | 0 | 0 |
| 5100 | 6.6802 | 26888.1 | 51.1820 | 234139.9 | 51003.7 | | 0 | 0 | 0 |
| 5200 | 6.8206 | 27563.1 | 51.3130 | 239264.6 | 51678.7 | | 0 | 0 | 0 |
| 5300 | 6.9672 | 28252.4 | 51.4443 | 244402.5 | 52368.0 | | 0 | 0 | 0 |
| 5400 | 7.1200 | 28956.7 | 51.5760 | 249553.5 | 53072.3 | | 0 | 0 | 0 |
| 5500 | 7.2787 | 29676.6 | 51.7081 | 254717.7 | 53792.2 | | 0 | 0 | 0 |
| 5600 | 7.4431 | 30412.7 | 51.8407 | 259895.2 | 54528.3 | | 0 | 0 | 0 |
| 5700 | 7.6128 | 31165.4 | 51.9739 | 265085.9 | 55281.0 | | 0 | 0 | 0 |
| 5800 | 7.7877 | 31935.4 | 52.1078 | 270290.0 | 56051.0 | | 0 | 0 | 0 |
| 5900 | 7.9672 | 32723.1 | 52.2425 | 275507.5 | 56838.7 | | 0 | 0 | 0 |
| 6000 | 8.0977 | 33491.2 | 52.3709 | 280734.1 | 57606.8 | | 0 | 0 | 0 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Na, 370.98° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (151) Na (crystal, liquid); molecular weight, 22.991

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H _O ^o , ^a cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H _O ^o), ^a cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|---------------------|----------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | 0 | 0 | -1534.3 | 0 | ----- | -25649.9 | ----- |
| 100 | 5.356 | 313.0 | 5.639 | 250.9 | -1221.3 | 0 | 0 | -25833.7 | 50.8518 |
| 200 | 6.211 | 899.7 | 9.672 | 1034.7 | -634.6 | 0 | 0 | -25743.8 | 22.6540 |
| 298.15 | 6.747 | 1534.3 | 12.247 | 2117.1 | 0 | 0 | 0 | -25596.9 | 13.4151 |
| 300 | 6.76 | 1546.8 | 12.289 | 2139.9 | 12.5 | 0 | 0 | -25593.5 | 13.2994 |
| ^b 370.98 | 7.46 | 2088.8 | 13.907 | 3070.4 | 554.5 | 0 | 0 | -39626.1 | 9.6931 |
| 370.98 | 7.62 | 2710.6 | 15.583 | 3070.4 | 1176.3 | 0 | 0 | -24676.9 | 9.6931 |
| 400 | 7.52 | 2948.9 | 16.202 | 3531.9 | 1414.6 | 0 | 0 | -24588.3 | 8.6866 |
| 500 | 7.32 | 3691.1 | 17.859 | 5238.4 | 2156.8 | 0 | 0 | -24442.9 | 6.0016 |
| 600 | 7.10 | 4411.4 | 19.173 | 7092.4 | 2877.1 | 0 | 0 | -24219.4 | 4.2288 |
| 700 | 6.96 | 5113.8 | 20.256 | 9065.4 | 3579.5 | 0 | 0 | -24013.8 | 2.9737 |
| .800 | 6.90 | 5806.4 | 21.181 | 11138.4 | 4272.1 | 0 | 0 | -23818.0 | 2.0403 |
| 900 | 6.89 | 6495.4 | 21.992 | 13297.4 | 4961.1 | 0 | 0 | -23625.8 | 1.3200 |
| 1000 | 6.93 | 7186.1 | 22.720 | 15533.9 | 5651.8 | 0 | 0 | -23431.9 | 0.7487 |
| 1100 | 7.01 | 7882.9 | 23.384 | 17839.5 | 6348.6 | 0 | 0 | -23232.0 | 0.2850 |
| 1200 | 7.11 | 8589.2 | 23.998 | 20208.4 | 7054.9 | 0 | 0 | -23022.5 | -0.0980 |
| 1300 | 7.18 | 9304.0 | 24.570 | 22637.0 | 7769.7 | 0 | 0 | -22804.5 | -0.4191 |
| 1400 | 7.24 | 10025.0 | 25.100 | 25115.0 | 8490.7 | 0 | 0 | -22580.3 | -0.6926 |
| 1500 | 7.29 | 10751.0 | 25.610 | 27664.0 | 9216.7 | 0 | 0 | -22351.1 | -0.9244 |
| 1600 | 7.33 | 11483.0 | 26.080 | 30245.0 | 9948.7 | 0 | 0 | -22116.0 | -1.1274 |
| 1700 | 7.36 | 12217.0 | 26.520 | 32867.0 | 10682.7 | 0 | 0 | -21878.8 | -1.3053 |
| 1800 | 7.39 | 12955.0 | 26.940 | 35537.0 | 11420.7 | 0 | 0 | -21637.8 | -1.4611 |
| 1900 | 7.41 | 13695.0 | 27.340 | 38251.0 | 12160.7 | 0 | 0 | -21394.8 | -1.5986 |
| 2000 | 7.43 | 14437.0 | 27.730 | 41023.0 | 12902.7 | 0 | 0 | -21149.9 | -1.7189 |
| 2100 | 7.44 | 15180.0 | 28.090 | 43809.0 | 13645.7 | 0 | 0 | -20904.3 | -1.8289 |
| 2200 | 7.46 | 15925.0 | 28.430 | 46621.0 | 14390.7 | 0 | 0 | -20657.0 | -1.9286 |
| 2300 | 7.47 | 16672.0 | 28.770 | 49499.0 | 15137.7 | 0 | 0 | -20408.2 | -2.0156 |
| 2400 | 7.48 | 17419.0 | 29.080 | 52373.0 | 15884.7 | 0 | 0 | -20160.1 | -2.0976 |
| 2500 | 7.49 | 18168.0 | 29.390 | 55307.0 | 16633.7 | 0 | 0 | -19910.7 | -2.1696 |

^aH_T^o refers to crystal state.

^bMelting point.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (152) Na₂ (gas); molecular weight, 45.982

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 31391.2 | 34459.8 | ----- | -16840.0 | ----- |
| 100 | 8.3032 | 748.6 | 45.4851 | 3799.9 | 32139.8 | 34582.4 | -68.1006 | -17085.0 | 33.6031 |
| 200 | 8.8187 | 1611.3 | 51.4447 | 8677.7 | 33002.5 | 34271.7 | -30.4333 | -17216.0 | 14.8746 |
| 298.15 | 8.9662 | 2485.1 | 54.9974 | 13912.4 | 33876.3 | 33876.3 | -18.1646 | -17317.4 | 8.6656 |
| 300 | 8.9680 | 2501.7 | 55.0529 | 14014.2 | 33892.9 | 33867.9 | -18.0116 | -17319.2 | 8.5873 |
| a 400 | 9.0480 | 3402.7 | 57.6446 | 19655.1 | 34793.9 | 31964.7 | -11.9478 | -17411.8 | 5.4255 |
| 500 | 9.1067 | 4310.6 | 59.6701 | 25524.5 | 35701.8 | 31388.2 | -8.4846 | -17497.6 | 3.5185 |
| 600 | 9.1568 | 5223.8 | 61.3350 | 31577.2 | 36615.0 | 30860.8 | -6.2165 | -17578.0 | 2.2411 |
| 700 | 9.2028 | 6141.8 | 62.7500 | 37783.2 | 37533.0 | 30374.0 | -4.6229 | -17653.6 | 1.3246 |
| 800 | 9.2466 | 7064.3 | 63.9817 | 44121.1 | 38455.5 | 29911.3 | -3.4462 | -17724.7 | 0.6343 |
| 900 | 9.2891 | 7991.1 | 65.0733 | 50574.9 | 39382.3 | 29460.1 | -2.5447 | -17791.6 | 0.0953 |
| 1000 | 9.3308 | 8922.1 | 66.0541 | 57132.0 | 40313.3 | 29009.7 | -1.8348 | -17854.2 | -0.3375 |
| 1100 | 9.3720 | 9857.2 | 66.9454 | 63782.7 | 41248.4 | 28551.2 | -1.2628 | -17912.7 | -0.6927 |
| 1200 | 9.4128 | 10796.5 | 67.7626 | 70518.2 | 42187.7 | 28077.9 | -0.7937 | -17967.9 | -0.9897 |
| 1300 | 9.4534 | 11739.8 | 68.5176 | 77333.2 | 43131.0 | 27591.6 | -0.4036 | -18017.4 | -1.2418 |
| 1400 | 9.4538 | 12687.1 | 69.2197 | 84220.4 | 44078.3 | 27096.9 | -0.0733 | -18063.7 | -1.4584 |
| 1500 | 9.5340 | 13638.5 | 69.8761 | 91175.6 | 45029.7 | 26596.3 | 0.2022 | -18105.9 | -1.6466 |
| 1600 | 9.5742 | 14593.9 | 70.4927 | 98194.3 | 45985.1 | 26087.7 | 0.4432 | -18144.2 | -1.8117 |
| 1700 | 9.6142 | 15553.4 | 71.0743 | 105272.9 | 46944.6 | 25579.2 | 0.6529 | -18178.5 | -1.9576 |
| 1800 | 9.6542 | 16516.8 | 71.6250 | 112408.1 | 47908.0 | 25066.6 | 0.8346 | -18208.9 | -2.0875 |
| 1900 | 9.6942 | 17484.2 | 72.1480 | 119597.0 | 48875.4 | 24554.0 | 0.9932 | -18235.5 | -2.2040 |
| 2000 | 9.7341 | 18455.6 | 72.6463 | 126836.9 | 49846.8 | 24041.4 | 1.1289 | -18258.4 | -2.3089 |
| 2100 | 9.7740 | 19431.0 | 73.1222 | 134125.5 | 50822.2 | 23530.8 | 1.2538 | -18277.8 | -2.4039 |
| 2200 | 9.8138 | 20410.4 | 73.5778 | 141460.7 | 51801.6 | 23020.2 | 1.3668 | -18293.9 | -2.4904 |
| 2300 | 9.8537 | 21393.8 | 74.0149 | 148840.4 | 52785.0 | 22509.6 | 1.4616 | -18306.9 | -2.5695 |
| 2400 | 9.8935 | 22381.1 | 74.4351 | 156263.1 | 53772.3 | 22002.9 | 1.5532 | -18317.2 | -2.6420 |
| 2500 | 9.9333 | 23372.5 | 74.8398 | 163726.9 | 54763.7 | 21496.3 | 1.6306 | -18325.1 | -2.7087 |
| 2600 | 9.9731 | 24367.8 | 75.2301 | 171230.6 | 55759.0 | | | -18331.1 | -2.7703 |
| 2700 | 10.0128 | 25367.1 | 75.6073 | 178772.5 | 56758.3 | | | -18335.8 | -2.8274 |
| 2800 | 10.0526 | 26370.4 | 75.9721 | 186351.6 | 57761.6 | | | -18339.6 | -2.8804 |
| 2900 | 10.0923 | 27377.6 | 76.3256 | 193966.6 | 58768.8 | | | -18343.1 | -2.9298 |
| 3000 | 10.1321 | 28388.8 | 76.6684 | 201616.4 | 59780.0 | | | -18347.1 | -2.9759 |
| 3100 | 10.1718 | 29404.0 | 77.0013 | 209299.9 | 60795.2 | | | -18352.3 | -3.0190 |
| 3200 | 10.2116 | 30423.2 | 77.3248 | 217016.3 | 61814.4 | | | -18359.3 | -3.0594 |
| 3300 | 10.2513 | 31446.3 | 77.6397 | 224764.6 | 62837.5 | | | -18368.7 | -3.0974 |
| 3400 | 10.2910 | 32473.5 | 77.9463 | 232544.0 | 63864.7 | | | -18381.8 | -3.1332 |
| 3500 | 10.3308 | 33504.5 | 78.2452 | 240353.6 | 64895.7 | | | -18399.3 | -3.1670 |
| 3600 | 10.3705 | 34539.6 | 78.5368 | 248192.8 | 65930.8 | | | -18422.1 | -3.1989 |
| 3700 | 10.4102 | 35578.6 | 78.8215 | 256060.7 | 66969.8 | | | -18451.2 | -3.2292 |
| 3800 | 10.4499 | 36621.6 | 79.0996 | 263956.8 | 68012.8 | | | -18487.8 | -3.2579 |
| 3900 | 10.4896 | 37668.6 | 79.3716 | 271880.4 | 69059.8 | | | -18532.7 | -3.2852 |
| 4000 | 10.5293 | 38719.6 | 79.6376 | 279831.0 | 70110.8 | | | -18587.3 | -3.3112 |
| 4100 | 10.5690 | 39774.5 | 79.8981 | 287807.8 | 71165.7 | | | -18652.8 | -3.3360 |
| 4200 | 10.6087 | 40833.4 | 80.1533 | 295810.4 | 72224.6 | | | -18729.2 | -3.3597 |
| 4300 | 10.6484 | 41896.2 | 80.4034 | 303838.3 | 73287.4 | | | -18819.9 | -3.3824 |
| 4400 | 10.6881 | 42963.1 | 80.6486 | 311890.9 | 74354.3 | | | -18905.0 | -3.4041 |
| 4500 | 10.7278 | 44033.9 | 80.8893 | 319967.8 | 75425.1 | | | -19015.3 | -3.4250 |
| 4600 | 10.7675 | 45108.6 | 81.1255 | 328068.6 | 76499.8 | | | -19145.3 | -3.4452 |
| 4700 | 10.8072 | 46187.4 | 81.3575 | 336192.8 | 77578.6 | | | -19292.5 | -3.4646 |
| 4800 | 10.8469 | 47270.1 | 81.5854 | 344340.0 | 78661.3 | | | -19458.2 | -3.4834 |
| 4900 | 10.8866 | 48356.7 | 81.8095 | 352509.8 | 79747.9 | | | -19643.6 | -3.5015 |
| 5000 | 10.9263 | 49447.4 | 82.0298 | 360701.8 | 80838.6 | | | -19846.3 | -3.5191 |
| 5100 | 10.9660 | 50542.0 | 82.2466 | 368915.6 | 81933.2 | | | -20074.2 | -3.5362 |
| 5200 | 11.0057 | 51640.6 | 82.4599 | 377151.0 | 83031.8 | | | -20325.6 | -3.5529 |
| 5300 | 11.0454 | 52743.1 | 82.6699 | 385407.5 | 84134.3 | | | -20601.7 | -3.5691 |
| 5400 | 11.0851 | 53849.7 | 82.8768 | 393684.8 | 85240.9 | | | -20903.8 | -3.5849 |
| 5500 | 11.1248 | 54960.2 | 83.0805 | 401982.7 | 86351.4 | | | -21233.1 | -3.6004 |
| 5600 | 11.1645 | 56074.6 | 83.2813 | 410300.8 | 87465.8 | | | -21590.7 | -3.6156 |
| 5700 | 11.2041 | 57193.1 | 83.4793 | 418638.9 | 88584.3 | | | -21977.8 | -3.6305 |
| 5800 | 11.2438 | 58315.4 | 83.6745 | 426996.6 | 89706.6 | | | -22395.4 | -3.6452 |
| 5900 | 11.2835 | 59441.8 | 83.8670 | 435373.7 | 90833.0 | | | -22844.4 | -3.6597 |
| 6000 | 11.3232 | 60572.2 | 84.0570 | 443769.9 | 91963.4 | | | -23250.3 | -3.6736 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Na, 370.98° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(153) NaCl (gas); molecular weight, 58.448

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -45798.1 | -43167.0 | ----- | -97365.3 | ----- |
| 100 | 7.2627 | 701.3 | 46.2238 | 3921.0 | -45096.7 | -43126.7 | 98.1844 | -97657.6 | 209.2641 |
| 200 | 8.1467 | 1475.7 | 51.5554 | 8835.3 | -44322.3 | -43301.8 | 50.9882 | -97879.1 | 102.4531 |
| 298.15 | 8.5547 | 2298.1 | 54.8953 | 14069.0 | -43500.0 | -43500.0 | 35.3821 | -98047.5 | 67.2179 |
| 300 | 8.5597 | 2313.9 | 54.9482 | 14170.6 | -43484.2 | -43504.2 | 35.1854 | -98050.5 | 66.7747 |
| 400 | 8.7528 | 3180.6 | 57.4402 | 19795.5 | -42617.5 | -44454.3 | 27.2107 | -98210.9 | 48.9048 |
| 500 | 8.8598 | 4061.7 | 59.4058 | 25641.3 | -41736.4 | -44742.3 | 22.3384 | -98362.6 | 38.1654 |
| 600 | 8.9284 | 4951.3 | 61.0276 | 31665.3 | -40846.8 | -45007.4 | 19.0699 | -98519.2 | 30.9944 |
| 700 | 8.9778 | 5846.7 | 62.4078 | 37838.8 | -39951.4 | -45253.7 | 16.7219 | -98664.2 | 25.8646 |
| 800 | 9.0164 | 6746.5 | 63.6092 | 44140.9 | -39051.6 | -45489.2 | 14.9514 | -98802.0 | 22.0116 |
| 900 | 9.0488 | 7649.8 | 64.6731 | 50556.0 | -38148.3 | -45720.1 | 13.5674 | -98932.5 | 19.0108 |
| 1000 | 9.0771 | 8556.1 | 65.6280 | 57071.9 | -37242.0 | -45951.7 | 12.4545 | -99056.3 | 16.6070 |
| 1100 | 9.1027 | 9465.1 | 66.4944 | 63678.7 | -36332.9 | -46188.3 | 11.5393 | -99173.7 | 14.6379 |
| 1200 | 9.1266 | 10376.6 | 67.2874 | 70368.3 | -35421.5 | -46433.4 | 10.7727 | -99285.5 | 12.9951 |
| 1300 | 9.1491 | 11290.4 | 68.0189 | 77134.1 | -34507.7 | -46685.8 | 10.1206 | -99391.9 | 11.6035 |
| 1400 | 9.1707 | 12206.4 | 68.6977 | 83970.4 | -33591.7 | -46943.4 | 9.5594 | -99493.6 | 10.4094 |
| 1500 | 9.1916 | 13124.5 | 69.3311 | 90872.2 | -32673.6 | -47204.8 | 9.0676 | -99590.9 | 9.3735 |
| 1600 | 9.2120 | 14044.7 | 69.9250 | 97835.3 | -31753.4 | -47471.0 | 8.6371 | -99684.1 | 8.4662 |
| 1700 | 9.2319 | 14966.9 | 70.4840 | 104856.0 | -30831.2 | -47738.2 | 8.2557 | -99773.5 | 7.6650 |
| 1800 | 9.2515 | 15891.0 | 71.0123 | 111931.0 | -29907.0 | -48008.2 | 7.9142 | -99859.5 | 6.9521 |
| 1900 | 9.2709 | 16817.2 | 71.5130 | 119057.5 | -28980.9 | -48279.0 | 7.6066 | -99942.3 | 6.3137 |
| 2000 | 9.2901 | 17745.2 | 71.9890 | 126232.8 | -28052.8 | -48550.7 | 7.3261 | -100022.0 | 5.7387 |
| 2100 | 9.3091 | 18675.2 | 72.4427 | 133454.6 | -27122.9 | -48822.2 | 7.0734 | -100099.0 | 5.2181 |
| 2200 | 9.3279 | 19607.0 | 72.8762 | 140720.7 | -26191.0 | -49094.5 | 6.8432 | -100173.5 | 4.7444 |
| 2300 | 9.3467 | 20540.8 | 73.2913 | 148029.2 | -25257.3 | -49367.7 | 6.6289 | -100245.7 | 4.3116 |
| 2400 | 9.3653 | 21476.4 | 73.6895 | 155378.4 | -24321.7 | -49639.7 | 6.4346 | -100315.9 | 3.9146 |
| 2500 | 9.3838 | 22413.8 | 74.0722 | 162766.6 | -23384.2 | -49912.6 | 6.2524 | -100384.3 | 3.5491 |
| 2600 | 9.4023 | 23353.1 | 74.4406 | 170192.4 | -22444.9 | -50185.9 | - | -100451.3 | 3.2115 |
| 2700 | 9.4208 | 24294.3 | 74.7958 | 177654.3 | -21503.8 | -50459.2 | - | -100517.1 | 2.8987 |
| 2800 | 9.4391 | 25237.3 | 75.1387 | 185151.1 | -20560.8 | -50732.5 | - | -100582.2 | 2.6080 |
| 2900 | 9.4575 | 26182.1 | 75.4703 | 192681.6 | -19616.0 | -51005.8 | - | -100646.9 | 2.3372 |
| 3000 | 9.4758 | 27128.8 | 75.7912 | 200244.8 | -18669.3 | -51279.1 | - | -100711.4 | 2.0843 |
| 3100 | 9.4940 | 28077.3 | 76.1022 | 207839.5 | -17720.8 | -51552.4 | - | -100776.4 | 1.8476 |
| 3200 | 9.5123 | 29027.6 | 76.4039 | 215464.9 | -16770.5 | -51825.7 | - | -100842.0 | 1.6255 |
| 3300 | 9.5305 | 29979.7 | 76.6969 | 223120.0 | -15818.4 | -52099.0 | - | -100908.7 | 1.4167 |
| 3400 | 9.5486 | 30933.7 | 76.9817 | 230804.0 | -14864.4 | -52372.3 | - | -100977.1 | 1.2201 |
| 3500 | 9.5668 | 31889.4 | 77.2587 | 238516.1 | -13908.6 | -52645.6 | - | -101047.6 | 1.0346 |
| 3600 | 9.5849 | 32847.0 | 77.5285 | 246255.5 | -12951.0 | -52918.9 | - | -101120.6 | 0.8593 |
| 3700 | 9.6031 | 33806.4 | 77.7914 | 254021.6 | -11991.6 | -53192.2 | - | -101196.8 | 0.6933 |
| 3800 | 9.6212 | 34767.6 | 78.0477 | 261813.6 | -11030.4 | -53465.5 | - | -101276.5 | 0.5360 |
| 3900 | 9.6393 | 35730.7 | 78.2978 | 269630.9 | -10067.4 | -53738.8 | - | -101360.5 | 0.3866 |
| 4000 | 9.6574 | 36695.5 | 78.5421 | 277472.9 | -9102.6 | -54012.1 | - | -101449.3 | 0.2445 |
| 4100 | 9.6754 | 37662.1 | 78.7808 | 285339.1 | -8135.9 | -54285.4 | - | -101543.5 | 0.1093 |
| 4200 | 9.6935 | 38630.6 | 79.0142 | 293228.9 | -7167.5 | -54558.7 | - | -101643.1 | -0.0197 |
| 4300 | 9.7116 | 39600.8 | 79.2425 | 301141.8 | -6197.2 | -54832.0 | - | -101750.0 | -0.1427 |
| 4400 | 9.7296 | 40572.9 | 79.4659 | 309077.3 | -5225.2 | -55105.3 | - | -101854.0 | -0.2603 |
| 4500 | 9.7477 | 41546.8 | 79.6848 | 317034.8 | -4251.3 | -55378.6 | - | -101970.7 | -0.3727 |
| 4600 | 9.7657 | 42522.4 | 79.8992 | 325014.1 | -3275.6 | -55651.9 | - | -102097.4 | -0.4805 |
| 4700 | 9.7837 | 43499.9 | 80.1095 | 333014.5 | -2298.2 | -55925.2 | - | -102232.7 | -0.5837 |
| 4800 | 9.8017 | 44479.2 | 80.3156 | 341035.8 | -1318.9 | -56198.5 | - | -102377.2 | -0.6828 |
| 4900 | 9.8198 | 45460.2 | 80.5179 | 349077.5 | -337.8 | -56471.8 | - | -102531.7 | -0.7780 |
| 5000 | 9.8378 | 46443.1 | 80.7165 | 357139.3 | 645.1 | -56745.1 | - | -102695.0 | -0.8696 |
| 5100 | 9.8558 | 47427.8 | 80.9115 | 365220.7 | 1629.7 | -57018.4 | - | -102870.9 | -0.9576 |
| 5200 | 9.8738 | 48414.3 | 81.1030 | 373321.5 | 2616.2 | -57291.7 | - | -103058.7 | -1.0425 |
| 5300 | 9.8918 | 49402.5 | 81.2913 | 381441.2 | 3604.5 | -57565.0 | - | -103258.9 | -1.1243 |
| 5400 | 9.9098 | 50392.6 | 81.4763 | 389579.6 | 4594.6 | -57838.3 | - | -103472.2 | -1.2032 |
| 5500 | 9.9278 | 51384.5 | 81.6583 | 397736.4 | 5586.4 | -58111.6 | - | -103699.3 | -1.2794 |
| 5600 | 9.9458 | 52378.2 | 81.8374 | 405911.2 | 6580.1 | -58384.9 | - | -103940.5 | -1.3531 |
| 5700 | 9.9638 | 53373.7 | 82.0136 | 414103.8 | 7575.6 | -58658.2 | - | -104196.7 | -1.4243 |
| 5800 | 9.9817 | 54370.9 | 82.1870 | 422313.8 | 8572.9 | -58931.5 | - | -104468.2 | -1.4933 |
| 5900 | 9.9997 | 55370.0 | 82.3578 | 430541.1 | 9571.9 | -59204.8 | - | -104755.6 | -1.5601 |
| 6000 | 10.0177 | 56370.9 | 82.5260 | 438785.3 | 10572.8 | -59478.1 | - | -105021.5 | -1.6247 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Na, 370.98° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(154) $(\text{NaCl})_2$ (gas); molecular weight, 116.896

| T, °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -141100.0 | -135837.9 | ----- | -244234.5 | ----- |
| 100 | 13.7345 | 988.0 | 59.0951 | 4921.5 | -140112.0 | -136171.9 | 298.1717 | -245253.8 | 520.3309 |
| 200 | 17.7197 | 2605.7 | 70.1499 | 11424.3 | -138494.3 | -136453.2 | 149.2437 | -245607.8 | 252.1735 |
| 298.15 | 18.8309 | 4408.8 | 77.4708 | 18689.1 | -136691.2 | -136691.2 | 100.1239 | -245786.1 | 163.7954 |
| 300 | 18.8429 | 4443.7 | 77.5873 | 18832.5 | -136656.3 | -136696.3 | 99.5060 | -245789.0 | 162.6845 |
| a 400 | 19.2778 | 6352.6 | 83.0760 | 26877.8 | -134747.4 | -138420.9 | 74.5219 | -245934.3 | 117.9102 |
| 500 | 19.4871 | 8292.0 | 87.4027 | 35409.4 | -132808.0 | -138819.9 | 59.3761 | -246070.4 | 91.0301 |
| 600 | 19.6031 | 10247.0 | 90.9668 | 44333.1 | -130853.0 | -139174.3 | 49.2511 | -246197.8 | 73.1003 |
| 700 | 19.6738 | 12211.1 | 93.9944 | 53584.9 | -128888.9 | -139493.5 | 42.0015 | -246314.5 | 60.2869 |
| 800 | 19.7200 | 14181.0 | 96.6247 | 63118.8 | -126919.0 | -139794.2 | 36.5521 | -246419.8 | 50.6725 |
| 900 | 19.7518 | 16154.7 | 98.9493 | 72899.7 | -124945.3 | -140089.0 | 32.3049 | -246513.8 | 43.1916 |
| 1000 | 19.7746 | 18131.0 | 101.0316 | 82900.5 | -122969.0 | -140388.4 | 28.8996 | -246597.6 | 37.2047 |
| 1100 | 19.7915 | 20109.4 | 102.9171 | 93099.5 | -120990.6 | -140701.4 | 26.1075 | -246672.2 | 32.3048 |
| 1200 | 19.8044 | 22089.2 | 104.6398 | 103478.6 | -119010.8 | -141034.6 | 23.7756 | -246758.8 | 28.2203 |
| 1300 | 19.8145 | 24070.2 | 106.2254 | 114022.9 | -117029.8 | -141386.1 | 21.7976 | -246798.3 | 24.7634 |
| 1400 | 19.8225 | 26052.0 | 107.6941 | 124719.7 | -115048.0 | -141751.3 | 20.0996 | -246851.8 | 21.7996 |
| 1500 | 19.8289 | 28034.6 | 109.0620 | 135558.3 | -113065.4 | -142127.8 | 18.6185 | -246900.0 | 19.2304 |
| 1600 | 19.8342 | 30017.8 | 110.3419 | 146529.2 | -111082.2 | -142517.5 | 17.3237 | -246943.6 | 16.9820 |
| 1700 | 19.8386 | 32001.4 | 111.5444 | 157624.1 | -109098.6 | -142912.6 | 16.1792 | -246983.3 | 14.9978 |
| 1800 | 19.8422 | 33985.5 | 112.6785 | 168835.8 | -107114.5 | -143316.8 | 15.1580 | -247019.6 | 13.2337 |
| 1900 | 19.8453 | 35969.8 | 113.7514 | 180157.8 | -105130.2 | -143726.3 | 14.2409 | -247052.9 | 11.6552 |
| 2000 | 19.8480 | 37954.5 | 114.7694 | 191584.3 | -103145.5 | -144141.1 | 13.4091 | -247083.9 | 10.2343 |
| 2100 | 19.8503 | 39939.4 | 115.7378 | 203110.0 | -101160.6 | -144559.2 | 12.6591 | -247112.8 | 8.9485 |
| 2200 | 19.8523 | 41924.6 | 116.6613 | 214730.3 | -99175.4 | -144982.4 | 11.9772 | -247140.4 | 7.7796 |
| 2300 | 19.8540 | 43909.9 | 117.5438 | 226440.9 | -97190.1 | -145411.0 | 11.3466 | -247166.9 | 6.7121 |
| 2400 | 19.8555 | 45895.4 | 118.3888 | 238237.8 | -95204.6 | -145840.7 | 10.7736 | -247192.9 | 5.7335 |
| 2500 | 19.8568 | 47881.0 | 119.1994 | 250117.5 | -93219.0 | -146275.7 | 10.2397 | -247219.1 | 4.8331 |
| 2600 | 19.8580 | 49866.7 | 119.9782 | 262076.7 | -91233.3 | -146710.6 | - | -247246.0 | 4.0019 |
| 2700 | 19.8591 | 51852.6 | 120.7277 | 274112.2 | -89247.4 | -147145.5 | - | -247274.2 | 3.2321 |
| 2800 | 19.8600 | 53838.5 | 121.4499 | 286221.3 | -87261.5 | -147580.4 | - | -247304.3 | 2.5173 |
| 2900 | 19.8609 | 55824.6 | 122.1469 | 298401.3 | -85275.4 | -148015.3 | - | -247337.2 | 1.8517 |
| 3000 | 19.8617 | 57810.7 | 122.8202 | 310649.9 | -83289.3 | -148450.2 | - | -247373.6 | 1.2303 |
| 3100 | 19.8623 | 59796.9 | 123.4715 | 322964.6 | -81303.1 | -148885.1 | - | -247414.2 | 0.6490 |
| 3200 | 19.8630 | 61783.2 | 124.1021 | 335343.5 | -79316.8 | -149320.0 | - | -247459.9 | 0.1039 |
| 3300 | 19.8636 | 63769.5 | 124.7133 | 347784.4 | -77330.5 | -149754.9 | - | -247511.2 | -0.4083 |
| 3400 | 19.8641 | 65755.9 | 125.3063 | 360285.5 | -75344.1 | -150189.8 | - | -247569.5 | -0.8904 |
| 3500 | 19.8646 | 67742.3 | 125.8821 | 372845.1 | -73357.7 | -150624.7 | - | -247635.6 | -1.3452 |
| 3600 | 19.8650 | 69728.8 | 126.4417 | 385461.4 | -71371.2 | -151059.6 | - | -247710.4 | -1.7747 |
| 3700 | 19.8654 | 71715.3 | 126.9860 | 398132.9 | -69384.7 | -151494.5 | - | -247794.9 | -2.1812 |
| 3800 | 19.8658 | 73701.9 | 127.5158 | 410858.1 | -67398.1 | -151929.4 | - | -247890.3 | -2.5664 |
| 3900 | 19.8661 | 75688.5 | 128.0318 | 423635.6 | -65411.5 | -152364.3 | - | -247997.7 | -2.9321 |
| 4000 | 19.8664 | 77675.1 | 128.5348 | 436464.1 | -63424.9 | -152799.2 | - | -248118.3 | -3.2796 |
| 4100 | 19.8667 | 79661.8 | 129.0254 | 449342.2 | -61438.2 | -153234.1 | - | -248253.3 | -3.6103 |
| 4200 | 19.8670 | 81648.4 | 129.5041 | 462268.8 | -59451.6 | -153669.0 | - | -248402.8 | -3.9254 |
| 4300 | 19.8673 | 83635.2 | 129.9716 | 475242.6 | -57464.8 | -154103.9 | - | -248570.3 | -4.2261 |
| 4400 | 19.8675 | 85621.9 | 130.4283 | 488262.7 | -55478.1 | -154538.8 | - | -248755.8 | -4.5133 |
| 4500 | 19.8677 | 87608.7 | 130.8748 | 501327.9 | -53491.3 | -154973.7 | - | -248950.2 | -4.7879 |
| 4600 | 19.8679 | 89595.4 | 131.3115 | 514437.3 | -51504.5 | -155408.6 | - | -249148.0 | -5.0508 |
| 4700 | 19.8681 | 91582.2 | 131.7388 | 527589.9 | -49517.7 | -155843.5 | - | -249386.7 | -5.3028 |
| 4800 | 19.8683 | 93569.1 | 132.1571 | 540784.8 | -47530.9 | -156278.4 | - | -249647.6 | -5.5445 |
| 4900 | 19.8685 | 95555.9 | 132.5667 | 554021.1 | -45544.1 | -156713.3 | - | -249931.9 | -5.7766 |
| 5000 | 19.8687 | 97542.8 | 132.9681 | 567297.9 | -43557.2 | -157148.2 | - | -250237.3 | -5.9996 |
| 5100 | 19.8688 | 99529.6 | 133.3616 | 580614.4 | -41570.4 | -157583.1 | - | -250571.7 | -6.2142 |
| 5200 | 19.8690 | 101516.5 | 133.7474 | 593969.9 | -39583.5 | -158018.0 | - | -250933.3 | -6.4208 |
| 5300 | 19.8691 | 103503.4 | 134.1259 | 607363.6 | -37596.6 | -158452.9 | - | -251323.4 | -6.6200 |
| 5400 | 19.8692 | 105490.4 | 134.4973 | 620794.9 | -35609.6 | -158887.8 | - | -251743.2 | -6.8120 |
| 5500 | 19.8693 | 107477.3 | 134.8618 | 634262.9 | -33622.7 | -159322.7 | - | -252194.1 | -6.9974 |
| 5600 | 19.8695 | 109464.2 | 135.2199 | 647767.0 | -31635.8 | -159757.6 | - | -252677.1 | -7.1766 |
| 5700 | 19.8696 | 111451.2 | 135.5715 | 661306.6 | -29648.8 | -160192.5 | - | -253193.4 | -7.3497 |
| 5800 | 19.8697 | 113438.1 | 135.9171 | 674881.1 | -27661.9 | -160627.4 | - | -253744.0 | -7.5173 |
| 5900 | 19.8698 | 115425.1 | 136.2568 | 688489.9 | -25675.0 | -161062.3 | - | -254329.9 | -7.6795 |
| 6000 | 19.8699 | 117412.1 | 136.5907 | 702132.3 | -23687.9 | -161497.2 | - | -254976.5 | -7.8364 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Na, 370.98° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(155) NaF (gas); molecular weight, 41.991

| T , °K | C_p , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | | 0 | | 0 | | | | | |
| 100 | 7.0232 | 696.1 | 43.6063 | 5664.5 | -72808.9 | -70219.7 | | -114224.6 | |
| 200 | 7.6665 | 1428.1 | 48.6538 | 8302.6 | -72112.7 | -70184.0 | 157.2302 | -114523.9 | 245.9534 |
| 298.15 | 8.1958 | 2208.9 | 51.8226 | 15242.1 | -71380.7 | -70388.8 | 80.4561 | -114814.5 | 120.6882 |
| 300 | 8.2032 | 2224.0 | 51.8735 | 13338.0 | -70600.0 | -70600.0 | 55.1039 | -115055.0 | 79.5491 |
| 400 | 8.5035 | 3060.8 | 54.2787 | 18650.7 | -70584.8 | -70604.3 | 54.7847 | -115059.1 | 78.8290 |
| 500 | 8.6774 | 3920.6 | 56.1965 | 24177.7 | -69748.0 | -71544.6 | 41.8745 | -115259.3 | 57.8578 |
| 600 | 8.7869 | 4794.2 | 57.7890 | 29879.2 | -68888.3 | -71839.8 | 34.0411 | -115428.4 | 45.2547 |
| 700 | 8.8619 | 5676.8 | 59.1494 | 35727.8 | -68014.7 | -72102.2 | 28.7987 | -115576.5 | 36.8410 |
| 800 | 8.9170 | 6565.9 | 60.3365 | 41705.3 | -67132.0 | -72347.1 | 25.0409 | -115709.9 | 30.8238 |
| 900 | 8.9600 | 7459.8 | 61.3894 | 47790.6 | -66243.0 | -72582.7 | 22.2131 | -115832.7 | 26.3059 |
| 1000 | 8.9951 | 8357.6 | 62.3353 | 53977.7 | -65349.0 | -72815.1 | 20.0068 | -115947.4 | 22.7884 |
| 1100 | 9.0251 | 9258.7 | 63.1941 | 60254.8 | -64451.2 | -73049.6 | 18.2359 | -116055.7 | 19.9717 |
| 1200 | 9.0514 | 10162.5 | 63.9805 | 66614.1 | -63550.2 | -73290.3 | 16.7823 | -116158.9 | 17.6650 |
| 1300 | 9.0751 | 11068.9 | 64.7059 | 73048.9 | -62646.3 | -73540.5 | 15.5670 | -116257.7 | 15.7410 |
| 1400 | 9.0970 | 11977.5 | 65.3793 | 79553.5 | -61740.0 | -73799.2 | 14.5351 | -116352.9 | 14.1117 |
| 1500 | 9.1174 | 12888.2 | 66.0076 | 86123.2 | -60831.4 | -74063.9 | 13.6483 | -116444.7 | 12.7141 |
| 1600 | 9.1368 | 13800.9 | 66.5967 | 92753.7 | -59920.6 | -74333.5 | 12.8742 | -116533.6 | 11.5018 |
| 1700 | 9.1553 | 14715.6 | 67.1512 | 99441.4 | -59007.9 | -74608.8 | 12.1966 | -116619.9 | 10.4403 |
| 1800 | 9.1732 | 15632.0 | 67.6750 | 106182.9 | -58093.3 | -74885.8 | 11.5972 | -116703.7 | 9.5030 |
| 1900 | 9.1906 | 16550.2 | 68.1714 | 112975.5 | -57176.9 | -75166.5 | 11.0618 | -116785.3 | 8.6692 |
| 2000 | 9.2075 | 17470.1 | 68.6432 | 119816.4 | -56258.7 | -75448.8 | 10.5806 | -116864.7 | 7.9227 |
| 2100 | 9.2241 | 18391.7 | 69.0929 | 126703.4 | -55338.8 | -75732.8 | 10.1438 | -116942.3 | 7.2504 |
| 2200 | 9.2404 | 19314.9 | 69.5224 | 133634.3 | -54417.2 | -76017.5 | 9.7496 | -117018.1 | 6.6417 |
| 2300 | 9.2564 | 20239.7 | 69.9335 | 140607.2 | -53494.0 | -76303.7 | 9.3908 | -117092.3 | 6.0880 |
| 2400 | 9.2723 | 21166.2 | 70.3278 | 147620.4 | -52569.1 | -76591.5 | 9.0589 | -117165.2 | 5.5821 |
| 2500 | 9.2879 | 22094.2 | 70.7066 | 154672.3 | -51642.7 | -76878.9 | 8.7568 | -117236.8 | 5.1181 |
| 2600 | 9.3035 | 23023.8 | 71.0712 | 161761.3 | -50714.7 | -77167.9 | 8.4753 | -117307.5 | 4.6910 |
| 2700 | 9.3189 | 23954.9 | 71.4226 | 168886.1 | -49785.1 | | | -117377.6 | 4.2965 |
| 2800 | 9.3342 | 24887.5 | 71.7618 | 176045.4 | -48854.0 | | | -117447.2 | 3.9310 |
| 2900 | 9.3494 | 25821.7 | 72.0896 | 183238.1 | -47921.3 | | | -117516.7 | 3.5914 |
| 3000 | 9.3646 | 26757.4 | 72.4068 | 190463.0 | -46987.1 | | | -117586.4 | 3.2750 |
| 3100 | 9.3797 | 27694.6 | 72.7141 | 197719.1 | -46051.4 | | | -117656.7 | 2.9795 |
| 3200 | 9.3947 | 28633.3 | 73.0121 | 205005.5 | -45114.2 | | | -117728.0 | 2.7050 |
| 3300 | 9.4096 | 29573.6 | 73.3014 | 212321.2 | -44175.5 | | | -117800.6 | 2.4435 |
| 3400 | 9.4245 | 30515.3 | 73.5826 | 219665.5 | -43235.3 | | | -117874.8 | 2.1997 |
| 3500 | 9.4394 | 31458.5 | 73.8560 | 227037.5 | -42293.6 | | | -117951.3 | 1.9700 |
| 3600 | 9.4542 | 32403.2 | 74.1221 | 234436.4 | -41350.4 | | | -118030.4 | 1.7533 |
| 3700 | 9.4690 | 33349.3 | 74.3813 | 241861.7 | -40405.7 | | | -118112.5 | 1.5485 |
| 3800 | 9.4838 | 34297.0 | 74.6341 | 249312.5 | -39459.5 | | | -118198.3 | 1.3547 |
| 3900 | 9.4986 | 35246.1 | 74.8806 | 256788.3 | -38511.9 | | | -118288.3 | 1.1709 |
| 4000 | 9.5133 | 36196.7 | 75.1213 | 264288.4 | -37562.8 | | | -118382.9 | 0.9964 |
| 4100 | 9.5280 | 37148.7 | 75.3564 | 271812.3 | -36612.2 | | | -118482.8 | 0.8305 |
| 4200 | 9.5426 | 38102.3 | 75.5861 | 279359.5 | -35660.1 | | | -118588.6 | 0.6725 |
| 4300 | 9.5573 | 39057.3 | 75.8109 | 286929.4 | -34706.6 | | | -118700.3 | 0.5220 |
| 4400 | 9.5719 | 40013.7 | 76.0307 | 294521.5 | -33751.6 | | | -118819.7 | 0.3782 |
| 4500 | 9.5866 | 40971.6 | 76.2460 | 302135.4 | -32795.1 | | | -118936.8 | 0.2410 |
| 4600 | 9.6012 | 41931.0 | 76.4569 | 309770.6 | -31837.2 | | | -119066.9 | 0.1096 |
| 4700 | 9.6158 | 42891.9 | 76.6635 | 317426.6 | -30877.8 | | | -119207.5 | -0.0161 |
| 4800 | 9.6304 | 43854.2 | 76.8661 | 325103.1 | -29917.0 | | | -119357.1 | -0.1367 |
| 4900 | 9.6449 | 44818.0 | 77.0648 | 332799.7 | -28954.7 | | | -119516.4 | -0.2524 |
| 5000 | 9.6595 | 45783.2 | 77.2598 | 340516.0 | -27990.9 | | | -119686.1 | -0.3635 |
| 5100 | 9.6741 | 46749.9 | 77.4513 | 348251.6 | -27025.7 | | | -119864.9 | -0.4704 |
| 5200 | 9.6886 | 47718.0 | 77.6393 | 356006.1 | -26059.0 | | | -120056.9 | -0.5732 |
| 5300 | 9.7032 | 48687.6 | 77.8239 | 363779.3 | -25090.9 | | | -120261.1 | -0.6722 |
| 5400 | 9.7177 | 49658.6 | 78.0055 | 371570.8 | -24121.3 | | | -120478.2 | -0.7676 |
| 5500 | 9.7322 | 50631.1 | 78.1839 | 379380.3 | -23150.2 | | | -120708.8 | -0.8597 |
| 5600 | 9.7468 | 51605.1 | 78.3594 | 387207.5 | -22177.7 | | | -120953.5 | -0.9486 |
| 5700 | 9.7613 | 52580.5 | 78.5320 | 395052.1 | -21203.8 | | | -121212.8 | -1.0345 |
| 5800 | 9.7758 | 53557.3 | 78.7019 | 402913.8 | -20228.4 | | | -121487.4 | -1.1176 |
| 5900 | 9.7903 | 54535.6 | 78.8692 | 410792.4 | -19251.5 | | | -121777.8 | -1.1980 |
| 6000 | 9.8048 | 55515.4 | 79.0338 | 418687.5 | -18273.2 | | | -122084.5 | -1.2759 |
| | | | | | -17293.5 | | | -122370.0 | -1.3512 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Na, 370.98° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (156) $(\text{NaF})_2$ (gas); molecular weight, 83.982

| T, °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -203500.0 | -198321.8 | ----- | -286331.6 | ----- |
| 100 | 11.9290 | 904.9 | 54.6286 | 4558.0 | -202595.1 | -198737.6 | 434.9001 | -287417.4 | 612.3466 |
| 200 | 16.6526 | 2375.2 | 64.6303 | 10550.8 | -201124.8 | -199140.8 | 217.5443 | -287992.3 | 298.0085 |
| 298.15 | 18.2522 | 4100.8 | 71.6288 | 17255.4 | -199399.2 | -199399.2 | 145.8700 | -288309.3 | 194.3603 |
| 300 | 18.2703 | 4134.5 | 71.7417 | 17388.0 | -199365.5 | -199404.3 | 144.9686 | -288314.0 | 193.0571 |
| 400 | 18.9327 | 5999.0 | 77.1008 | 24841.3 | -197501.0 | -201114.2 | 108.5654 | -288523.5 | 140.5320 |
| 500 | 19.2590 | 7910.3 | 81.3644 | 32771.9 | -195589.7 | -201492.8 | 86.5702 | -288670.0 | 108.9973 |
| 600 | 19.4418 | 9846.1 | 84.8933 | 41089.9 | -193653.9 | -201829.0 | 71.8803 | -288777.6 | 87.9649 |
| 700 | 19.5540 | 11796.3 | 87.8993 | 49733.2 | -191703.7 | -202133.8 | 61.3709 | -288859.5 | 72.9368 |
| 800 | 19.6276 | 13755.6 | 90.5155 | 58656.8 | -189744.4 | -202423.9 | 53.4772 | -288923.9 | 61.6628 |
| 900 | 19.6785 | 15721.1 | 92.8304 | 67826.3 | -187778.9 | -202711.2 | 47.3291 | -288975.7 | 52.8924 |
| 1000 | 19.7150 | 17690.8 | 94.9058 | 77214.9 | -185809.2 | -203005.9 | 42.4033 | -289018.2 | 45.8749 |
| 1100 | 19.7422 | 19663.8 | 96.7861 | 86801.0 | -183836.2 | -203316.4 | 38.3672 | -289053.7 | 40.1326 |
| 1200 | 19.7629 | 21639.1 | 98.5049 | 96566.8 | -181860.9 | -203649.3 | 34.9987 | -289083.8 | 35.3468 |
| 1300 | 19.7790 | 23616.2 | 100.0874 | 106497.4 | -179883.8 | -204002.2 | 32.1434 | -289109.6 | 31.2968 |
| 1400 | 19.7918 | 25594.7 | 101.5537 | 116580.4 | -177905.2 | -204370.4 | 29.6936 | -289131.9 | 27.8252 |
| 1500 | 19.8022 | 27574.5 | 102.9195 | 126804.8 | -175925.5 | -204751.2 | 27.5609 | -289151.5 | 24.8162 |
| 1600 | 19.8107 | 29555.1 | 104.1978 | 137161.4 | -173944.9 | -205146.6 | 25.6957 | -289168.8 | 22.1831 |
| 1700 | 19.8177 | 31536.6 | 105.3990 | 147641.8 | -171963.4 | -205548.4 | 24.0481 | -289184.2 | 19.3597 |
| 1800 | 19.8237 | 33518.6 | 106.5320 | 158238.9 | -169981.4 | -205960.6 | 22.5794 | -289198.2 | 17.7944 |
| 1900 | 19.8287 | 35501.3 | 107.6039 | 168946.2 | -167998.7 | -206379.1 | 21.2621 | -289210.9 | 15.9464 |
| 2000 | 19.8329 | 37484.3 | 108.6211 | 179757.9 | -166015.7 | -206803.8 | 20.0699 | -289222.7 | 14.2831 |
| 2100 | 19.8366 | 39467.8 | 109.5889 | 190668.8 | -164032.2 | -207232.7 | 18.9938 | -289234.0 | 12.7781 |
| 2200 | 19.8398 | 41451.6 | 110.5117 | 201674.1 | -162048.3 | -207667.8 | 18.0154 | -289245.1 | 11.4099 |
| 2300 | 19.8426 | 43435.8 | 111.3937 | 212769.7 | -160064.2 | -208109.0 | 17.1141 | -289256.3 | 10.1607 |
| 2400 | 19.8450 | 45420.2 | 112.2382 | 223951.6 | -158079.8 | -208552.3 | 16.2928 | -289268.1 | 9.0155 |
| 2500 | 19.8472 | 47404.8 | 113.0484 | 235216.2 | -156095.2 | -209001.7 | 15.5305 | -289280.9 | 7.9618 |
| 2600 | 19.8491 | 49389.6 | 113.8269 | 246560.3 | -154110.4 | -209451.4 | - | -289295.3 | 6.9892 |
| 2700 | 19.8508 | 51374.6 | 114.5760 | 257980.6 | -152125.4 | -209901.1 | - | -289311.8 | 6.0886 |
| 2800 | 19.8523 | 53359.7 | 115.2980 | 269474.6 | -150140.3 | -210350.8 | - | -289331.0 | 5.2522 |
| 2900 | 19.8537 | 55345.0 | 115.9946 | 281039.4 | -148154.9 | -210800.5 | - | -289353.5 | 4.4735 |
| 3000 | 19.8549 | 57330.5 | 116.6677 | 292672.7 | -146169.5 | -211250.2 | - | -289380.1 | 3.7466 |
| 3100 | 19.8561 | 59316.0 | 117.3188 | 304372.2 | -144184.0 | -211700.0 | - | -289411.5 | 3.0666 |
| 3200 | 19.8571 | 61301.7 | 117.9492 | 316135.8 | -142198.3 | -212150.0 | - | -289448.5 | 2.4290 |
| 3300 | 19.8580 | 63287.4 | 118.5603 | 327961.4 | -140212.6 | -212600.0 | - | -289491.6 | 1.8299 |
| 3400 | 19.8589 | 65273.3 | 119.1531 | 339847.2 | -138226.7 | -213050.0 | - | -289542.1 | 1.2660 |
| 3500 | 19.8596 | 67259.2 | 119.7288 | 351791.4 | -136240.8 | -213500.0 | - | -289600.7 | 0.7342 |
| 3600 | 19.8603 | 69245.2 | 120.2882 | 363792.4 | -134254.8 | -213950.0 | - | -289668.4 | 0.2319 |
| 3700 | 19.8610 | 71231.3 | 120.8324 | 375848.6 | -132268.7 | -214400.0 | - | -289746.3 | -0.2434 |
| 3800 | 19.8616 | 73217.4 | 121.3621 | 387958.4 | -130282.6 | -214850.0 | - | -289835.3 | -0.6939 |
| 3900 | 19.8621 | 75203.6 | 121.8780 | 400120.5 | -128296.4 | -215300.0 | - | -289936.6 | -1.1213 |
| 4000 | 19.8627 | 77189.8 | 122.3809 | 412333.6 | -126310.2 | -215750.0 | - | -290051.4 | -1.5276 |
| 4100 | 19.8631 | 79176.1 | 122.8713 | 424596.3 | -124323.9 | -216200.0 | - | -290180.8 | -1.9142 |
| 4200 | 19.8636 | 81162.5 | 123.3500 | 436907.4 | -122337.5 | -216650.0 | - | -290325.0 | -2.2825 |
| 4300 | 19.8640 | 83148.8 | 123.8174 | 449265.9 | -120351.2 | -217100.0 | - | -290487.4 | -2.6339 |
| 4400 | 19.8644 | 85135.3 | 124.2741 | 461670.6 | -118364.7 | -217550.0 | - | -290668.0 | -2.9695 |
| 4500 | 19.8647 | 87121.7 | 124.7205 | 474120.4 | -116378.3 | -218000.0 | - | -290873.7 | -3.2904 |
| 4600 | 19.8651 | 89108.2 | 125.1571 | 486614.3 | -114391.8 | -218450.0 | - | -291105.1 | -3.5975 |
| 4700 | 19.8654 | 91094.7 | 125.5843 | 499151.5 | -112405.3 | -218900.0 | - | -291285.4 | -3.8919 |
| 4800 | 19.8657 | 93081.3 | 126.0025 | 511730.9 | -110418.7 | -219350.0 | - | -291542.2 | -4.1742 |
| 4900 | 19.8660 | 95067.9 | 126.4122 | 524351.7 | -108432.1 | -219800.0 | - | -291822.5 | -4.4452 |
| 5000 | 19.8662 | 97054.5 | 126.8135 | 537013.0 | -106445.5 | -220250.0 | - | -292124.0 | -4.7056 |
| 5100 | 19.8665 | 99041.1 | 127.2069 | 549714.1 | -104458.9 | -220700.0 | - | -292454.7 | -4.9561 |
| 5200 | 19.8667 | 101027.8 | 127.5927 | 562454.2 | -102472.2 | -221150.0 | - | -292821.2 | -5.1972 |
| 5300 | 19.8669 | 103014.5 | 127.9711 | 575232.4 | -100485.5 | -221600.0 | - | -293199.4 | -5.4296 |
| 5400 | 19.8671 | 105001.2 | 128.3425 | 588048.2 | -98498.8 | -222050.0 | - | -293615.9 | -5.6536 |
| 5500 | 19.8673 | 106987.9 | 128.7070 | 600900.7 | -96512.1 | -222500.0 | - | -294063.6 | -5.8698 |
| 5600 | 19.8675 | 108974.6 | 129.0650 | 613789.3 | -94525.4 | -222950.0 | - | -294543.5 | -6.0786 |
| 5700 | 19.8677 | 110961.4 | 129.4166 | 626713.5 | -92538.6 | -223400.0 | - | -295056.7 | -6.2805 |
| 5800 | 19.8679 | 112948.2 | 129.7622 | 639672.5 | -90551.8 | -223850.0 | - | -295604.4 | -6.4757 |
| 5900 | 19.8680 | 114935.0 | 130.1018 | 652665.7 | -88565.0 | -224300.0 | - | -296187.5 | -6.6647 |
| 6000 | 19.8682 | 116921.8 | 130.4357 | 665692.6 | -86578.2 | -224750.0 | - | -296731.3 | -6.8474 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Na, 370.98° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(157) NaH (gas); molecular weight, 23.999

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 27452.1 | 29998.3 | ----- | -47280.0 | ----- |
| 100 | 6.9635 | 691.3 | 37.3298 | 3041.7 | 28143.4 | 29997.1 | -61.2947 | -47582.3 | 100.5065 |
| 200 | 7.0103 | 1389.0 | 42.1642 | 7043.9 | 28841.1 | 29806.7 | -28.5854 | -47878.3 | 48.3882 |
| 298.15 | 7.2394 | 2086.8 | 44.9997 | 11329.9 | 29538.8 | 29538.8 | -17.9038 | -48155.8 | 31.1219 |
| 300 | 7.2453 | 2100.1 | 45.0445 | 11413.2 | 29552.2 | 29535.4 | -17.7705 | -48160.7 | 30.9042 |
| 400 | 7.5881 | 2841.6 | 47.1752 | 16028.5 | 30293.7 | 28525.4 | -12.4493 | -48412.9 | 22.1121 |
| 500 | 7.9096 | 3616.9 | 48.9040 | 20835.0 | 31069.0 | 28209.3 | -9.3487 | -48651.2 | 16.8107 |
| 600 | 8.1711 | 4421.5 | 50.3701 | 25800.6 | 31873.6 | 27943.5 | -7.5031 | -48820.3 | 15.2614 |
| 700 | 8.3756 | 5249.3 | 51.6457 | 30902.7 | 32701.4 | 27717.8 | -5.8549 | -48986.2 | 10.7170 |
| 800 | 8.5357 | 6095.1 | 52.7750 | 36124.8 | 33547.2 | 27518.3 | -4.7770 | -49153.9 | 8.8025 |
| 900 | 8.6629 | 6955.3 | 53.7880 | 41453.9 | 34407.4 | 27353.9 | -3.9442 | -49267.4 | 7.3092 |
| 1000 | 8.7662 | 7826.9 | 54.7062 | 46879.3 | 35279.0 | 27155.8 | -3.2825 | -49389.4 | 6.1114 |
| 1100 | 8.8520 | 8708.0 | 55.5459 | 52392.5 | 36160.1 | 26976.8 | -2.7449 | -49502.0 | 5.1291 |
| 1200 | 8.9247 | 9596.9 | 56.3193 | 57986.2 | 37049.0 | 26791.6 | -2.2996 | -49606.6 | 4.3087 |
| 1300 | 8.9877 | 10492.6 | 57.0362 | 63654.5 | 37944.7 | 26599.6 | -1.9255 | -49704.6 | 3.6130 |
| 1400 | 9.0433 | 11394.2 | 57.7043 | 69391.9 | 38846.3 | 26402.2 | -1.6065 | -49796.6 | 3.0157 |
| 1500 | 9.0931 | 12301.1 | 58.3300 | 75193.9 | 39753.2 | 26199.4 | -1.3347 | -49883.4 | 2.4970 |
| 1600 | 9.1385 | 13212.7 | 58.9183 | 81056.6 | 40664.8 | 25990.3 | -1.0964 | -49965.4 | 2.0424 |
| 1700 | 9.1802 | 14128.6 | 59.4736 | 86976.5 | 41580.7 | 25778.7 | -0.8873 | -50043.2 | 1.6407 |
| 1800 | 9.2192 | 15048.6 | 59.9994 | 92950.3 | 42500.7 | 25562.7 | -0.7036 | -50116.9 | 1.2830 |
| 1900 | 9.2558 | 15972.4 | 60.4989 | 98975.5 | 43424.5 | 25343.3 | -0.5408 | -50187.0 | 0.9625 |
| 2000 | 9.2905 | 16899.7 | 60.9745 | 105049.3 | 44351.8 | 25121.1 | -0.3979 | -50253.6 | 0.6737 |
| 2100 | 9.3237 | 17830.4 | 61.4286 | 111169.7 | 45282.5 | 24896.9 | -0.2672 | -50317.1 | 0.4121 |
| 2200 | 9.3556 | 18764.4 | 61.8631 | 117334.4 | 46216.5 | 24670.2 | -0.1486 | -50377.7 | 0.1739 |
| 2300 | 9.3864 | 19701.5 | 62.2797 | 123541.7 | 47153.6 | 24440.6 | -0.0441 | -50435.6 | -0.0438 |
| 2400 | 9.4163 | 20641.7 | 62.6798 | 129789.8 | 48093.8 | 24210.6 | 0.0538 | -50491.1 | -0.2436 |
| 2500 | 9.4454 | 21584.7 | 63.0648 | 136077.1 | 49036.8 | 23978.0 | 0.1407 | -50544.4 | -0.4276 |
| 2600 | 9.4738 | 22530.7 | 63.4358 | 142402.3 | 49982.8 | 49982.8 | ----- | -50596.0 | -0.5976 |
| 2700 | 9.5017 | 23479.5 | 63.7938 | 148763.8 | 50931.6 | 50931.6 | ----- | -50646.0 | -0.7552 |
| 2800 | 9.5290 | 24431.0 | 64.1399 | 155160.6 | 51883.1 | 51883.1 | ----- | -50694.8 | -0.9017 |
| 2900 | 9.5560 | 25385.3 | 64.4747 | 161591.5 | 52837.4 | 52837.4 | ----- | -50742.7 | -1.0382 |
| 3000 | 9.5825 | 26342.2 | 64.7991 | 168055.2 | 53794.3 | 53794.3 | ----- | -50790.2 | -1.1657 |
| 3100 | 9.6088 | 27301.8 | 65.1138 | 174551.0 | 54753.9 | 54753.9 | ----- | -50837.6 | -1.2851 |
| 3200 | 9.6347 | 28263.9 | 65.4193 | 181077.7 | 55716.0 | 55716.0 | ----- | -50885.4 | -1.3972 |
| 3300 | 9.6604 | 29228.7 | 65.7161 | 187634.5 | 56680.8 | 56680.8 | ----- | -50933.7 | -1.5025 |
| 3400 | 9.6859 | 30196.0 | 66.0049 | 194220.6 | 57648.1 | 57648.1 | ----- | -50983.3 | -1.6018 |
| 3500 | 9.7111 | 31165.9 | 66.2860 | 200835.2 | 58618.0 | 58618.0 | ----- | -51034.6 | -1.6954 |
| 3600 | 9.7362 | 32138.2 | 66.5600 | 207477.6 | 59590.3 | 59590.3 | ----- | -51088.0 | -1.7840 |
| 3700 | 9.7611 | 33113.1 | 66.8271 | 214147.0 | 60565.2 | 60565.2 | ----- | -51144.0 | -1.8679 |
| 3800 | 9.7859 | 34090.5 | 67.0877 | 220842.8 | 61542.6 | 61542.6 | ----- | -51203.2 | -1.9474 |
| 3900 | 9.8105 | 35070.3 | 67.3422 | 227564.3 | 62522.4 | 62522.4 | ----- | -51266.2 | -2.0230 |
| 4000 | 9.8351 | 36052.6 | 67.5909 | 234311.0 | 63504.7 | 63504.7 | ----- | -51333.5 | -2.0948 |
| 4100 | 9.8595 | 37037.3 | 67.8341 | 241082.3 | 64489.4 | 64489.4 | ----- | -51405.8 | -2.1633 |
| 4200 | 9.8838 | 38024.5 | 68.0719 | 247877.7 | 65476.6 | 65476.6 | ----- | -51483.1 | -2.2286 |
| 4300 | 9.9081 | 39014.0 | 68.3048 | 254696.6 | 66466.1 | 66466.1 | ----- | -51567.1 | -2.2909 |
| 4400 | 9.9322 | 40006.1 | 68.5329 | 261538.5 | 67458.2 | 67458.2 | ----- | -51647.8 | -2.3505 |
| 4500 | 9.9563 | 41000.5 | 68.7563 | 268403.0 | 68452.6 | 68452.6 | ----- | -51740.7 | -2.4075 |
| 4600 | 9.9803 | 41997.3 | 68.9754 | 275289.6 | 69449.4 | 69449.4 | ----- | -51843.1 | -2.4622 |
| 4700 | 10.0043 | 42996.5 | 69.1903 | 282197.9 | 70448.6 | 70448.6 | ----- | -51953.7 | -2.5147 |
| 4800 | 10.0282 | 43998.2 | 69.4012 | 289127.5 | 71450.3 | 71450.3 | ----- | -52073.1 | -2.5650 |
| 4900 | 10.0520 | 45002.2 | 69.6082 | 296078.0 | 72454.3 | 72454.3 | ----- | -52201.9 | -2.6135 |
| 5000 | 10.0758 | 46008.6 | 69.8115 | 303049.0 | 73460.7 | 73460.7 | ----- | -52339.0 | -2.6601 |
| 5100 | 10.0996 | 47017.3 | 70.0113 | 310040.2 | 74469.4 | 74469.4 | ----- | -52488.3 | -2.7050 |
| 5200 | 10.1233 | 48028.5 | 70.2076 | 317051.2 | 75480.6 | 75480.6 | ----- | -52649.0 | -2.7483 |
| 5300 | 10.1470 | 49042.0 | 70.4007 | 324081.6 | 76494.1 | 76494.1 | ----- | -52821.6 | -2.7902 |
| 5400 | 10.1706 | 50057.9 | 70.5906 | 331131.2 | 77510.0 | 77510.0 | ----- | -53006.9 | -2.8306 |
| 5500 | 10.1942 | 51076.1 | 70.7774 | 338199.6 | 78528.2 | 78528.2 | ----- | -53205.3 | -2.8696 |
| 5600 | 10.2178 | 52096.7 | 70.9613 | 345286.6 | 79548.8 | 79548.8 | ----- | -53417.6 | -2.9075 |
| 5700 | 10.2413 | 53119.7 | 71.1424 | 352391.8 | 80571.8 | 80571.8 | ----- | -53644.2 | -2.9441 |
| 5800 | 10.2649 | 54145.0 | 71.3207 | 359515.0 | 81597.1 | 81597.1 | ----- | -53885.7 | -2.9797 |
| 5900 | 10.2884 | 55172.6 | 71.4964 | 366655.9 | 82624.7 | 82624.7 | ----- | -54142.6 | -3.0141 |
| 6000 | 10.3118 | 56202.6 | 71.6695 | 373814.2 | 83654.7 | 83654.7 | ----- | -54377.5 | -3.0475 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Na, 370.98° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (158) NaO (gas); molecular weight, 38.991

| T, °K | C _p , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 11064.7 | 13636.4 | ----- | -71000.0 | ----- |
| 100 | 6.9722 | 695.4 | 44.7098 | 3775.6 | 11760.1 | 13672.0 | -25.8636 | -71328.9 | 151.7201 |
| 200 | 7.3684 | 1408.2 | 49.6355 | 8518.9 | 12473.0 | 13450.3 | -11.0139 | -71670.3 | 73.6295 |
| 298.15 | 7.8956 | 2158.4 | 52.6800 | 13548.2 | 13223.1 | 13223.1 | -6.2111 | -71930.4 | 47.8061 |
| 300 | 7.9041 | 2173.0 | 52.7288 | 13645.7 | 13237.7 | 13218.7 | -6.1514 | -71934.7 | 47.4810 |
| 400 | 8.2701 | 2983.1 | 55.0569 | 19039.7 | 14047.8 | 12271.7 | -3.7961 | -72139.3 | 34.3630 |
| 500 | 8.5001 | 3822.5 | 56.9289 | 24642.0 | 14887.2 | 12003.3 | -2.4691 | -72307.2 | 26.4716 |
| 600 | 8.6495 | 4680.5 | 58.4928 | 30415.2 | 15745.2 | 11763.3 | -1.6031 | -72452.4 | 21.1992 |
| 700 | 8.7520 | 5550.8 | 59.8343 | 36333.2 | 16615.6 | 11542.3 | -0.9965 | -72582.7 | 17.4260 |
| 800 | 8.8264 | 6429.9 | 61.0081 | 42376.5 | 17494.7 | 11330.0 | -0.5500 | -72702.6 | 14.5912 |
| 900 | 8.8829 | 7315.5 | 62.0511 | 48530.4 | 18380.3 | 11119.5 | -0.2091 | -72814.8 | 12.3828 |
| 1000 | 8.9279 | 8206.1 | 62.9894 | 54783.2 | 19270.9 | 10905.6 | 0.0584 | -72921.3 | 10.6135 |
| 1100 | 8.9650 | 9100.8 | 63.8421 | 61125.5 | 20165.6 | 10684.1 | 0.2729 | -73023.0 | 9.1638 |
| 1200 | 8.9966 | 9999.9 | 64.6235 | 67549.3 | 21063.7 | 10451.7 | 0.4481 | -73120.9 | 7.9540 |
| 1300 | 9.0242 | 10900.0 | 65.3448 | 74048.2 | 21964.8 | 10209.6 | 0.5929 | -73215.5 | 6.9290 |
| 1400 | 9.0489 | 11803.7 | 66.0144 | 80616.5 | 22868.4 | 9960.2 | 0.7149 | -73307.1 | 6.0493 |
| 1500 | 9.0713 | 12709.7 | 66.6395 | 87249.6 | 23774.5 | 9704.9 | 0.8153 | -73396.3 | 5.2860 |
| 1600 | 9.0921 | 13617.9 | 67.2256 | 93943.1 | 24682.6 | 9442.7 | 0.9030 | -73483.1 | 4.6173 |
| 1700 | 9.1116 | 14528.1 | 67.7774 | 100693.6 | 25592.8 | 9177.4 | 0.9790 | -73567.7 | 4.0265 |
| 1800 | 9.1301 | 15440.2 | 68.2988 | 107497.6 | 26504.9 | 8907.2 | 1.0440 | -73650.5 | 3.5008 |
| 1900 | 9.1477 | 16354.1 | 68.7929 | 114352.4 | 27418.8 | 8633.9 | 1.1000 | -73731.4 | 3.0299 |
| 2000 | 9.1647 | 17269.7 | 69.2625 | 121255.4 | 28334.5 | 8357.5 | 1.1469 | -73810.7 | 2.6057 |
| 2100 | 9.1811 | 18187.0 | 69.7101 | 128204.2 | 29251.8 | 8079.0 | 1.1902 | -73888.6 | 2.2214 |
| 2200 | 9.1970 | 19105.9 | 70.1376 | 135196.7 | 30170.7 | 7797.3 | 1.2292 | -73965.2 | 1.8717 |
| 2300 | 9.2126 | 20026.4 | 70.5467 | 142251.1 | 31091.2 | 7512.5 | 1.2605 | -74040.9 | 1.5521 |
| 2400 | 9.2279 | 20948.4 | 70.9391 | 149305.5 | 32013.2 | 7226.5 | 1.2914 | -74115.7 | 1.2588 |
| 2500 | 9.2429 | 21872.0 | 71.3161 | 156418.4 | 32936.7 | 6937.4 | 1.3163 | -74190.0 | 0.9888 |
| 2600 | 9.2577 | 22797.0 | 71.6789 | 163568.3 | 33861.8 | 6654.8 | 1.3416 | -74264.2 | 0.7392 |
| 2700 | 9.2722 | 23723.5 | 72.0286 | 170753.7 | 34788.3 | 6373.7 | 1.3673 | -74338.5 | 0.5079 |
| 2800 | 9.2867 | 24651.4 | 72.3661 | 177973.6 | 35716.2 | 6094.9 | 1.3934 | -74413.2 | 0.2929 |
| 2900 | 9.3009 | 25580.8 | 72.6922 | 185226.6 | 36645.6 | 5818.4 | 1.4199 | -74488.9 | 0.0925 |
| 3000 | 9.3151 | 26511.6 | 73.0070 | 192511.7 | 37576.4 | 5543.4 | 1.4468 | -74565.9 | -0.0947 |
| 3100 | 9.3291 | 27443.8 | 73.3134 | 199827.8 | 38508.6 | 5268.9 | 1.4740 | -74644.5 | -0.2700 |
| 3200 | 9.3430 | 28377.4 | 73.6098 | 207174.0 | 39442.2 | 4995.9 | 1.5015 | -74725.4 | -0.4345 |
| 3300 | 9.3569 | 29312.4 | 73.8976 | 214549.5 | 40377.2 | 4724.4 | 1.5293 | -74808.8 | -0.5893 |
| 3400 | 9.3706 | 30248.8 | 74.1771 | 221953.3 | 41313.6 | 4454.4 | 1.5574 | -74895.4 | -0.7351 |
| 3500 | 9.3843 | 31186.6 | 74.4489 | 229384.6 | 42251.3 | 4185.9 | 1.5858 | -74985.6 | -0.8727 |
| 3600 | 9.3980 | 32125.7 | 74.7135 | 236842.8 | 43190.4 | 3918.9 | 1.6145 | -75080.0 | -1.0028 |
| 3700 | 9.4116 | 33066.2 | 74.9712 | 244327.1 | 44130.9 | 3653.4 | 1.6434 | -75179.1 | -1.1261 |
| 3800 | 9.4251 | 34008.0 | 75.2223 | 251836.8 | 45072.7 | 3389.4 | 1.6725 | -75283.6 | -1.2430 |
| 3900 | 9.4386 | 34951.2 | 75.4673 | 259371.4 | 46015.9 | 3126.9 | 1.7018 | -75393.9 | -1.3541 |
| 4000 | 9.4521 | 35895.7 | 75.7065 | 266930.1 | 46960.5 | 2865.9 | 1.7314 | -75510.7 | -1.4598 |
| 4100 | 9.4655 | 36841.6 | 75.9400 | 274512.5 | 47906.3 | 2607.4 | 1.7612 | -75634.7 | -1.5605 |
| 4200 | 9.4789 | 37788.8 | 76.1683 | 282117.9 | 48853.6 | 2350.4 | 1.7913 | -75766.0 | -1.6566 |
| 4300 | 9.4922 | 38737.4 | 76.3915 | 289745.9 | 49802.1 | 2094.9 | 1.8216 | -75906.2 | -1.7485 |
| 4400 | 9.5056 | 39687.3 | 76.6098 | 297396.1 | 50752.0 | 1840.9 | 1.8522 | -76045.4 | -1.8361 |
| 4500 | 9.5189 | 40638.5 | 76.8236 | 305067.8 | 51703.2 | 1588.4 | 1.8830 | -76199.1 | -1.9201 |
| 4600 | 9.5322 | 41591.0 | 77.0330 | 312760.6 | 52655.8 | 1337.4 | 1.9140 | -76364.5 | -2.0006 |
| 4700 | 9.5455 | 42544.9 | 77.2381 | 320474.2 | 53609.7 | 1087.9 | 1.9452 | -76540.4 | -2.0779 |
| 4800 | 9.5587 | 43500.1 | 77.4392 | 328208.1 | 54564.9 | 839.4 | 1.9766 | -76727.4 | -2.1521 |
| 4900 | 9.5719 | 44456.7 | 77.6364 | 335961.9 | 55521.4 | 591.9 | 1.9991 | -76926.1 | -2.2235 |
| 5000 | 9.5852 | 45414.5 | 77.8300 | 343735.3 | 56479.3 | 345.4 | 2.0218 | -77135.3 | -2.2922 |
| 5100 | 9.5984 | 46373.7 | 78.0199 | 351527.8 | 57438.4 | 95.9 | 2.0447 | -77359.0 | -2.3584 |
| 5200 | 9.6116 | 47334.2 | 78.2064 | 359339.1 | 58398.9 | -293.6 | 2.0678 | -77596.4 | -2.4223 |
| 5300 | 9.6247 | 48296.0 | 78.3896 | 367169.0 | 59360.8 | -544.1 | 2.0911 | -77847.9 | -2.4839 |
| 5400 | 9.6379 | 49259.1 | 78.5696 | 375017.0 | 60323.9 | -794.6 | 2.1146 | -78114.2 | -2.5434 |
| 5500 | 9.6511 | 50223.6 | 78.7466 | 382882.8 | 61288.3 | -1045.1 | 2.1383 | -78396.0 | -2.6010 |
| 5600 | 9.6642 | 51189.3 | 78.9206 | 390766.2 | 62254.1 | -1295.6 | 2.1622 | -78693.8 | -2.6567 |
| 5700 | 9.6774 | 52156.4 | 79.0918 | 398666.8 | 63221.2 | -1546.1 | 2.1863 | -79008.1 | -2.7101 |
| 5800 | 9.6905 | 53124.8 | 79.2602 | 406584.5 | 64189.6 | -1796.6 | 2.2106 | -79339.3 | -2.7631 |
| 5900 | 9.7036 | 54094.5 | 79.4260 | 414518.8 | 65159.3 | -2047.1 | 2.2351 | -79688.1 | -2.8138 |
| 6000 | 9.7167 | 55065.5 | 79.5892 | 422469.6 | 66130.3 | -2297.6 | 2.2600 | -80047.0 | -2.8630 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Na, 370.98° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
(159) NaOH (gas); molecular weight, 39.999

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | ----- | ----- | ----- | ----- | ----- |
| 100 | 8.0961 | 797.2 | 47.3492 | 3937.7 | -53410.6 | -54827.1 | ----- | -191071.9 | ----- |
| 200 | 8.9741 | 1649.0 | 53.2179 | 8994.5 | -57613.4 | -55069.1 | 122.2747 | -191815.7 | 410.8078 |
| 298.15 | 9.7739 | 2570.5 | 56.9564 | 14410.9 | -56761.6 | -55453.2 | 61.9432 | -192515.0 | 200.9062 |
| 300 | 9.7870 | 2588.7 | 57.0169 | 14516.3 | -55840.0 | -55840.0 | 41.9356 | -193011.3 | 131.5634 |
| 400 | 10.3875 | 3599.2 | 59.9193 | 20368.7 | -55821.9 | -55847.3 | 41.6830 | -193101.2 | 130.6966 |
| 500 | 10.8029 | 4660.0 | 62.2891 | 26482.5 | -54811.4 | -56941.3 | 31.4477 | -193602.3 | 95.4815 |
| 600 | 11.0976 | 5755.8 | 64.2822 | 32813.5 | -53750.6 | -57337.5 | 25.2053 | -194045.6 | 74.3038 |
| 700 | 11.3245 | 6877.3 | 66.0105 | 39330.1 | -52654.8 | -57689.7 | 21.0162 | -194449.9 | 60.1542 |
| 800 | 11.5163 | 8019.5 | 67.5355 | 46008.8 | -51533.3 | -58010.7 | 18.0063 | -194825.8 | 50.0270 |
| 900 | 11.6897 | 9160.0 | 68.9020 | 52831.9 | -50391.1 | -58312.6 | 15.7368 | -195179.4 | 42.4173 |
| 1000 | 11.8516 | 10357.1 | 70.1421 | 59785.0 | -49230.7 | -58603.8 | 13.9628 | -195513.6 | 36.4881 |
| 1100 | 12.0044 | 11550.0 | 71.2790 | 66856.9 | -48053.5 | -58890.2 | 12.5365 | -195830.3 | 31.7369 |
| 1200 | 12.1481 | 12757.7 | 72.3297 | 74038.0 | -46860.7 | -59176.8 | 11.3636 | -196130.7 | 27.8434 |
| 1300 | 12.2824 | 13979.3 | 73.3074 | 81320.4 | -45653.0 | -59467.5 | 10.3817 | -196415.8 | 24.5939 |
| 1400 | 12.4071 | 15213.8 | 74.2223 | 88697.4 | -44431.4 | -59761.9 | 9.5467 | -196686.7 | 21.8405 |
| 1500 | 12.5220 | 16460.4 | 75.0823 | 96163.0 | -43196.8 | -60058.4 | 8.8281 | -196944.3 | 19.4772 |
| 1600 | 12.6275 | 17717.9 | 75.8938 | 103712.2 | -41950.3 | -60356.8 | 8.1996 | -197189.7 | 17.4264 |
| 1700 | 12.7239 | 18985.6 | 76.6623 | 111340.4 | -40692.7 | -60658.4 | 7.6493 | -197424.0 | 15.6298 |
| 1800 | 12.8118 | 20262.4 | 77.3921 | 119043.4 | -39425.1 | -60959.8 | 7.1619 | -197648.0 | 14.0427 |
| 1900 | 12.8919 | 21547.7 | 78.0870 | 126817.6 | -38148.2 | -61263.3 | 6.7259 | -197862.8 | 12.6304 |
| 2000 | 12.9647 | 22840.6 | 78.7501 | 134659.7 | -36863.0 | -61568.4 | 6.3335 | -198069.2 | 11.3654 |
| 2100 | 13.0309 | 24140.4 | 79.3843 | 142566.7 | -35570.1 | -61875.1 | 5.9764 | -198268.1 | 10.2257 |
| 2200 | 13.0912 | 25446.5 | 79.9919 | 150535.7 | -34270.2 | -62182.9 | 5.6542 | -198460.2 | 9.1936 |
| 2300 | 13.1461 | 26758.5 | 80.5751 | 158564.2 | -32964.1 | -62493.0 | 5.3607 | -198646.4 | 8.2544 |
| 2400 | 13.1962 | 28075.6 | 81.1357 | 166650.0 | -31652.2 | -62806.1 | 5.0886 | -198827.4 | 7.3960 |
| 2500 | 13.2419 | 29397.5 | 81.6753 | 174790.7 | -30335.0 | -63120.2 | 4.8409 | -199004.0 | 6.6085 |
| 2600 | 13.2837 | 30723.9 | 82.1955 | 182984.4 | -29015.1 | -63437.5 | 4.6096 | -199176.7 | 5.8834 |
| 2700 | 13.3219 | 32054.2 | 82.6975 | 191229.2 | -27686.8 | ----- | ----- | -199346.4 | 5.2134 |
| 2800 | 13.3570 | 33388.1 | 83.1827 | 199523.3 | -26356.5 | ----- | ----- | -199513.7 | 4.5926 |
| 2900 | 13.3892 | 34725.5 | 83.6519 | 207865.2 | -25022.5 | ----- | ----- | -199679.2 | 4.0156 |
| 3000 | 13.4189 | 36065.9 | 84.1064 | 216253.2 | -23685.2 | ----- | ----- | -199843.8 | 3.4780 |
| 3100 | 13.4462 | 37409.2 | 84.5468 | 224686.0 | -22344.7 | ----- | ----- | -200007.9 | 2.9758 |
| 3200 | 13.4714 | 38755.1 | 84.9741 | 233162.1 | -21001.5 | ----- | ----- | -200172.4 | 2.5056 |
| 3300 | 13.4946 | 40103.4 | 85.3890 | 241680.4 | -19655.6 | ----- | ----- | -200337.8 | 2.0644 |
| 3400 | 13.5162 | 41453.9 | 85.7922 | 250239.5 | -18307.3 | ----- | ----- | -200504.6 | 1.6497 |
| 3500 | 13.5362 | 42806.6 | 86.1843 | 258838.5 | -16956.7 | ----- | ----- | -200673.8 | 1.2590 |
| 3600 | 13.5548 | 44161.1 | 86.5659 | 267476.1 | -15604.1 | ----- | ----- | -200846.0 | 0.8903 |
| 3700 | 13.5720 | 45517.5 | 86.9375 | 276151.3 | -14249.5 | ----- | ----- | -201021.8 | 0.5418 |
| 3800 | 13.5881 | 46875.5 | 87.2997 | 284863.2 | -12893.2 | ----- | ----- | -201201.8 | 0.2118 |
| 3900 | 13.6031 | 48235.1 | 87.6528 | 293610.9 | -11535.1 | ----- | ----- | -201386.9 | -0.1011 |
| 4000 | 13.6171 | 49596.1 | 87.9974 | 302393.5 | -10175.6 | ----- | ----- | -201577.7 | -0.3982 |
| 4100 | 13.6302 | 50958.4 | 88.3338 | 311210.1 | -8814.6 | ----- | ----- | -201774.8 | -0.6807 |
| 4200 | 13.6425 | 52322.1 | 88.6624 | 320060.0 | -7452.2 | ----- | ----- | -201979.2 | -0.9497 |
| 4300 | 13.6540 | 53686.9 | 88.9836 | 328942.4 | -6088.5 | ----- | ----- | -202190.8 | -1.2062 |
| 4400 | 13.6647 | 55052.9 | 89.2976 | 337856.5 | -4723.7 | ----- | ----- | -202411.6 | -1.4510 |
| 4500 | 13.6749 | 56419.8 | 89.6048 | 346801.7 | -3357.8 | ----- | ----- | -202631.6 | -1.6849 |
| 4600 | 13.6844 | 57787.8 | 89.9054 | 355777.2 | -1990.8 | ----- | ----- | -202866.3 | -1.9086 |
| 4700 | 13.6934 | 59156.7 | 90.1998 | 364782.5 | -622.8 | ----- | ----- | -203113.1 | -2.1229 |
| 4800 | 13.7019 | 60526.5 | 90.4882 | 373817.0 | 746.1 | ----- | ----- | -203370.8 | -2.3284 |
| 4900 | 13.7099 | 61897.1 | 90.7708 | 382880.0 | 2115.8 | ----- | ----- | -203640.0 | -2.5255 |
| 5000 | 13.7174 | 63268.4 | 91.0479 | 391971.0 | 3486.4 | ----- | ----- | -203921.5 | -2.7149 |
| 5100 | 13.7246 | 64640.5 | 91.3196 | 401089.4 | 4857.8 | ----- | ----- | -204214.0 | -2.8969 |
| 5200 | 13.7313 | 66013.3 | 91.5862 | 410234.7 | 6229.9 | ----- | ----- | -204521.6 | -3.0720 |
| 5300 | 13.7377 | 67386.8 | 91.8478 | 419406.5 | 7602.7 | ----- | ----- | -204843.5 | -3.2407 |
| 5400 | 13.7438 | 68760.9 | 92.1046 | 428604.1 | 8976.1 | ----- | ----- | -205180.2 | -3.4033 |
| 5500 | 13.7496 | 70135.5 | 92.3569 | 437827.2 | 10350.2 | ----- | ----- | -205532.4 | -3.5601 |
| 5600 | 13.7550 | 71510.8 | 92.6047 | 447075.3 | 11724.9 | ----- | ----- | -205900.8 | -3.7114 |
| 5700 | 13.7602 | 72886.5 | 92.8482 | 456348.0 | 13100.1 | ----- | ----- | -206285.9 | -3.8577 |
| 5800 | 13.7652 | 74262.8 | 93.0875 | 465644.8 | 14475.9 | ----- | ----- | -206688.3 | -3.9990 |
| 5900 | 13.7699 | 75639.6 | 93.3229 | 474965.4 | 15852.2 | ----- | ----- | -207108.5 | -4.1358 |
| 6000 | 13.7744 | 77016.8 | 93.5543 | 484309.3 | 17228.9 | ----- | ----- | -207547.1 | -4.2682 |
| | | | | | 18606.1 | ----- | ----- | -207966.6 | -4.3963 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Na, 370.98° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (160) (NaOH)₂ (gas); molecular weight, 79.998

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -171000.0 | -163832.9 | ----- | -436362.5 | ----- |
| 100 | 11.9308 | 904.9 | 56.4653 | 4741.7 | -170095.1 | -165006.4 | 356.1027 | -438499.8 | 933.1690 |
| 200 | 17.0533 | 2386.9 | 66.5343 | 10919.9 | -168613.1 | -165996.4 | 175.3629 | -440119.8 | 453.2890 |
| 298.15 | 19.9932 | 4212.8 | 73.9232 | 17827.4 | -166787.2 | -166787.2 | 115.5245 | -441239.7 | 294.7803 |
| 300 | 20.0402 | 4249.9 | 74.0470 | 17964.2 | -166750.1 | -166800.9 | 114.7703 | -441308.8 | 292.7856 |
| 400 | 22.1839 | 6667.5 | 80.1243 | 25682.2 | -164632.5 | -168842.2 | 84.2704 | -442214.2 | 212.3381 |
| 500 | 23.6845 | 8665.8 | 85.2466 | 33957.5 | -162334.2 | -169508.0 | 65.7832 | -442924.3 | 163.9801 |
| 600 | 24.7330 | 11089.6 | 89.6628 | 42708.1 | -159910.4 | -169980.1 | 53.4183 | -443500.4 | 131.6942 |
| 700 | 25.5075 | 13603.3 | 93.5362 | 51872.0 | -157395.7 | -170351.3 | 44.5640 | -443981.6 | 108.6053 |
| 800 | 26.1200 | 16185.7 | 96.9836 | 61401.1 | -154814.3 | -170657.3 | 37.9102 | -444390.8 | 91.2711 |
| 900 | 26.6342 | 18824.1 | 100.0905 | 71257.4 | -152175.9 | -170922.1 | 32.7268 | -444741.8 | 77.7774 |
| 1000 | 27.0835 | 21510.4 | 102.9205 | 81410.0 | -149489.6 | -171163.0 | 28.5737 | -445043.2 | 66.9745 |
| 1100 | 27.4850 | 24239.2 | 105.5210 | 91833.9 | -146760.8 | -171393.1 | 25.1707 | -445300.9 | 58.1302 |
| 1200 | 27.8474 | 27006.1 | 107.9283 | 102507.8 | -143993.9 | -171622.9 | 22.3315 | -445519.6 | 50.7560 |
| 1300 | 28.1756 | 29807.5 | 110.1704 | 113414.0 | -141192.5 | -171853.6 | 19.9259 | -445703.1 | 44.5134 |
| 1400 | 28.4728 | 32640.2 | 112.2695 | 124537.1 | -138359.8 | -172083.0 | 17.8624 | -445854.8 | 39.1607 |
| 1500 | 28.7419 | 35501.2 | 114.2433 | 135863.7 | -135498.8 | -172311.9 | 16.0666 | -445977.7 | 34.5202 |
| 1600 | 28.9853 | 38387.7 | 116.1061 | 147382.1 | -132612.3 | -172543.7 | 14.4978 | -446074.7 | 30.4587 |
| 1700 | 29.2051 | 41297.4 | 117.8701 | 159081.7 | -129702.6 | -172772.0 | 13.1128 | -446148.4 | 26.8744 |
| 1800 | 29.4038 | 44228.1 | 119.5451 | 170953.1 | -126771.9 | -173002.2 | 11.8789 | -446201.1 | 23.6879 |
| 1900 | 29.5833 | 47177.6 | 121.1398 | 182988.0 | -123822.4 | -173233.3 | 10.7728 | -446234.2 | 20.8366 |
| 2000 | 29.7456 | 50144.1 | 122.6614 | 195178.7 | -120853.8 | -173465.9 | 9.7715 | -446251.8 | 18.2702 |
| 2100 | 29.8926 | 53126.2 | 124.1163 | 207518.1 | -117873.8 | -173699.2 | 8.8695 | -446253.7 | 15.9482 |
| 2200 | 30.0257 | 56122.2 | 125.5100 | 219999.9 | -114877.8 | -173935.7 | 8.0500 | -446242.5 | 13.8373 |
| 2300 | 30.1465 | 59130.9 | 126.8474 | 232618.2 | -111869.1 | -174176.9 | 7.2952 | -446219.6 | 11.9100 |
| 2400 | 30.2563 | 62151.1 | 128.1328 | 245367.6 | -108848.9 | -174419.1 | 6.6083 | -446186.7 | 10.1435 |
| 2500 | 30.3563 | 65181.8 | 129.3700 | 258243.2 | -105818.2 | -174667.0 | 5.9708 | -446145.4 | 8.5184 |
| 2600 | 30.4474 | 68222.1 | 130.5624 | 271240.1 | -102777.9 | | | -446097.2 | 7.0185 |
| 2700 | 30.5307 | 71271.1 | 131.7131 | 284354.2 | -99728.9 | | | -446043.4 | 5.6298 |
| 2800 | 30.6069 | 74328.0 | 132.8248 | 297581.4 | -96672.0 | | | -445985.5 | 4.3405 |
| 2900 | 30.6768 | 77392.2 | 133.9001 | 310918.0 | -93607.8 | | | -445925.0 | 3.1403 |
| 3000 | 30.7410 | 80463.2 | 134.9412 | 324360.3 | -90536.8 | | | -445863.2 | 2.0202 |
| 3100 | 30.8001 | 83540.3 | 135.9501 | 337905.2 | -87459.7 | | | -445801.5 | 0.9726 |
| 3200 | 30.8546 | 86623.0 | 136.9289 | 351549.4 | -84377.0 | | | -445741.3 | -0.0095 |
| 3300 | 30.9049 | 89711.0 | 137.8791 | 365290.0 | -81288.9 | | | -445683.6 | -0.9319 |
| 3400 | 30.9514 | 92803.9 | 138.8024 | 379124.3 | -78196.1 | | | -445630.4 | -1.7999 |
| 3500 | 30.9945 | 95901.2 | 139.7002 | 393049.6 | -75098.8 | | | -445582.6 | -2.6183 |
| 3600 | 31.0345 | 99002.7 | 140.5739 | 407063.5 | -71997.3 | | | -445541.8 | -3.3911 |
| 3700 | 31.0716 | 102108.0 | 141.4246 | 421163.6 | -68892.0 | | | -445509.3 | -4.1220 |
| 3800 | 31.1062 | 105216.9 | 142.2539 | 435347.7 | -65783.1 | | | -445486.6 | -4.8145 |
| 3900 | 31.1384 | 108329.2 | 143.0623 | 449613.7 | -62670.8 | | | -445475.0 | -5.4714 |
| 4000 | 31.1685 | 111444.5 | 143.8510 | 463959.6 | -59555.5 | | | -445476.0 | -6.0955 |
| 4100 | 31.1966 | 114562.6 | 144.6210 | 478383.3 | -56437.2 | | | -445491.1 | -6.6891 |
| 4200 | 31.2229 | 117683.8 | 145.3731 | 492883.1 | -53316.2 | | | -445520.7 | -7.2545 |
| 4300 | 31.2476 | 120807.3 | 146.1081 | 507457.3 | -50192.7 | | | -445568.4 | -7.7936 |
| 4400 | 31.2707 | 123933.3 | 146.8267 | 522104.2 | -47066.7 | | | -445614.3 | -8.3082 |
| 4500 | 31.2925 | 127061.5 | 147.5297 | 536822.2 | -43938.5 | | | -445659.6 | -8.8001 |
| 4600 | 31.3129 | 130191.7 | 148.2177 | 551609.7 | -40808.3 | | | -445788.9 | -9.2707 |
| 4700 | 31.3322 | 133324.0 | 148.8913 | 566465.2 | -37676.0 | | | -445909.7 | -9.7213 |
| 4800 | 31.3503 | 136458.1 | 149.5512 | 581387.5 | -34541.9 | | | -446033.6 | -10.1534 |
| 4900 | 31.3674 | 139594.0 | 150.1978 | 596375.0 | -31406.0 | | | -446221.8 | -10.5679 |
| 5000 | 31.3836 | 142731.6 | 150.8316 | 611426.6 | -28263.4 | | | -446412.1 | -10.9660 |
| 5100 | 31.3988 | 145870.7 | 151.4533 | 626540.9 | -25129.3 | | | -446632.4 | -11.3487 |
| 5200 | 31.4133 | 149011.3 | 152.0631 | 641716.9 | -21988.7 | | | -446881.0 | -11.7168 |
| 5300 | 31.4270 | 152153.3 | 152.6616 | 656953.2 | -18846.7 | | | -447159.3 | -12.0713 |
| 5400 | 31.4400 | 155296.7 | 153.2492 | 672248.8 | -15703.3 | | | -447468.6 | -12.4128 |
| 5500 | 31.4523 | 158441.3 | 153.8262 | 687602.6 | -12558.7 | | | -447810.1 | -12.7422 |
| 5600 | 31.4640 | 161587.1 | 154.3930 | 703013.7 | -9412.9 | | | -448184.9 | -13.0601 |
| 5700 | 31.4751 | 164734.1 | 154.9500 | 718480.9 | -6265.9 | | | -448594.3 | -13.3671 |
| 5800 | 31.4857 | 167882.1 | 155.4975 | 734003.4 | -3117.9 | | | -449039.2 | -13.6638 |
| 5900 | 31.4958 | 171031.2 | 156.0356 | 749580.1 | 31.2 | | | -449520.7 | -13.9507 |
| 6000 | 31.5054 | 174181.3 | 156.5653 | 765210.2 | 3181.3 | | | -449964.2 | -14.2280 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Na, 370.98° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(161) Ne (gas); molecular weight, 20.183

| T, °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| C | ----- | C | ----- | C | -1481.3 | 0 | ----- | 0 | ----- |
| 1CC | 4.9681 | 456.8 | 25.5205 | 2455.3 | -984.4 | 0 | 0 | 0 | 0 |
| 2CC | 4.9681 | 993.6 | 32.9646 | 5559.3 | -487.6 | 0 | 0 | 0 | 0 |
| 258.15 | 4.9681 | 1461.3 | 34.9482 | 8538.6 | C | 0 | 0 | 0 | 0 |
| 300 | 4.9681 | 1450.4 | 34.9790 | 9003.2 | 9.2 | 0 | 0 | 0 | 0 |
| 4CC | 4.9681 | 1987.2 | 36.4082 | 12576.0 | 506.0 | 0 | 0 | 0 | 0 |
| 5CC | 4.9681 | 2484.1 | 37.5168 | 16274.3 | 1002.8 | 0 | 0 | 0 | 0 |
| 6CC | 4.9681 | 2980.9 | 38.4226 | 20072.7 | 1499.6 | 0 | 0 | 0 | 0 |
| 7CC | 4.9681 | 3477.7 | 39.1885 | 23554.2 | 1996.5 | 0 | 0 | 0 | 0 |
| 8CC | 4.9681 | 3974.5 | 39.8519 | 27907.0 | 2493.3 | 0 | 0 | 0 | 0 |
| 9CC | 4.9681 | 4471.3 | 40.4370 | 31922.0 | 2990.1 | 0 | 0 | 0 | 0 |
| 10CC | 4.9681 | 4968.1 | 40.9605 | 35922.3 | 3486.9 | 0 | 0 | 0 | 0 |
| 11CC | 4.9681 | 5465.0 | 41.4340 | 40112.4 | 3983.7 | 0 | 0 | 0 | 0 |
| 12CC | 4.9681 | 5961.8 | 41.8663 | 44277.8 | 4480.5 | 0 | 0 | 0 | 0 |
| 13CC | 4.9681 | 6458.6 | 42.2635 | 48484.5 | 4977.3 | 0 | 0 | 0 | 0 |
| 14CC | 4.9681 | 6955.4 | 42.6321 | 52729.6 | 5474.2 | 0 | 0 | 0 | 0 |
| 15CC | 4.9681 | 7452.2 | 42.9745 | 57010.1 | 5971.0 | 0 | 0 | 0 | 0 |
| 16CC | 4.9681 | 7949.0 | 43.2955 | 61323.8 | 6467.8 | 0 | 0 | 0 | 0 |
| 17CC | 4.9681 | 8445.9 | 43.5967 | 65668.6 | 6964.6 | 0 | 0 | 0 | 0 |
| 18CC | 4.9681 | 8942.7 | 43.8807 | 70042.6 | 7461.4 | 0 | 0 | 0 | 0 |
| 19CC | 4.9681 | 9439.5 | 44.1493 | 74444.2 | 7958.2 | 0 | 0 | 0 | 0 |
| 20CC | 4.9681 | 9936.3 | 44.4041 | 78872.0 | 8455.0 | 0 | 0 | 0 | 0 |
| 21CC | 4.9681 | 10433.1 | 44.6465 | 83324.6 | 8951.9 | 0 | 0 | 0 | 0 |
| 22CC | 4.9681 | 10929.9 | 44.8777 | 87800.9 | 9448.7 | 0 | 0 | 0 | 0 |
| 23CC | 4.9681 | 11426.7 | 45.0985 | 92299.8 | 9945.5 | 0 | 0 | 0 | 0 |
| 24CC | 4.9681 | 11923.6 | 45.3099 | 96820.3 | 10442.3 | 0 | 0 | 0 | 0 |
| 25CC | 4.9681 | 12420.4 | 45.5128 | 101361.5 | 10939.1 | 0 | 0 | 0 | 0 |
| 26CC | 4.9681 | 12917.2 | 45.7076 | 105922.6 | 11435.9 | 0 | 0 | 0 | 0 |
| 27CC | 4.9681 | 13414.0 | 45.8951 | 110502.8 | 11932.8 | 0 | 0 | 0 | 0 |
| 28CC | 4.9681 | 13910.8 | 46.0758 | 115101.4 | 12429.6 | 0 | 0 | 0 | 0 |
| 29CC | 4.9681 | 14407.6 | 46.2501 | 119717.7 | 12926.4 | 0 | 0 | 0 | 0 |
| 30CC | 4.9681 | 14904.4 | 46.4186 | 124351.2 | 13423.2 | 0 | 0 | 0 | 0 |
| 31CC | 4.9681 | 15401.3 | 46.5815 | 129001.3 | 13920.0 | 0 | 0 | 0 | 0 |
| 32CC | 4.9681 | 15898.1 | 46.7392 | 133667.3 | 14416.8 | 0 | 0 | 0 | 0 |
| 33CC | 4.9681 | 16394.9 | 46.8921 | 138348.9 | 14913.6 | 0 | 0 | 0 | 0 |
| 34CC | 4.9681 | 16891.7 | 47.0404 | 143045.6 | 15410.5 | 0 | 0 | 0 | 0 |
| 35CC | 4.9681 | 17388.5 | 47.1844 | 147756.9 | 15907.3 | 0 | 0 | 0 | 0 |
| 36CC | 4.9681 | 17885.3 | 47.3244 | 152482.3 | 16404.1 | 0 | 0 | 0 | 0 |
| 37CC | 4.9681 | 18382.2 | 47.4605 | 157221.6 | 16900.9 | 0 | 0 | 0 | 0 |
| 38CC | 4.9681 | 18879.0 | 47.5930 | 161974.3 | 17397.7 | 0 | 0 | 0 | 0 |
| 39CC | 4.9681 | 19375.8 | 47.7220 | 166740.1 | 17894.5 | 0 | 0 | 0 | 0 |
| 40CC | 4.9681 | 19872.6 | 47.8478 | 171518.6 | 18391.3 | 0 | 0 | 0 | 0 |
| 41CC | 4.9681 | 20369.4 | 47.9705 | 176309.5 | 18888.2 | 0 | 0 | 0 | 0 |
| 42CC | 4.9681 | 20866.2 | 48.0902 | 181112.6 | 19385.0 | 0 | 0 | 0 | 0 |
| 43CC | 4.9681 | 21363.0 | 48.2071 | 185927.5 | 19881.8 | 0 | 0 | 0 | 0 |
| 44CC | 4.9681 | 21859.9 | 48.3213 | 190753.9 | 20378.6 | 0 | 0 | 0 | 0 |
| 45CC | 4.9681 | 22356.7 | 48.4330 | 195591.7 | 20875.4 | 0 | 0 | 0 | 0 |
| 46CC | 4.9681 | 22853.5 | 48.5422 | 200440.4 | 21372.2 | 0 | 0 | 0 | 0 |
| 47CC | 4.9681 | 23350.3 | 48.6490 | 205300.0 | 21869.1 | 0 | 0 | 0 | 0 |
| 48CC | 4.9681 | 23847.1 | 48.7536 | 210170.2 | 22365.9 | 0 | 0 | 0 | 0 |
| 49CC | 4.9681 | 24343.9 | 48.8560 | 215050.7 | 22862.7 | 0 | 0 | 0 | 0 |
| 50CC | 4.9681 | 24840.7 | 48.9564 | 219941.3 | 23359.5 | 0 | 0 | 0 | 0 |
| 51CC | 4.9681 | 25337.6 | 49.0548 | 224841.9 | 23856.3 | 0 | 0 | 0 | 0 |
| 52CC | 4.9681 | 25834.4 | 49.1512 | 229752.2 | 24353.1 | 0 | 0 | 0 | 0 |
| 53CC | 4.9681 | 26331.2 | 49.2455 | 234672.1 | 24849.9 | 0 | 0 | 0 | 0 |
| 54CC | 4.9681 | 26828.0 | 49.3388 | 239601.3 | 25346.8 | 0 | 0 | 0 | 0 |
| 55CC | 4.9681 | 27324.8 | 49.4295 | 244539.8 | 25843.6 | 0 | 0 | 0 | 0 |
| 56CC | 4.9681 | 27821.6 | 49.5194 | 249487.3 | 26340.4 | 0 | 0 | 0 | 0 |
| 57CC | 4.9681 | 28318.5 | 49.6074 | 254443.6 | 26837.2 | 0 | 0 | 0 | 0 |
| 58CC | 4.9681 | 28815.3 | 49.6938 | 259408.7 | 27334.0 | 0 | 0 | 0 | 0 |
| 59CC | 4.9681 | 29312.1 | 49.7787 | 264382.3 | 27830.8 | 0 | 0 | 0 | 0 |
| 60CC | 4.9681 | 29808.9 | 49.8622 | 269364.4 | 28327.6 | 0 | 0 | 0 | 0 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(162) O (gas); molecular weight, 16.0000

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 57949.1 | 58986.5 | ----- | 0 | ----- |
| 100 | 5.6656 | 527.5 | 32.4662 | 2719.1 | 58476.6 | 59167.2 | -126.7319 | 0 | 0 |
| 200 | 5.4341 | 1084.9 | 36.3400 | 6183.1 | 59034.0 | 59376.7 | -61.9894 | 0 | 0 |
| 298.15 | 5.2373 | 1667.5 | 38.4686 | 9861.9 | 59556.6 | 59556.6 | -40.6022 | 0 | 0 |
| 300 | 5.2347 | 1617.2 | 38.5010 | 9933.1 | 59560.3 | 59559.8 | -40.3330 | 0 | 0 |
| 400 | 5.1347 | 2135.1 | 39.9917 | 13861.6 | 60084.3 | 59722.7 | -29.4725 | 0 | 0 |
| 500 | 5.0808 | 2645.6 | 41.1311 | 17919.9 | 60594.8 | 59867.6 | -22.9391 | 0 | 0 |
| 600 | 5.0490 | 3152.0 | 42.0544 | 22080.6 | 61101.1 | 59996.4 | -18.5735 | 0 | 0 |
| 700 | 5.0289 | 3655.8 | 42.8311 | 26325.9 | 61605.0 | 60111.2 | -15.4488 | 0 | 0 |
| 800 | 5.0154 | 4158.0 | 43.5016 | 30643.3 | 62107.1 | 60214.6 | -13.1010 | 0 | 0 |
| 900 | 5.0059 | 4659.0 | 44.0918 | 35023.6 | 62608.2 | 60308.6 | -11.2719 | 0 | 0 |
| 1000 | 4.9990 | 5159.3 | 44.6188 | 39459.6 | 63108.4 | 60395.0 | -9.8065 | 0 | 0 |
| 1100 | 4.9936 | 5658.9 | 45.0950 | 43945.7 | 63608.0 | 60475.1 | -8.6058 | 0 | 0 |
| 1200 | 4.9898 | 6158.1 | 45.5294 | 48477.2 | 64107.2 | 60550.1 | -7.6040 | 0 | 0 |
| 1300 | 4.9867 | 6656.9 | 45.9286 | 53050.4 | 64606.0 | 60620.5 | -6.7552 | 0 | 0 |
| 1400 | 4.9842 | 7155.4 | 46.2981 | 57661.9 | 65104.6 | 60687.1 | -6.0269 | 0 | 0 |
| 1500 | 4.9823 | 7653.7 | 46.6419 | 62309.1 | 65602.9 | 60750.1 | -5.3951 | 0 | 0 |
| 1600 | 4.9807 | 8151.9 | 46.9634 | 66989.6 | 66101.0 | 60809.7 | -4.8416 | 0 | 0 |
| 1700 | 4.9795 | 8649.9 | 47.2653 | 71701.2 | 66599.0 | 60866.3 | -4.3528 | 0 | 0 |
| 1800 | 4.9786 | 9147.6 | 47.5499 | 76442.1 | 67096.9 | 60919.8 | -3.9179 | 0 | 0 |
| 1900 | 4.9780 | 9645.6 | 47.8191 | 81210.6 | 67594.8 | 60970.5 | -3.5285 | 0 | 0 |
| 2000 | 4.9778 | 10143.4 | 48.0744 | 86005.4 | 68092.5 | 61018.3 | -3.1777 | 0 | 0 |
| 2100 | 4.9780 | 10641.2 | 48.3173 | 90825.1 | 68590.3 | 61063.3 | -2.8601 | 0 | 0 |
| 2200 | 4.9786 | 11139.0 | 48.5489 | 95668.5 | 69088.2 | 61105.5 | -2.5712 | 0 | 0 |
| 2300 | 4.9797 | 11636.9 | 48.7702 | 100534.5 | 69586.1 | 61145.1 | -2.3072 | 0 | 0 |
| 2400 | 4.9814 | 12135.0 | 48.9822 | 105422.2 | 70084.1 | 61182.2 | -2.0650 | 0 | 0 |
| 2500 | 4.9836 | 12633.2 | 49.1856 | 110330.7 | 70582.4 | 61216.7 | -1.8421 | 0 | 0 |
| 2600 | 4.9864 | 13131.7 | 49.3811 | 115259.1 | 71080.9 | 61248.9 | -1.6362 | 0 | 0 |
| 2700 | 4.9899 | 13630.5 | 49.5693 | 120206.6 | 71579.7 | 61278.8 | -1.4455 | 0 | 0 |
| 2800 | 4.9940 | 14129.7 | 49.7509 | 125172.7 | 72078.9 | 61306.5 | -1.2683 | 0 | 0 |
| 2900 | 4.9988 | 14629.4 | 49.9262 | 130156.6 | 72578.5 | 61332.2 | -1.1033 | 0 | 0 |
| 3000 | 5.0043 | 15129.5 | 50.0958 | 135157.8 | 73078.6 | 61356.0 | -0.9492 | 0 | 0 |
| 3100 | 5.0104 | 15630.2 | 50.2599 | 140175.6 | 73579.4 | 61378.0 | -0.8050 | 0 | 0 |
| 3200 | 5.0172 | 16131.6 | 50.4191 | 145209.6 | 74080.8 | 61398.4 | -0.6698 | 0 | 0 |
| 3300 | 5.0246 | 16633.7 | 50.5736 | 150259.3 | 74582.8 | 61417.3 | -0.5427 | 0 | 0 |
| 3400 | 5.0327 | 17136.5 | 50.7237 | 155324.2 | 75085.7 | 61434.9 | -0.4230 | 0 | 0 |
| 3500 | 5.0413 | 17640.2 | 50.8697 | 160403.9 | 75589.4 | 61451.3 | -0.3102 | 0 | 0 |
| 3600 | 5.0504 | 18144.8 | 51.0119 | 165498.0 | 76094.0 | 61466.6 | -0.2036 | 0 | 0 |
| 3700 | 5.0600 | 18650.3 | 51.1504 | 170606.1 | 76599.5 | 61481.0 | -0.1027 | 0 | 0 |
| 3800 | 5.0701 | 19156.8 | 51.2855 | 175727.9 | 77106.0 | 61494.5 | -0.0072 | 0 | 0 |
| 3900 | 5.0806 | 19664.4 | 51.4173 | 180863.1 | 77613.5 | 61507.4 | 0.0835 | 0 | 0 |
| 4000 | 5.0915 | 20173.0 | 51.5461 | 186011.3 | 78122.1 | 61519.6 | 0.1697 | 0 | 0 |
| 4100 | 5.1027 | 20682.7 | 51.6719 | 191172.2 | 78631.8 | 61531.4 | 0.2517 | 0 | 0 |
| 4200 | 5.1141 | 21193.5 | 51.7950 | 196345.6 | 79142.7 | 61542.7 | 0.3298 | 0 | 0 |
| 4300 | 5.1258 | 21705.5 | 51.9155 | 201531.1 | 79654.7 | 61553.8 | 0.4043 | 0 | 0 |
| 4400 | 5.1376 | 22218.7 | 52.0335 | 206728.6 | 80167.8 | 61564.6 | 0.4754 | 0 | 0 |
| 4500 | 5.1496 | 22733.0 | 52.1491 | 211937.8 | 80682.2 | 61575.2 | 0.5433 | 0 | 0 |
| 4600 | 5.1617 | 23248.6 | 52.2624 | 217158.3 | 81197.8 | 61585.8 | 0.6083 | 0 | 0 |
| 4700 | 5.1738 | 23765.4 | 52.3735 | 222390.2 | 81714.5 | 61596.3 | 0.6706 | 0 | 0 |
| 4800 | 5.1860 | 24283.4 | 52.4826 | 227633.0 | 82232.5 | 61606.9 | 0.7303 | 0 | 0 |
| 4900 | 5.1981 | 24802.6 | 52.5896 | 232886.6 | 82751.7 | 61617.5 | 0.7875 | 0 | 0 |
| 5000 | 5.2102 | 25323.0 | 52.6946 | 238150.8 | 83272.1 | 61628.1 | 0.8425 | 0 | 0 |
| 5100 | 5.2223 | 25844.6 | 52.7981 | 243425.5 | 83793.8 | 61639.0 | 0.8953 | 0 | 0 |
| 5200 | 5.2342 | 26367.4 | 52.8996 | 248710.4 | 84316.6 | 61649.9 | 0.9461 | 0 | 0 |
| 5300 | 5.2460 | 26891.5 | 52.9994 | 254005.4 | 84840.6 | 61661.1 | 0.9950 | 0 | 0 |
| 5400 | 5.2577 | 27416.6 | 53.0976 | 259310.2 | 85365.8 | 61672.4 | 1.0421 | 0 | 0 |
| 5500 | 5.2691 | 27943.0 | 53.1941 | 264624.8 | 85892.1 | 61683.9 | 1.0875 | 0 | 0 |
| 5600 | 5.2804 | 28470.5 | 53.2892 | 269949.0 | 86419.6 | 61695.7 | 1.1312 | 0 | 0 |
| 5700 | 5.2915 | 28999.1 | 53.3826 | 275282.6 | 86948.2 | 61707.7 | 1.1735 | 0 | 0 |
| 5800 | 5.3024 | 29528.8 | 53.4749 | 280625.5 | 87477.9 | 61719.9 | 1.2143 | 0 | 0 |
| 5900 | 5.3131 | 30059.5 | 53.5656 | 285977.5 | 88008.7 | 61732.3 | 1.2537 | 0 | 0 |
| 6000 | 5.3235 | 30591.4 | 53.6550 | 291338.6 | 88540.5 | 61744.9 | 1.2918 | 0 | 0 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(163) O₂ (gas); molecular weight, 32.0000

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H _O ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H _O ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -2074.7 | 0 | ----- | -117973.0 | ----- |
| 100 | 6.9567 | 693.5 | 41.3967 | 3446.1 | -1381.2 | 0 | 0 | -118334.4 | 253.4639 |
| 200 | 6.9615 | 1389.3 | 46.2195 | 7854.6 | -685.4 | 0 | 0 | -118753.5 | 123.9789 |
| 298.15 | 7.0215 | 2074.7 | 49.0070 | 12536.7 | 0 | 0 | 0 | -119113.3 | 81.2043 |
| 300 | 7.0237 | 2087.7 | 49.0504 | 12627.4 | 13.0 | 0 | 0 | -119119.7 | 80.6659 |
| 400 | 7.1961 | 2797.9 | 51.0923 | 17639.0 | 723.2 | 0 | 0 | -119445.4 | 58.9449 |
| 500 | 7.4315 | 3529.0 | 52.7228 | 22832.4 | 1454.3 | 0 | 0 | -119735.2 | 45.8782 |
| 600 | 7.6704 | 4284.3 | 54.0991 | 28175.2 | 2209.5 | 0 | 0 | -119992.7 | 37.1469 |
| 700 | 7.8837 | 5062.3 | 55.2979 | 33646.3 | 2987.5 | 0 | 0 | -120222.4 | 30.8976 |
| 800 | 8.0638 | 5859.9 | 56.3628 | 39230.3 | 3785.2 | 0 | 0 | -120429.1 | 26.2020 |
| 900 | 8.2129 | 6674.0 | 57.3214 | 44915.3 | 4599.2 | 0 | 0 | -120617.1 | 22.5338 |
| 1000 | 8.3362 | 7501.6 | 58.1933 | 50691.7 | 5426.9 | 0 | 0 | -120789.9 | 19.6129 |
| 1100 | 8.4394 | 8340.5 | 58.9928 | 56551.6 | 6265.8 | 0 | 0 | -120950.3 | 17.2116 |
| 1200 | 8.5276 | 9189.0 | 59.7310 | 62488.2 | 7114.3 | 0 | 0 | -121100.1 | 15.2079 |
| 1300 | 8.6048 | 10045.7 | 60.4167 | 68496.0 | 7971.0 | 0 | 0 | -121241.1 | 13.5105 |
| 1400 | 8.6743 | 10909.7 | 61.0570 | 74570.1 | 8835.0 | 0 | 0 | -121378.2 | 12.0539 |
| 1500 | 8.7386 | 11780.4 | 61.6577 | 80706.1 | 9705.7 | 0 | 0 | -121500.1 | 10.7901 |
| 1600 | 8.7995 | 12657.3 | 62.2236 | 86900.4 | 10582.6 | 0 | 0 | -121619.5 | 9.6832 |
| 1700 | 8.8582 | 13540.2 | 62.7588 | 93149.8 | 11465.5 | 0 | 0 | -121732.6 | 8.7056 |
| 1800 | 8.9155 | 14428.9 | 63.2668 | 99451.3 | 12354.2 | 0 | 0 | -121839.7 | 7.8359 |
| 1900 | 8.9720 | 15323.3 | 63.7503 | 105802.3 | 13248.6 | 0 | 0 | -121941.0 | 7.0570 |
| 2000 | 9.0280 | 16223.3 | 64.2120 | 112200.6 | 14148.6 | 0 | 0 | -122036.5 | 6.3554 |
| 2100 | 9.0835 | 17128.9 | 64.6538 | 118644.1 | 15054.2 | 0 | 0 | -122126.5 | 5.7202 |
| 2200 | 9.1386 | 18040.0 | 65.0776 | 125130.8 | 15965.3 | 0 | 0 | -122211.1 | 5.1423 |
| 2300 | 9.1932 | 18956.6 | 65.4851 | 131659.0 | 16881.9 | 0 | 0 | -122290.3 | 4.6143 |
| 2400 | 9.2472 | 19878.6 | 65.8775 | 138227.3 | 17803.9 | 0 | 0 | -122364.4 | 4.1300 |
| 2500 | 9.3005 | 20806.0 | 66.2560 | 144834.1 | 18731.3 | 0 | 0 | -122433.5 | 3.6842 |
| 2600 | 9.3528 | 21738.7 | 66.6218 | 151478.1 | 19664.0 | 0 | 0 | -122497.8 | 3.2725 |
| 2700 | 9.4042 | 22676.6 | 66.9758 | 158158.1 | 20601.8 | 0 | 0 | -122557.5 | 2.8910 |
| 2800 | 9.4543 | 23619.5 | 67.3187 | 164872.9 | 21544.7 | 0 | 0 | -122613.0 | 2.5367 |
| 2900 | 9.5032 | 24567.4 | 67.6513 | 171621.4 | 22492.6 | 0 | 0 | -122664.4 | 2.2066 |
| 3000 | 9.5508 | 25520.1 | 67.9743 | 178402.8 | 23445.4 | 0 | 0 | -122711.9 | 1.8984 |
| 3100 | 9.5969 | 26477.5 | 68.2882 | 185216.0 | 24402.7 | 0 | 0 | -122756.0 | 1.6100 |
| 3200 | 9.6415 | 27439.4 | 68.5936 | 192060.2 | 25364.7 | 0 | 0 | -122796.8 | 1.3395 |
| 3300 | 9.6846 | 28405.7 | 68.8910 | 198934.5 | 26331.0 | 0 | 0 | -122834.7 | 1.0853 |
| 3400 | 9.7261 | 29376.3 | 69.1807 | 205838.1 | 27301.5 | 0 | 0 | -122869.8 | 0.8461 |
| 3500 | 9.7661 | 30350.9 | 69.4632 | 212770.4 | 28276.2 | 0 | 0 | -122902.6 | 0.6204 |
| 3600 | 9.8045 | 31329.4 | 69.7389 | 219730.5 | 29254.7 | 0 | 0 | -122933.2 | 0.4072 |
| 3700 | 9.8414 | 32311.8 | 70.0080 | 226717.9 | 30237.0 | 0 | 0 | -122962.0 | 0.2055 |
| 3800 | 9.8768 | 33297.7 | 70.2709 | 233731.9 | 31222.9 | 0 | 0 | -122989.0 | 0.0143 |
| 3900 | 9.9108 | 34287.1 | 70.5279 | 240771.9 | 32212.3 | 0 | 0 | -123014.7 | -0.1671 |
| 4000 | 9.9433 | 35279.8 | 70.7793 | 247837.3 | 33205.0 | 0 | 0 | -123039.2 | -0.3394 |
| 4100 | 9.9745 | 36275.7 | 71.0252 | 254927.6 | 34200.9 | 0 | 0 | -123062.7 | -0.5034 |
| 4200 | 10.0045 | 37274.6 | 71.2659 | 262042.2 | 35199.9 | 0 | 0 | -123085.4 | -0.6596 |
| 4300 | 10.0332 | 38276.5 | 71.5017 | 269180.6 | 36201.8 | 0 | 0 | -123107.5 | -0.8085 |
| 4400 | 10.0608 | 39281.2 | 71.7326 | 276342.4 | 37206.5 | 0 | 0 | -123129.2 | -0.9507 |
| 4500 | 10.0872 | 40288.7 | 71.9590 | 283527.0 | 38213.9 | 0 | 0 | -123150.5 | -1.0867 |
| 4600 | 10.1127 | 41298.7 | 72.1810 | 290734.0 | 39223.9 | 0 | 0 | -123171.6 | -1.2167 |
| 4700 | 10.1372 | 42311.2 | 72.3988 | 297963.0 | 40236.4 | 0 | 0 | -123192.6 | -1.3412 |
| 4800 | 10.1608 | 43326.1 | 72.6124 | 305213.6 | 41251.3 | 0 | 0 | -123213.7 | -1.4605 |
| 4900 | 10.1836 | 44343.3 | 72.8222 | 312485.4 | 42268.5 | 0 | 0 | -123234.9 | -1.5750 |
| 5000 | 10.2055 | 45362.7 | 73.0281 | 319777.9 | 43288.0 | 0 | 0 | -123256.3 | -1.6850 |
| 5100 | 10.2268 | 46384.4 | 73.2304 | 327090.9 | 44309.6 | 0 | 0 | -123277.9 | -1.7906 |
| 5200 | 10.2474 | 47408.1 | 73.4292 | 334423.9 | 45333.3 | 0 | 0 | -123299.8 | -1.8922 |
| 5300 | 10.2673 | 48433.8 | 73.6246 | 341776.6 | 46359.1 | 0 | 0 | -123322.1 | -1.9900 |
| 5400 | 10.2867 | 49461.5 | 73.8167 | 349148.7 | 47386.8 | 0 | 0 | -123344.8 | -2.0842 |
| 5500 | 10.3054 | 50491.1 | 74.0056 | 356539.9 | 48416.4 | 0 | 0 | -123367.9 | -2.1749 |
| 5600 | 10.3237 | 51522.6 | 74.1915 | 363949.7 | 49447.9 | 0 | 0 | -123391.4 | -2.2625 |
| 5700 | 10.3414 | 52555.9 | 74.3744 | 371378.1 | 50481.1 | 0 | 0 | -123415.3 | -2.3470 |
| 5800 | 10.3587 | 53590.9 | 74.5544 | 378824.5 | 51516.1 | 0 | 0 | -123439.7 | -2.4286 |
| 5900 | 10.3755 | 54627.6 | 74.7316 | 386288.9 | 52552.8 | 0 | 0 | -123464.5 | -2.5074 |
| 6000 | 10.3919 | 55666.0 | 74.9061 | 393770.8 | 53591.2 | 0 | 0 | -123489.8 | -2.5836 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(164) OH (gas); molecular weight, 17.008

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 1205.6 | 9254.9 | ----- | -101360.0 | ----- |
| 100 | 7.5609 | 655.9 | 35.8480 | 2928.9 | 1361.5 | 9184.6 | -19.4259 | -101728.4 | 218.2554 |
| 200 | 7.2951 | 1399.3 | 41.0123 | 6603.2 | 8604.9 | 9278.7 | -9.3429 | -102039.2 | 106.9662 |
| 298.15 | 7.1439 | 2106.8 | 43.8927 | 10979.8 | 9312.5 | 9312.5 | -5.9987 | -102341.7 | 70.2141 |
| 300 | 7.1421 | 2120.1 | 43.9365 | 11061.0 | 9329.7 | 9312.8 | -5.9567 | -102347.6 | 69.7515 |
| 400 | 7.0757 | 2830.5 | 45.9811 | 15561.9 | 10036.2 | 9320.9 | -4.2599 | -102651.9 | 51.0872 |
| 500 | 7.0492 | 3536.5 | 47.5566 | 20241.8 | 10742.1 | 9312.0 | -3.2417 | -102953.2 | 39.8552 |
| 600 | 7.0530 | 4241.4 | 46.8417 | 25063.7 | 11447.0 | 9289.3 | -2.5640 | -103251.5 | 32.3452 |
| 700 | 7.0866 | 4948.1 | 49.9311 | 30003.7 | 12153.7 | 9255.9 | -2.0815 | -103545.4 | 26.9655 |
| 800 | 7.1478 | 5659.6 | 50.8811 | 35045.3 | 12865.2 | 9215.8 | -1.7210 | -103832.9 | 22.9192 |
| 900 | 7.2312 | 6378.4 | 51.7276 | 40176.4 | 13584.0 | 9172.0 | -1.4418 | -104112.0 | 19.7635 |
| 1000 | 7.3299 | 7106.4 | 52.4945 | 45388.1 | 14312.0 | 9127.1 | -1.2194 | -104381.0 | 17.2323 |
| 1100 | 7.4372 | 7844.7 | 53.1981 | 50673.3 | 15050.3 | 9082.7 | -1.0387 | -104639.2 | 15.1560 |
| 1200 | 7.5478 | 8593.9 | 53.8503 | 56026.0 | 15797.6 | 9039.9 | -0.8886 | -104885.9 | 13.4216 |
| 1300 | 7.6578 | 9354.2 | 54.4585 | 61441.8 | 16559.8 | 8999.0 | -0.7622 | -105121.3 | 11.9957 |
| 1400 | 7.7644 | 10125.4 | 55.0297 | 66916.5 | 17331.0 | 8960.1 | -0.6546 | -105345.5 | 10.6871 |
| 1500 | 7.8662 | 10906.9 | 55.5691 | 72446.7 | 18112.6 | 8922.7 | -0.5615 | -105559.0 | 9.5897 |
| 1600 | 7.9622 | 11698.4 | 56.0795 | 78029.4 | 18904.0 | 8887.0 | -0.4803 | -105762.5 | 8.6276 |
| 1700 | 8.0520 | 12499.2 | 56.5653 | 83661.8 | 19704.8 | 8852.8 | -0.4090 | -105956.6 | 7.7771 |
| 1800 | 8.1355 | 13308.6 | 57.0279 | 89341.7 | 20514.2 | 8819.8 | -0.3459 | -106141.9 | 7.0197 |
| 1900 | 8.2132 | 14126.9 | 57.4699 | 95066.7 | 21331.7 | 8786.9 | -0.2896 | -106319.1 | 6.3409 |
| 2000 | 8.2852 | 14951.0 | 57.8930 | 100835.0 | 22156.7 | 8754.4 | -0.2393 | -106488.7 | 5.7289 |
| 2100 | 8.3519 | 15782.9 | 58.2989 | 106644.8 | 22988.6 | 8721.6 | -0.1938 | -106651.4 | 5.1744 |
| 2200 | 8.4137 | 16621.2 | 58.6889 | 112494.3 | 23826.9 | 8688.7 | -0.1527 | -106807.7 | 4.6696 |
| 2300 | 8.4711 | 17465.5 | 59.0641 | 118382.0 | 24671.2 | 8654.9 | -0.1150 | -106958.2 | 4.2079 |
| 2400 | 8.5243 | 18315.3 | 59.4255 | 124306.6 | 25521.0 | 8620.5 | -0.0810 | -107103.2 | 3.7842 |
| 2500 | 8.5739 | 19170.3 | 59.7746 | 130266.8 | 26375.9 | 8585.2 | -0.0496 | -107243.3 | 3.3939 |
| 2600 | 8.6201 | 20030.0 | 60.1120 | 136261.2 | 27235.6 | 8548.6 | -0.0209 | -107378.9 | 3.0331 |
| 2700 | 8.6633 | 20894.1 | 60.4381 | 142288.8 | 28099.8 | 8511.0 | 0.0058 | -107510.4 | 2.6986 |
| 2800 | 8.7037 | 21762.5 | 60.7539 | 148348.5 | 28968.2 | 8471.9 | 0.0302 | -107638.0 | 2.3876 |
| 2900 | 8.7416 | 22634.3 | 61.0600 | 154439.3 | 29840.4 | 8431.5 | 0.0530 | -107762.2 | 2.0978 |
| 3000 | 8.7772 | 23510.8 | 61.3570 | 160560.2 | 30716.5 | 8389.5 | 0.0742 | -107883.1 | 1.8269 |
| 3100 | 8.8108 | 24390.2 | 61.6453 | 166710.4 | 31595.8 | 8345.6 | 0.0938 | -108001.3 | 1.5733 |
| 3200 | 8.8426 | 25272.9 | 61.9256 | 172889.0 | 32478.5 | 8300.1 | 0.1122 | -108116.8 | 1.3352 |
| 3300 | 8.8726 | 26158.6 | 62.1981 | 179095.2 | 33364.3 | 8253.5 | 0.1293 | -108229.9 | 1.1113 |
| 3400 | 8.9010 | 27047.3 | 62.4635 | 185328.4 | 34253.0 | 8204.5 | 0.1453 | -108340.9 | 0.9004 |
| 3500 | 8.9281 | 27938.8 | 62.7219 | 191587.7 | 35144.5 | 8153.4 | 0.1603 | -108449.9 | 0.7014 |
| 3600 | 8.9539 | 28833.0 | 62.9738 | 197872.6 | 36038.6 | 8101.3 | 0.1745 | -108557.2 | 0.5132 |
| 3700 | 8.9785 | 29729.6 | 63.2194 | 204182.2 | 36935.3 | 8047.6 | 0.1877 | -108662.9 | 0.3350 |
| 3800 | 9.0020 | 30628.6 | 63.4592 | 210516.2 | 37834.3 | 7991.1 | 0.2002 | -108767.2 | 0.1660 |
| 3900 | 9.0245 | 31529.9 | 63.6933 | 216873.9 | 38735.6 | 7934.1 | 0.2117 | -108870.3 | 0.0055 |
| 4000 | 9.0462 | 32433.4 | 63.9220 | 223254.7 | 39639.1 | 7874.9 | 0.2230 | -108972.1 | -0.1471 |
| 4100 | 9.0670 | 33339.1 | 64.1457 | 229658.1 | 40544.8 | 7814.8 | 0.2333 | -109073.0 | -0.2923 |
| 4200 | 9.0870 | 34246.8 | 64.3644 | 236083.7 | 41452.5 | 7752.4 | 0.2434 | -109172.9 | -0.4308 |
| 4300 | 9.1063 | 35156.5 | 64.5784 | 242530.8 | 42362.1 | 7688.8 | 0.2527 | -109272.1 | -0.5630 |
| 4400 | 9.1250 | 36068.1 | 64.7880 | 248999.2 | 43273.7 | 7623.1 | 0.2616 | -109370.5 | -0.6893 |
| 4500 | 9.1430 | 36981.5 | 64.9933 | 255488.2 | 44187.2 | 7556.6 | 0.2699 | -109468.2 | -0.8100 |
| 4600 | 9.1605 | 37896.7 | 65.1944 | 261997.7 | 45102.3 | 7488.2 | 0.2778 | -109565.4 | -0.9257 |
| 4700 | 9.1775 | 38813.5 | 65.3916 | 268527.0 | 46019.2 | 7418.2 | 0.2853 | -109662.2 | -1.0365 |
| 4800 | 9.1940 | 39732.1 | 65.5850 | 275075.9 | 46937.7 | 7346.3 | 0.2925 | -109758.4 | -1.1427 |
| 4900 | 9.2100 | 40652.2 | 65.7747 | 281643.9 | 47857.9 | 7273.0 | 0.2992 | -109854.3 | -1.2448 |
| 5000 | 9.2256 | 41574.1 | 65.9610 | 288230.8 | 48779.7 | 7198.9 | 0.3057 | -109949.7 | -1.3428 |
| 5100 | 9.2421 | 42497.6 | 66.1439 | 294836.2 | 49703.2 | 7123.2 | 0.3119 | -110044.6 | -1.4371 |
| 5200 | 9.2574 | 43422.5 | 66.3235 | 301459.6 | 50628.2 | 7046.2 | 0.3177 | -110139.3 | -1.5278 |
| 5300 | 9.2725 | 44349.1 | 66.5000 | 308100.7 | 51554.8 | 6967.7 | 0.3231 | -110233.5 | -1.6152 |
| 5400 | 9.2874 | 45277.1 | 66.6734 | 314759.4 | 52482.7 | 6888.0 | 0.3286 | -110327.6 | -1.6994 |
| 5500 | 9.3020 | 46206.5 | 66.8440 | 321435.4 | 53412.1 | 6806.7 | 0.3335 | -110421.3 | -1.7806 |
| 5600 | 9.3164 | 47137.4 | 67.0117 | 328128.2 | 54343.1 | 6724.5 | 0.3384 | -110514.7 | -1.8590 |
| 5700 | 9.3305 | 48069.8 | 67.1767 | 334837.6 | 55275.4 | 6641.4 | 0.3429 | -110607.7 | -1.9347 |
| 5800 | 9.3445 | 49003.6 | 67.3391 | 341563.4 | 56207.2 | 6556.9 | 0.3472 | -110700.4 | -2.0078 |
| 5900 | 9.3583 | 49938.6 | 67.4990 | 348305.4 | 57144.3 | 6470.9 | 0.3515 | -110793.0 | -2.0785 |
| 6000 | 9.3719 | 50875.2 | 67.6564 | 355063.1 | 58080.9 | 6384.3 | 0.3553 | -110885.1 | -2.1470 |

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (165) P (gas); molecular weight, 30.975

| T , °K | C_p^0 , cal/mole °K | $H_T^0 - H_0^0$, cal/mole | S_T^0 , cal/mole °K | $-(F_T^0 - H_0^0)$, cal/mole | H_T^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| C | ----- | C | ----- | C | 13698.7 | 74981.0 | ----- | 0 | ----- |
| 1CC | 4.9681 | 456.8 | 33.5527 | 2858.5 | 74155.6 | 75264.7 | -158.1097 | 0 | 0 |
| 2CC | 4.9681 | 953.6 | 36.9963 | 6405.6 | 74692.4 | 75220.5 | -75.8216 | 0 | 0 |
| 25E.15 | 4.9681 | 1481.3 | 38.9800 | 10140.6 | 75180.0 | 75180.0 | -48.7684 | 0 | 0 |
| 3CC | 4.9681 | 1450.4 | 39.0107 | 10212.8 | 75189.2 | 75178.7 | -48.4285 | 0 | 0 |
| 4CC | 4.9681 | 1987.3 | 40.4400 | 14188.7 | 75686.0 | 74902.4 | -34.1687 | 0 | 0 |
| 5CC | 4.9681 | 2484.1 | 41.5486 | 18290.2 | 76182.8 | 74775.0 | -26.5905 | 0 | 0 |
| 6CC | 4.9681 | 2980.5 | 42.4544 | 22491.7 | 76675.6 | 74647.6 | -21.1478 | 0 | 0 |
| 7CC | 4.9682 | 3477.7 | 43.2202 | 26776.5 | 77176.4 | 74520.2 | -17.2668 | 0 | 0 |
| 8CC | 4.9682 | 3974.5 | 43.8836 | 31132.4 | 77673.3 | 74392.8 | -14.3610 | 0 | 0 |
| 9CC | 4.9682 | 4471.3 | 44.4686 | 35550.6 | 78170.1 | 74265.4 | -12.1049 | 0 | 0 |
| 10CC | 4.9683 | 4968.2 | 44.9523 | 40024.1 | 78666.9 | 74138.1 | -10.3030 | 0 | 0 |
| 11CC | 4.9685 | 5465.0 | 45.4658 | 44547.4 | 79163.7 | 74010.7 | -8.8314 | 0 | 0 |
| 12CC | 4.9693 | 5961.9 | 45.8581 | 49115.9 | 79660.6 | 73883.4 | -7.6071 | 0 | 0 |
| 1300 | 4.9708 | 6458.5 | 46.2559 | 53725.9 | 80157.6 | 73756.2 | -6.5729 | 0 | 0 |
| 1400 | 4.9739 | 6956.1 | 46.6644 | 58374.1 | 80654.8 | 73629.2 | -5.6880 | 0 | 0 |
| 15CC | 4.9750 | 7453.7 | 47.0077 | 63057.9 | 81152.5 | 73502.6 | -4.9224 | 0 | 0 |
| 1600 | 4.9770 | 7952.0 | 47.3293 | 67774.9 | 81650.7 | 73376.7 | -4.2537 | 0 | 0 |
| 17CC | 4.9787 | 8451.2 | 47.6320 | 72523.1 | 82150.0 | 73251.7 | -3.6646 | 0 | 0 |
| 18CC | 5.0147 | 8951.5 | 47.9181 | 77300.8 | 82650.6 | 73128.2 | -3.1419 | 0 | 0 |
| 19CC | 5.0356 | 9454.3 | 48.1898 | 82106.3 | 83153.1 | 73006.4 | -2.6750 | 0 | 0 |
| 20CC | 5.0619 | 9959.2 | 48.4487 | 86938.3 | 83657.9 | 72887.1 | -2.2555 | 0 | 0 |
| 21CC | 5.0939 | 10466.5 | 48.6965 | 91795.6 | 84165.7 | 72770.6 | -1.8765 | 0 | 0 |
| 22CC | 5.1317 | 10978.1 | 48.9343 | 96677.3 | 84676.9 | 72657.7 | -1.5326 | 0 | 0 |
| 23CC | 5.1753 | 11493.5 | 49.1632 | 101582.2 | 85192.2 | 72548.8 | -1.2190 | 0 | 0 |
| 24CC | 5.2246 | 12012.4 | 49.3846 | 106509.7 | 85712.1 | 72444.5 | -0.9320 | 0 | 0 |
| 25CC | 5.2752 | 12538.5 | 49.5990 | 111458.9 | 86237.3 | 72345.5 | -0.6683 | 0 | 0 |
| 26CC | 5.3387 | 13069.4 | 49.8072 | 116425.3 | 86768.1 | 72245.5 | 0 | 0 | 0 |
| 27CC | 5.4028 | 13606.4 | 50.0099 | 121420.2 | 87305.2 | 72145.5 | 0 | 0 | 0 |
| 28CC | 5.4705 | 14150.1 | 50.2076 | 126431.1 | 87848.8 | 72045.5 | 0 | 0 | 0 |
| 29CC | 5.5424 | 14700.7 | 50.4008 | 131461.5 | 88399.5 | 71945.5 | 0 | 0 | 0 |
| 30CC | 5.6167 | 15258.7 | 50.5899 | 136511.1 | 88957.4 | 71845.5 | 0 | 0 | 0 |
| 31CC | 5.6933 | 15824.2 | 50.7753 | 141579.4 | 89522.9 | 71745.5 | 0 | 0 | 0 |
| 3200 | 5.7716 | 16397.4 | 50.9573 | 146666.0 | 90096.1 | 71645.5 | 0 | 0 | 0 |
| 33CC | 5.8509 | 16978.5 | 51.1361 | 151770.7 | 90677.3 | 71545.5 | 0 | 0 | 0 |
| 34CC | 5.9308 | 17567.6 | 51.3100 | 156893.2 | 91266.3 | 71445.5 | 0 | 0 | 0 |
| 35CC | 6.0106 | 18164.7 | 51.4851 | 162033.0 | 91863.4 | 71345.5 | 0 | 0 | 0 |
| 36CC | 6.0899 | 18769.7 | 51.6555 | 167190.1 | 92468.4 | 71245.5 | 0 | 0 | 0 |
| 37CC | 6.1683 | 19382.6 | 51.8234 | 172364.1 | 93081.4 | 71145.5 | 0 | 0 | 0 |
| 38CC | 6.2452 | 20003.3 | 51.9889 | 177554.7 | 93702.1 | 71045.5 | 0 | 0 | 0 |
| 39CC | 6.3204 | 20631.6 | 52.1521 | 182761.8 | 94330.3 | 70945.5 | 0 | 0 | 0 |
| 40CC | 6.3934 | 21267.3 | 52.3131 | 187985.1 | 94966.1 | 70845.5 | 0 | 0 | 0 |
| 41CC | 6.4640 | 21910.2 | 52.4718 | 193224.3 | 95608.9 | 70745.5 | 0 | 0 | 0 |
| 42CC | 6.5319 | 22560.0 | 52.6284 | 198479.3 | 96258.8 | 70645.5 | 0 | 0 | 0 |
| 43CC | 6.5970 | 23216.5 | 52.7829 | 203749.9 | 96915.2 | 70545.5 | 0 | 0 | 0 |
| 44CC | 6.6589 | 23879.3 | 52.9352 | 209035.9 | 97578.1 | 70445.5 | 0 | 0 | 0 |
| 45CC | 6.7177 | 24548.2 | 53.0856 | 214336.9 | 98246.9 | 70345.5 | 0 | 0 | 0 |
| 46CC | 6.7731 | 25222.7 | 53.2338 | 219652.9 | 98921.5 | 70245.5 | 0 | 0 | 0 |
| 47CC | 6.8252 | 25902.7 | 53.3801 | 224983.6 | 99601.4 | 70145.5 | 0 | 0 | 0 |
| 48CC | 6.8738 | 26587.7 | 53.5243 | 230328.8 | 100286.4 | 70045.5 | 0 | 0 | 0 |
| 49CC | 6.9189 | 27277.2 | 53.6665 | 235688.4 | 100976.1 | 69945.5 | 0 | 0 | 0 |
| 50CC | 6.9606 | 27971.3 | 53.8067 | 241062.1 | 101670.1 | 69845.5 | 0 | 0 | 0 |
| 51CC | 6.9988 | 28669.3 | 53.9449 | 246449.7 | 102368.1 | 69745.5 | 0 | 0 | 0 |
| 52CC | 7.0337 | 29371.0 | 54.0811 | 251851.0 | 103069.7 | 69645.5 | 0 | 0 | 0 |
| 53CC | 7.0652 | 30075.9 | 54.2154 | 257265.8 | 103774.7 | 69545.5 | 0 | 0 | 0 |
| 54CC | 7.0936 | 30783.9 | 54.3478 | 262694.0 | 104482.7 | 69445.5 | 0 | 0 | 0 |
| 55CC | 7.1188 | 31494.6 | 54.4782 | 268135.3 | 105193.3 | 69345.5 | 0 | 0 | 0 |
| 56CC | 7.1409 | 32207.6 | 54.6066 | 273589.6 | 105906.3 | 69245.5 | 0 | 0 | 0 |
| 57CC | 7.1601 | 32922.6 | 54.7332 | 279056.6 | 106621.4 | 69145.5 | 0 | 0 | 0 |
| 58CC | 7.1765 | 33639.5 | 54.8579 | 284536.1 | 107338.2 | 69045.5 | 0 | 0 | 0 |
| 59CC | 7.1903 | 34357.9 | 54.9807 | 290028.1 | 108056.6 | 68945.5 | 0 | 0 | 0 |
| 60CC | 7.2015 | 35077.5 | 55.1016 | 295532.2 | 108776.2 | 68845.5 | 0 | 0 | 0 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of P, 317.30° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (166) P (crystal IV, crystal III, liquid); molecular weight, 30.975

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, ^a cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, ^a cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|---------------------|------------------------------|----------------------------------------------------|------------------------------|-------------------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | 0 | 0 | -1282.3 | 0 | ----- | -74981.0 | ----- |
| 100 | 3.281 | 213.2 | 4.390 | 225.8 | -1069.1 | 0 | 0 | -75264.7 | 158.1097 |
| 200 | 5.041 | 754.2 | 7.841 | 814.0 | -528.1 | 0 | 0 | -75220.5 | 75.8216 |
| 298.15 | 5.694 | 1282.3 | 9.981 | 1693.5 | 0 | 0 | 0 | -75180.0 | 48.7684 |
| 300 | 5.705 | 1292.8 | 10.016 | 1712.0 | 10.5 | 0 | 0 | -75178.7 | 48.4285 |
| ^b 317.30 | 5.798 | 1392.3 | 10.338 | 1887.9 | 110.0 | 0 | 0 | -80706.6 | 44.4340 |
| 317.30 | 6.242 | 1549.7 | 10.834 | 1887.9 | 267.4 | 0 | 0 | -73540.2 | 44.4340 |
| 400 | 6.242 | 2065.9 | 12.2797 | 2846.0 | 783.6 | 0 | 0 | -74902.4 | 34.7687 |
| 500 | 6.242 | 2690.1 | 13.6726 | 4146.2 | 1407.8 | 0 | 0 | -74775.0 | 26.5905 |
| 600 | 6.242 | 3314.3 | 14.8107 | 5572.1 | 2032.0 | 0 | 0 | -74647.6 | 21.1478 |
| 700 | 6.242 | 3938.5 | 15.7729 | 7102.5 | 2656.2 | 0 | 0 | -74520.2 | 17.2668 |
| 800 | 6.242 | 4562.7 | 16.6064 | 8722.4 | 3280.4 | 0 | 0 | -74392.8 | 14.3610 |
| 900 | 6.242 | 5186.9 | 17.3416 | 10420.5 | 3904.6 | 0 | 0 | -74265.4 | 12.1049 |
| 1000 | 6.242 | 5811.1 | 17.9992 | 12188.1 | 4528.8 | 0 | 0 | -74138.1 | 10.3030 |
| 1100 | 6.242 | 6435.3 | 18.5942 | 14018.2 | 5153.0 | 0 | 0 | -74010.7 | 8.8314 |
| 1200 | 6.242 | 7059.5 | 19.1373 | 15905.2 | 5777.2 | 0 | 0 | -73883.4 | 7.6071 |
| 1300 | 6.242 | 7683.7 | 19.6369 | 17844.2 | 6401.4 | 0 | 0 | -73756.2 | 6.5729 |
| 1400 | 6.242 | 8307.9 | 20.0995 | 19831.4 | 7025.6 | 0 | 0 | -73629.2 | 5.6880 |
| 1500 | 6.242 | 8932.1 | 20.5301 | 21863.1 | 7649.8 | 0 | 0 | -73502.6 | 4.9224 |
| 1600 | 6.242 | 9556.3 | 20.9330 | 23936.5 | 8274.0 | 0 | 0 | -73376.7 | 4.2537 |
| 1700 | 6.242 | 10180.5 | 21.3114 | 26048.9 | 8898.2 | 0 | 0 | -73251.7 | 3.6646 |
| 1800 | 6.242 | 10804.7 | 21.6682 | 28198.0 | 9522.4 | 0 | 0 | -73128.2 | 3.1419 |
| 1900 | 6.242 | 11428.9 | 22.0057 | 30381.9 | 10146.6 | 0 | 0 | -73006.4 | 2.6750 |
| 2000 | 6.242 | 12053.1 | 22.3259 | 32598.6 | 10770.8 | 0 | 0 | -72887.1 | 2.2555 |
| 2100 | 6.242 | 12677.3 | 22.6304 | 34846.5 | 11395.0 | 0 | 0 | -72770.6 | 1.8765 |
| 2200 | 6.242 | 13301.5 | 22.9208 | 37124.2 | 12019.2 | 0 | 0 | -72657.6 | 1.5326 |
| 2300 | 6.242 | 13925.7 | 23.1983 | 39430.2 | 12643.4 | 0 | 0 | -72548.8 | 1.2190 |
| 2400 | 6.242 | 14549.9 | 23.4639 | 41763.4 | 13267.6 | 0 | 0 | -72444.5 | 0.9320 |
| 2500 | 6.242 | 15174.1 | 23.7187 | 44122.7 | 13891.8 | 0 | 0 | -72345.5 | 0.6683 |

^a H_0° refers to crystal IV state.

^bMelting point.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(167) P₂ (gas); molecular weight, 61.950

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 31317.5 | 33882.1 | ----- | -116080.0 | ----- |
| 100 | 6.9601 | 695.3 | 44.2777 | 3732.4 | 32012.8 | 34151.0 | -66.8758 | -116378.3 | 249.3435 |
| 200 | 7.1946 | 1399.5 | 49.1494 | 8430.4 | 32717.0 | 33773.2 | -29.5899 | -116667.3 | 122.0533 |
| 298.15 | 7.6551 | 2128.2 | 52.1076 | 13407.7 | 33445.7 | 33445.7 | -17.4901 | -116914.3 | 80.0466 |
| 300 | 7.6645 | 2142.3 | 52.1550 | 13504.2 | 33459.8 | 33438.8 | -17.3389 | -116918.5 | 79.5182 |
| 400 | 8.0493 | 2929.2 | 54.4159 | 18837.2 | 34246.6 | 32679.4 | -11.3295 | -117125.4 | 58.2078 |
| 500 | 8.3105 | 3748.0 | 56.2420 | 24373.0 | 35065.5 | 32249.8 | -7.7806 | -117300.1 | 45.4005 |
| 600 | 8.4851 | 4588.4 | 57.7737 | 30075.8 | 35905.9 | 31841.8 | -5.4454 | -117453.4 | 36.8502 |
| 700 | 8.6049 | 5443.2 | 59.0912 | 35920.6 | 36760.7 | 31448.2 | -3.7983 | -117592.2 | 30.7353 |
| 800 | 8.6902 | 6308.2 | 60.2461 | 41888.7 | 37625.7 | 31064.8 | -2.5783 | -117720.8 | 26.1438 |
| 900 | 8.7532 | 7180.5 | 61.2735 | 47965.6 | 38498.0 | 30688.8 | -1.6408 | -117842.1 | 22.5689 |
| 1000 | 8.8012 | 8058.4 | 62.1983 | 54140.0 | 39375.9 | 30318.2 | -0.9000 | -117957.9 | 19.7761 |
| 1100 | 8.8390 | 8940.5 | 63.0390 | 60402.5 | 40257.9 | 29951.9 | -0.3012 | -118069.5 | 17.3615 |
| 1200 | 8.8695 | 9825.9 | 63.8095 | 66745.4 | 41143.4 | 29588.9 | 0.1918 | -118177.8 | 15.4059 |
| 1300 | 8.8948 | 10714.2 | 64.5204 | 73162.4 | 42031.7 | 29228.8 | 0.6038 | -118283.6 | 13.7496 |
| 1400 | 8.9161 | 11604.8 | 65.1804 | 79647.8 | 42922.2 | 28871.0 | 0.9527 | -118387.4 | 12.3287 |
| 1500 | 8.9345 | 12497.3 | 65.7962 | 86197.0 | 43814.8 | 28515.1 | 1.2513 | -118490.1 | 11.0961 |
| 1600 | 8.9506 | 13391.6 | 66.3734 | 92805.8 | 44709.1 | 28161.0 | 1.5094 | -118592.4 | 10.0167 |
| 1700 | 8.9650 | 14287.4 | 66.9164 | 99470.5 | 45604.9 | 27808.4 | 1.7343 | -118695.1 | 9.0635 |
| 1800 | 8.9780 | 15184.5 | 67.4292 | 106188.1 | 46502.0 | 27457.1 | 1.9316 | -118799.2 | 8.2154 |
| 1900 | 8.9898 | 16082.9 | 67.9150 | 112955.5 | 47400.4 | 27107.1 | 2.1060 | -118905.7 | 7.4550 |
| 2000 | 9.0007 | 16982.5 | 68.3764 | 119770.2 | 48300.0 | 26758.3 | 2.2639 | -119015.9 | 6.7718 |
| 2100 | 9.0109 | 17883.0 | 68.8157 | 126630.0 | 49200.5 | 26410.5 | 2.3992 | -119130.8 | 6.1523 |
| 2200 | 9.0205 | 18784.6 | 69.2352 | 133532.7 | 50102.1 | 26063.6 | 2.5234 | -119251.7 | 5.5885 |
| 2300 | 9.0295 | 19687.1 | 69.6363 | 140476.4 | 51004.6 | 25717.7 | 2.6352 | -119379.8 | 5.0732 |
| 2400 | 9.0382 | 20590.5 | 70.0208 | 147459.4 | 51908.0 | 25372.7 | 2.7363 | -119516.3 | 4.6003 |
| 2500 | 9.0464 | 21494.7 | 70.3899 | 154480.1 | 52812.2 | 25028.6 | 2.8281 | -119662.3 | 4.1647 |
| 2600 | 9.0544 | 22399.8 | 70.7449 | 161536.9 | 53717.3 | ----- | ----- | -119819.0 | 3.7621 |
| 2700 | 9.0620 | 23305.6 | 71.0868 | 168628.6 | 54623.1 | ----- | ----- | -119987.3 | 3.3888 |
| 2800 | 9.0695 | 24212.2 | 71.4165 | 175753.9 | 55529.7 | ----- | ----- | -120168.0 | 3.0417 |
| 2900 | 9.0768 | 25119.5 | 71.7348 | 182911.5 | 56437.0 | ----- | ----- | -120362.0 | 2.7181 |
| 3000 | 9.0839 | 26027.5 | 72.0427 | 190100.5 | 57345.0 | ----- | ----- | -120569.8 | 2.4155 |
| 3100 | 9.0909 | 26936.3 | 72.3407 | 197319.8 | 58253.8 | ----- | ----- | -120792.0 | 2.1319 |
| 3200 | 9.0978 | 27845.7 | 72.6294 | 204568.3 | 59163.2 | ----- | ----- | -121029.1 | 1.8655 |
| 3300 | 9.1046 | 28755.8 | 72.9095 | 211845.3 | 60073.3 | ----- | ----- | -121281.2 | 1.6148 |
| 3400 | 9.1113 | 29666.6 | 73.1813 | 219150.0 | 60984.1 | ----- | ----- | -121548.6 | 1.3783 |
| 3500 | 9.1180 | 30578.1 | 73.4456 | 226481.4 | 61895.6 | ----- | ----- | -121831.2 | 1.1548 |
| 3600 | 9.1248 | 31490.2 | 73.7025 | 233838.8 | 62807.7 | ----- | ----- | -122129.2 | 0.9433 |
| 3700 | 9.1315 | 32403.1 | 73.9526 | 241221.6 | 63720.5 | ----- | ----- | -122442.2 | 0.7427 |
| 3800 | 9.1383 | 33316.5 | 74.1962 | 248629.1 | 64634.0 | ----- | ----- | -122770.1 | 0.5521 |
| 3900 | 9.1452 | 34230.7 | 74.4337 | 256060.7 | 65548.2 | ----- | ----- | -123112.5 | 0.3708 |
| 4000 | 9.1522 | 35145.6 | 74.6653 | 263515.7 | 66463.1 | ----- | ----- | -123469.0 | 0.1981 |
| 4100 | 9.1593 | 36061.2 | 74.8914 | 270993.6 | 67378.7 | ----- | ----- | -123839.2 | 0.0333 |
| 4200 | 9.1666 | 36977.5 | 75.1122 | 278493.8 | 68294.9 | ----- | ----- | -124222.6 | -0.1241 |
| 4300 | 9.1742 | 37894.5 | 75.3280 | 286015.8 | 69212.0 | ----- | ----- | -124618.5 | -0.2747 |
| 4400 | 9.1820 | 38812.3 | 75.5390 | 293559.2 | 70129.8 | ----- | ----- | -125026.3 | -0.4188 |
| 4500 | 9.1900 | 39730.9 | 75.7454 | 301123.5 | 71048.4 | ----- | ----- | -125445.4 | -0.5571 |
| 4600 | 9.1984 | 40650.3 | 75.9475 | 308708.1 | 71967.8 | ----- | ----- | -125875.2 | -0.6897 |
| 4700 | 9.2072 | 41570.6 | 76.1454 | 316312.8 | 72888.1 | ----- | ----- | -126314.8 | -0.8172 |
| 4800 | 9.2163 | 42491.8 | 76.3393 | 323937.1 | 73809.3 | ----- | ----- | -126763.5 | -0.9397 |
| 4900 | 9.2259 | 43413.9 | 76.5295 | 331580.6 | 74731.4 | ----- | ----- | -127220.8 | -1.0577 |
| 5000 | 9.2359 | 44336.9 | 76.7160 | 339242.9 | 75654.4 | ----- | ----- | -127685.7 | -1.1714 |
| 5100 | 9.2464 | 45261.1 | 76.8990 | 346923.6 | 76578.5 | ----- | ----- | -128157.6 | -1.2811 |
| 5200 | 9.2574 | 46186.2 | 77.0786 | 354622.6 | 77503.7 | ----- | ----- | -128635.7 | -1.3869 |
| 5300 | 9.2690 | 47112.6 | 77.2551 | 362339.3 | 78430.1 | ----- | ----- | -129119.3 | -1.4891 |
| 5400 | 9.2812 | 48040.1 | 77.4284 | 370073.5 | 79357.6 | ----- | ----- | -129607.7 | -1.5878 |
| 5500 | 9.2940 | 48968.8 | 77.5989 | 377824.9 | 80286.3 | ----- | ----- | -130100.3 | -1.6834 |
| 5600 | 9.3074 | 49898.9 | 77.7664 | 385593.1 | 81216.4 | ----- | ----- | -130596.2 | -1.7759 |
| 5700 | 9.3215 | 50830.3 | 77.9313 | 393378.1 | 82147.8 | ----- | ----- | -131094.9 | -1.8654 |
| 5800 | 9.3362 | 51763.2 | 78.0935 | 401179.3 | 83080.7 | ----- | ----- | -131595.8 | -1.9523 |
| 5900 | 9.3517 | 52697.6 | 78.2533 | 408996.7 | 84015.1 | ----- | ----- | -132098.1 | -2.0365 |
| 6000 | 9.3678 | 53633.6 | 78.4106 | 416829.9 | 84951.0 | ----- | ----- | -132601.4 | -2.1182 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of P, 317.30° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(168) P₄ (gas); molecular weight, 123.900

| T, °K | C _p , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| | | C | | 0 | | | | | |
| 100 | 8.8988 | 811.4 | 53.4889 | 4537.5 | 10662.1 | 15791.3 | ----- | -284132.9 | ----- |
| 200 | 13.2939 | 1922.9 | 61.0131 | 10279.7 | 11473.6 | 15750.0 | -26.5680 | -285308.7 | 605.8708 |
| 298.15 | 16.0516 | 3377.9 | 66.8954 | 16567.0 | 12585.0 | 14697.4 | -9.5803 | -286184.5 | 293.7060 |
| 300 | 16.0878 | 3407.6 | 66.9948 | 16690.8 | 14040.0 | 14040.0 | -4.3968 | -286680.0 | 190.6766 |
| 400 | 17.5100 | 5095.2 | 71.8398 | 23640.8 | 14069.7 | 14027.7 | -4.3333 | -286687.0 | 189.3808 |
| 500 | 18.2811 | 6888.3 | 75.8380 | 31030.6 | 15757.3 | 12622.7 | -1.9310 | -286986.7 | 137.1436 |
| | | | | | 17550.5 | 11919.1 | -0.5880 | -287180.8 | 105.7742 |
| 600 | 18.7352 | 8741.0 | 79.2145 | 38787.7 | 19403.1 | 11275.0 | 0.2579 | -287315.4 | 84.8492 |
| 700 | 19.0221 | 10629.9 | 82.1257 | 46858.1 | 21292.0 | 10667.1 | 0.8295 | -287413.8 | 69.8967 |
| 800 | 19.2139 | 12542.3 | 84.6791 | 55201.0 | 23204.4 | 10082.7 | 1.2348 | -287488.6 | 58.6790 |
| 900 | 19.3479 | 14470.8 | 86.9503 | 63784.5 | 25132.9 | 9514.3 | 1.5325 | -287547.4 | 49.9520 |
| 1000 | 19.4452 | 16410.7 | 88.9941 | 72583.5 | 27072.8 | 8957.4 | 1.7570 | -287594.8 | 42.9692 |
| 1100 | 19.5178 | 18359.0 | 90.8510 | 81577.1 | 29021.1 | 8408.9 | 1.9297 | -287633.8 | 37.2551 |
| 1200 | 19.5735 | 20313.7 | 92.5518 | 90748.5 | 30975.8 | 7866.8 | 2.0645 | -287666.7 | 32.4928 |
| 1300 | 19.6171 | 22273.3 | 94.1203 | 100083.1 | 32935.4 | 7329.6 | 2.1711 | -287695.0 | 28.4627 |
| 1400 | 19.6519 | 24236.8 | 95.5754 | 109568.8 | 34898.9 | 6796.4 | 2.2560 | -287720.4 | 25.0080 |
| 1500 | 19.6800 | 26203.5 | 96.9322 | 119194.9 | 36865.6 | 6266.2 | 2.3240 | -287744.3 | 22.0136 |
| 1600 | 19.7031 | 28172.6 | 98.2031 | 128952.3 | 38834.8 | 5738.6 | 2.3787 | -287768.2 | 19.3934 |
| 1700 | 19.7223 | 30143.9 | 99.3982 | 138833.0 | 40806.1 | 5213.1 | 2.4227 | -287793.9 | 17.0812 |
| 1800 | 19.7384 | 32117.0 | 100.5260 | 148829.7 | 42779.1 | 4689.4 | 2.4581 | -287823.3 | 15.0257 |
| 1900 | 19.7521 | 34091.5 | 101.5935 | 158936.2 | 44753.7 | 4167.1 | 2.4865 | -287858.7 | 13.1864 |
| 2000 | 19.7637 | 36067.3 | 102.6070 | 169146.7 | 46729.5 | 3646.1 | 2.5089 | -287902.2 | 11.5308 |
| 2100 | 19.7738 | 38044.2 | 103.5715 | 179456.0 | 48706.4 | 3126.2 | 2.5266 | -287956.3 | 10.0326 |
| 2200 | 19.7825 | 40022.1 | 104.4916 | 189859.5 | 50684.2 | 2607.2 | 2.5402 | -288023.4 | 8.6704 |
| 2300 | 19.7902 | 42000.7 | 105.3712 | 200352.9 | 52662.8 | 2089.1 | 2.5503 | -288106.0 | 7.4262 |
| 2400 | 19.7969 | 43980.1 | 106.2136 | 210932.5 | 54642.2 | 1571.6 | 2.5576 | -288206.4 | 6.2854 |
| 2500 | 19.8028 | 45960.1 | 107.0218 | 221594.5 | 56622.2 | 1054.8 | 2.5624 | -288327.0 | 5.2355 |
| 2600 | 19.8080 | 47940.6 | 107.7986 | 232335.8 | 58602.7 | | | -288469.9 | 4.2659 |
| 2700 | 19.8127 | 49921.6 | 108.5463 | 243153.3 | 60583.8 | | | -288637.0 | 3.3676 |
| 2800 | 19.8169 | 51903.1 | 109.2669 | 254044.1 | 62565.3 | | | -288830.1 | 2.5329 |
| 2900 | 19.8207 | 53885.0 | 109.9623 | 265005.8 | 64547.1 | | | -289050.8 | 1.7553 |
| 3000 | 19.8241 | 55867.2 | 110.6344 | 276035.8 | 66529.4 | | | -289300.3 | 1.0289 |
| 3100 | 19.8271 | 57849.8 | 111.2844 | 287131.9 | 68511.9 | | | -289579.7 | 0.3488 |
| 3200 | 19.8299 | 59832.7 | 111.9140 | 298292.0 | 70494.8 | | | -289889.8 | -0.2895 |
| 3300 | 19.8325 | 61815.8 | 112.5242 | 309514.1 | 72477.9 | | | -290231.1 | -0.8898 |
| 3400 | 19.8348 | 63799.1 | 113.1163 | 320796.3 | 74461.3 | | | -290604.1 | -1.4554 |
| 3500 | 19.8369 | 65782.7 | 113.6913 | 332136.8 | 76444.9 | | | -291008.8 | -1.9895 |
| 3600 | 19.8389 | 67766.5 | 114.2501 | 343534.0 | 78428.6 | | | -291445.1 | -2.4946 |
| 3700 | 19.8407 | 69750.5 | 114.7937 | 354986.3 | 80412.6 | | | -291912.8 | -2.9731 |
| 3800 | 19.8423 | 71734.6 | 115.3229 | 366492.2 | 82396.8 | | | -292411.4 | -3.4273 |
| 3900 | 19.8438 | 73719.0 | 115.8383 | 378050.4 | 84381.1 | | | -292940.3 | -3.8588 |
| 4000 | 19.8453 | 75703.4 | 116.3407 | 389659.5 | 86365.5 | | | -293498.7 | -4.2696 |
| 4100 | 19.8466 | 77688.0 | 116.8308 | 401318.1 | 88350.1 | | | -294085.6 | -4.6611 |
| 4200 | 19.8478 | 79672.7 | 117.3090 | 413025.2 | 90334.8 | | | -294700.2 | -5.0347 |
| 4300 | 19.8489 | 81657.6 | 117.7761 | 424779.6 | 92319.7 | | | -295341.2 | -5.3917 |
| 4400 | 19.8500 | 83642.5 | 118.2324 | 436580.1 | 94304.6 | | | -296007.5 | -5.7332 |
| 4500 | 19.8510 | 85627.6 | 118.6785 | 448425.7 | 96289.7 | | | -296698.0 | -6.0603 |
| 4600 | 19.8519 | 87612.7 | 119.1148 | 460315.5 | 98274.8 | | | -297411.1 | -6.3739 |
| 4700 | 19.8528 | 89597.9 | 119.5418 | 472248.4 | 100260.1 | | | -298145.6 | -6.6749 |
| 4800 | 19.8536 | 91583.3 | 119.9597 | 484223.5 | 102245.4 | | | -298900.2 | -6.9641 |
| 4900 | 19.8544 | 93568.7 | 120.3691 | 496240.0 | 104230.8 | | | -299673.5 | -7.2422 |
| 5000 | 19.8551 | 95554.1 | 120.7702 | 508297.1 | 106216.3 | | | -300464.0 | -7.5098 |
| 5100 | 19.8558 | 97539.7 | 121.1634 | 520393.8 | 108201.8 | | | -301270.4 | -7.7677 |
| 5200 | 19.8564 | 99525.3 | 121.5490 | 532529.5 | 110187.4 | | | -302091.4 | -8.0163 |
| 5300 | 19.8570 | 101511.0 | 121.9272 | 544703.4 | 112173.1 | | | -302925.7 | -8.2561 |
| 5400 | 19.8576 | 103496.7 | 122.2984 | 556914.7 | 114158.8 | | | -303771.8 | -8.4878 |
| 5500 | 19.8581 | 105482.5 | 122.6628 | 569162.8 | 116144.6 | | | -304628.6 | -8.7116 |
| 5600 | 19.8586 | 107468.3 | 123.0206 | 581447.0 | 118130.4 | | | -305494.8 | -8.9281 |
| 5700 | 19.8591 | 109454.2 | 123.3721 | 593766.7 | 120116.3 | | | -306369.2 | -9.1375 |
| 5800 | 19.8596 | 111440.1 | 123.7175 | 606121.3 | 122102.3 | | | -307250.7 | -9.3403 |
| 5900 | 19.8600 | 113426.1 | 124.0570 | 618510.0 | 124088.2 | | | -308138.1 | -9.5368 |
| 6000 | 19.8604 | 115412.1 | 124.3908 | 630932.4 | 126074.3 | | | -309030.5 | -9.7273 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of P, 317.30° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(169) PCl_3 (gas); molecular weight, 137.346

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_o^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_o^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -75436.7 | -70864.2 | ----- | -231490.4 | ----- |
| 100 | 11.0987 | 892.5 | 58.9944 | 5006.9 | -74544.1 | -71228.8 | 152.7951 | -232585.2 | 491.5882 |
| 200 | 15.1106 | 2220.6 | 68.0383 | 11387.0 | -73216.1 | -71530.1 | 74.8741 | -233250.9 | 237.1285 |
| 298.15 | 17.1673 | 3816.7 | 74.5035 | 18396.7 | -71620.0 | -71620.0 | 49.1280 | -233651.9 | 153.1584 |
| 300 | 17.1937 | 3848.5 | 74.6102 | 18534.6 | -71588.2 | -71621.2 | 48.8043 | -233658.3 | 152.1022 |
| 400 | 18.2158 | 5624.6 | 79.7128 | 26260.5 | -69812.1 | -71862.2 | 35.7316 | -233969.9 | 109.5228 |
| 500 | 18.7618 | 7476.1 | 83.8421 | 34444.9 | -67960.6 | -71915.8 | 27.8763 | -234237.9 | 83.9431 |
| 600 | 19.0809 | 9369.6 | 87.2934 | 43006.4 | -66067.1 | -71949.8 | 22.6363 | -234474.5 | 66.8714 |
| 700 | 19.2816 | 11288.4 | 90.2509 | 51887.2 | -64148.3 | -71973.0 | 18.8919 | -234583.3 | 54.6657 |
| 800 | 19.4154 | 13223.7 | 92.8349 | 61044.2 | -62213.0 | -71989.9 | 16.0828 | -234672.0 | 45.5037 |
| 900 | 19.5087 | 15170.2 | 95.1274 | 70444.5 | -60266.5 | -72003.3 | 13.8975 | -235028.5 | 38.3724 |
| 1000 | 19.5763 | 17124.6 | 97.1865 | 80061.9 | -58312.1 | -72014.7 | 12.1490 | -235170.7 | 32.6637 |
| 1100 | 19.6268 | 19084.9 | 99.0548 | 89875.4 | -56351.8 | -72025.2 | 10.7182 | -235296.3 | 27.9903 |
| 1200 | 19.6655 | 21049.6 | 100.7643 | 99867.6 | -54387.1 | -72035.4 | 9.5256 | -235407.6 | 24.0938 |
| 1300 | 19.6957 | 23017.7 | 102.3396 | 110023.8 | -52419.0 | -72045.8 | 8.5164 | -235506.8 | 20.7953 |
| 1400 | 19.7198 | 24988.5 | 103.8002 | 120331.7 | -50448.2 | -72056.8 | 7.6512 | -235595.7 | 17.9669 |
| 1500 | 19.7393 | 26961.5 | 105.1614 | 130780.6 | -48475.2 | -72068.6 | 6.9013 | -235676.1 | 15.5148 |
| 1600 | 19.7553 | 28936.2 | 106.4358 | 141361.1 | -46500.4 | -72081.4 | 6.2450 | -235749.3 | 13.3684 |
| 1700 | 19.7686 | 30912.5 | 107.6339 | 152065.2 | -44524.2 | -72095.3 | 5.6658 | -235816.7 | 11.4740 |
| 1800 | 19.7797 | 32889.9 | 108.7642 | 162885.6 | -42546.8 | -72110.6 | 5.1509 | -235879.6 | 9.7896 |
| 1900 | 19.7892 | 34868.4 | 109.8339 | 173816.0 | -40568.3 | -72127.2 | 4.6900 | -235939.2 | 8.2822 |
| 2000 | 19.7973 | 36847.7 | 110.8491 | 184850.6 | -38589.0 | -72145.2 | 4.2752 | -235996.6 | 6.9251 |
| 2100 | 19.8043 | 38827.8 | 111.8152 | 195984.2 | -36608.9 | -72164.7 | 3.8997 | -236052.9 | 5.6970 |
| 2200 | 19.8103 | 40808.5 | 112.7367 | 207212.1 | -34628.2 | -72185.8 | 3.5583 | -236109.2 | 4.5803 |
| 2300 | 19.8156 | 42789.8 | 113.6174 | 218530.2 | -32646.9 | -72208.5 | 3.2465 | -236166.4 | 3.5604 |
| 2400 | 19.8202 | 44771.6 | 114.4608 | 229934.4 | -30665.1 | -72232.7 | 2.9606 | -236225.4 | 2.6253 |
| 2500 | 19.8243 | 46753.8 | 115.2700 | 241421.2 | -28682.9 | -72258.6 | 2.6975 | -236287.1 | 1.7648 |
| 2600 | 19.8279 | 48736.4 | 116.0476 | 252987.3 | -26700.2 | -26700.2 | ----- | -236352.2 | 0.9702 |
| 2700 | 19.8312 | 50719.4 | 116.7960 | 264629.7 | -24717.3 | -24717.3 | ----- | -236421.5 | 0.2343 |
| 2800 | 19.8341 | 52702.7 | 117.5172 | 276345.6 | -22734.0 | -22734.0 | ----- | -236495.5 | -0.4492 |
| 2900 | 19.8367 | 54686.2 | 118.2133 | 288132.3 | -20750.5 | -20750.5 | ----- | -236574.8 | -1.0858 |
| 3000 | 19.8390 | 56670.0 | 118.8858 | 299987.5 | -18766.7 | -18766.7 | ----- | -236659.8 | -1.6802 |
| 3100 | 19.8412 | 58654.0 | 119.5364 | 311908.8 | -16782.7 | -16782.7 | ----- | -236751.0 | -2.2364 |
| 3200 | 19.8431 | 60638.2 | 120.1663 | 323894.1 | -14798.5 | -14798.5 | ----- | -236848.7 | -2.7581 |
| 3300 | 19.8448 | 62622.6 | 120.7770 | 335941.4 | -12814.1 | -12814.1 | ----- | -236953.0 | -3.2483 |
| 3400 | 19.8464 | 64607.2 | 121.3694 | 348048.8 | -10829.5 | -10829.5 | ----- | -237064.2 | -3.7100 |
| 3500 | 19.8479 | 66591.9 | 121.9447 | 360214.7 | -8844.8 | -8844.8 | ----- | -237182.5 | -4.1454 |
| 3600 | 19.8493 | 68576.8 | 122.5039 | 372437.3 | -6859.9 | -6859.9 | ----- | -237307.7 | -4.5569 |
| 3700 | 19.8505 | 70561.8 | 123.0478 | 384715.0 | -4874.9 | -4874.9 | ----- | -237440.0 | -4.9464 |
| 3800 | 19.8517 | 72546.9 | 123.5772 | 397046.3 | -2889.8 | -2889.8 | ----- | -237579.3 | -5.3155 |
| 3900 | 19.8527 | 74532.1 | 124.0928 | 409429.9 | -904.6 | -904.6 | ----- | -237725.4 | -5.6660 |
| 4000 | 19.8537 | 76517.4 | 124.5955 | 421864.5 | 1080.7 | 1080.7 | ----- | -237878.3 | -5.9991 |
| 4100 | 19.8546 | 78502.8 | 125.0857 | 434348.6 | 3066.1 | 3066.1 | ----- | -238037.7 | -6.3162 |
| 4200 | 19.8554 | 80488.3 | 125.5642 | 446881.2 | 5051.6 | 5051.6 | ----- | -238203.4 | -6.6184 |
| 4300 | 19.8562 | 82473.9 | 126.0314 | 459461.1 | 7037.2 | 7037.2 | ----- | -238375.3 | -6.9068 |
| 4400 | 19.8570 | 84459.6 | 126.4879 | 472087.1 | 9022.9 | 9022.9 | ----- | -238552.9 | -7.1822 |
| 4500 | 19.8577 | 86445.3 | 126.9341 | 484758.3 | 11008.6 | 11008.6 | ----- | -238736.1 | -7.4456 |
| 4600 | 19.8583 | 88431.1 | 127.3706 | 497473.6 | 12994.4 | 12994.4 | ----- | -238924.6 | -7.6977 |
| 4700 | 19.8589 | 90417.0 | 127.7977 | 510232.1 | 14980.3 | 14980.3 | ----- | -239118.0 | -7.9393 |
| 4800 | 19.8595 | 92402.9 | 128.2158 | 523032.9 | 16966.2 | 16966.2 | ----- | -239316.0 | -8.1711 |
| 4900 | 19.8600 | 94388.9 | 128.6253 | 535875.0 | 18952.2 | 18952.2 | ----- | -239518.4 | -8.3935 |
| 5000 | 19.8605 | 96374.9 | 129.0265 | 548757.6 | 20938.2 | 20938.2 | ----- | -239724.7 | -8.6073 |
| 5100 | 19.8610 | 98360.9 | 129.4198 | 561680.0 | 22924.3 | 22924.3 | ----- | -239934.6 | -8.8128 |
| 5200 | 19.8614 | 100347.1 | 129.8055 | 574641.4 | 24910.4 | 24910.4 | ----- | -240147.9 | -9.0106 |
| 5300 | 19.8618 | 102333.2 | 130.1838 | 587640.9 | 26896.5 | 26896.5 | ----- | -240364.3 | -9.2011 |
| 5400 | 19.8622 | 104319.4 | 130.5551 | 600677.9 | 28882.7 | 28882.7 | ----- | -240583.3 | -9.3848 |
| 5500 | 19.8626 | 106305.7 | 130.9195 | 613751.6 | 30869.0 | 30869.0 | ----- | -240804.7 | -9.5619 |
| 5600 | 19.8629 | 108291.9 | 131.2774 | 626861.6 | 32855.3 | 32855.3 | ----- | -241028.3 | -9.7328 |
| 5700 | 19.8633 | 110278.3 | 131.6290 | 640006.9 | 34841.6 | 34841.6 | ----- | -241253.6 | -9.8979 |
| 5800 | 19.8636 | 112264.6 | 131.9744 | 653187.2 | 36827.9 | 36827.9 | ----- | -241480.5 | -10.0574 |
| 5900 | 19.8639 | 114251.0 | 132.3140 | 666401.6 | 38814.3 | 38814.3 | ----- | -241708.7 | -10.2117 |
| 6000 | 19.8642 | 116237.4 | 132.6479 | 679649.7 | 40800.7 | 40800.7 | ----- | -241937.9 | -10.3610 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of P, 317.30° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (170) PF₃ (gas); molecular weight, 87.975

| T, °K | C _p ^o , cal/mole °K | H _f ^o -H ₀ ^o , cal/mole | S _f ^o , cal/mole °K | -(F _f ^o -H ₀ ^o), cal/mole | H _f ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | C | ----- | 0 | -225400.7 | -229552.9 | ----- | -351000.0 | ----- |
| 100 | 8.7409 | 810.2 | 53.1036 | 4500.1 | -224590.4 | -221395.0 | 461.1494 | -352182.2 | 752.8734 |
| 200 | 11.6208 | 1828.1 | 60.0434 | 10180.5 | -223572.5 | -221972.3 | 239.0271 | -353238.5 | 367.5831 |
| 298.15 | 14.0278 | 3092.3 | 65.1539 | 16333.3 | -222308.4 | -222308.4 | 159.1250 | -354062.9 | 240.3836 |
| 300 | 14.0665 | 3118.3 | 65.2408 | 16454.0 | -222282.4 | -222313.7 | 158.1202 | -354076.3 | 238.7832 |
| 400 | 15.7919 | 4617.0 | 69.5403 | 23199.2 | -220783.7 | -222743.3 | 117.5875 | -354694.8 | 174.2463 |
| 500 | 16.9286 | 6257.0 | 73.1952 | 30340.6 | -219143.7 | -222935.6 | 93.2381 | -355147.8 | 135.4647 |
| 600 | 17.6789 | 7989.9 | 76.3526 | 37821.7 | -217410.8 | -223074.1 | 76.9931 | -355486.4 | 109.5813 |
| 700 | 18.1876 | 9784.8 | 79.1184 | 45598.1 | -215615.9 | -223178.8 | 65.3831 | -355746.2 | 91.0775 |
| 800 | 18.5435 | 11622.3 | 81.5716 | 53635.0 | -213778.3 | -223261.7 | 56.6720 | -355950.5 | 77.1906 |
| 900 | 18.8004 | 13490.2 | 83.7714 | 61904.0 | -211910.5 | -223330.2 | 49.8944 | -356114.9 | 66.3841 |
| 1000 | 18.9909 | 15380.2 | 85.7625 | 70382.3 | -210020.5 | -223385.0 | 44.4707 | -356249.7 | 57.7352 |
| 1100 | 19.1356 | 17286.9 | 87.5796 | 79050.7 | -208112.8 | -223441.4 | 40.0321 | -356362.1 | 50.6564 |
| 1200 | 19.2480 | 19206.3 | 89.2497 | 87893.3 | -206194.4 | -223485.5 | 36.3324 | -356457.1 | 44.7557 |
| 1300 | 19.3367 | 21135.7 | 90.7940 | 96896.5 | -204265.0 | -223534.9 | 33.2012 | -356538.7 | 39.7616 |
| 1400 | 19.4080 | 23073.0 | 92.2297 | 106048.5 | -202327.6 | -223578.8 | 30.5168 | -356609.5 | 35.4799 |
| 1500 | 19.4662 | 25016.8 | 93.5707 | 115339.3 | -200383.8 | -223622.1 | 28.1859 | -356671.8 | 31.7685 |
| 1600 | 19.5141 | 26965.9 | 94.8286 | 124759.9 | -198434.7 | -223665.2 | 26.1535 | -356727.4 | 28.5205 |
| 1700 | 19.5541 | 28919.4 | 96.0129 | 134302.5 | -196481.3 | -223708.8 | 24.3563 | -356777.9 | 25.6541 |
| 1800 | 19.5878 | 30876.5 | 97.1316 | 143960.3 | -194524.1 | -223753.3 | 22.7584 | -356824.6 | 23.1059 |
| 1900 | 19.6164 | 32836.8 | 98.1914 | 153726.9 | -192563.9 | -223798.9 | 21.3285 | -356868.8 | 20.8257 |
| 2000 | 19.6410 | 34799.7 | 99.1982 | 163596.8 | -190601.0 | -223845.9 | 20.0413 | -356911.6 | 18.7732 |
| 2100 | 19.6622 | 36764.9 | 100.1570 | 173564.9 | -188635.8 | -223894.6 | 18.8764 | -356954.2 | 16.9159 |
| 2200 | 19.6806 | 38732.0 | 101.0722 | 183626.7 | -186668.6 | -223945.0 | 17.8172 | -356997.4 | 15.2274 |
| 2300 | 19.6967 | 40700.9 | 101.9474 | 193778.0 | -184699.8 | -223997.3 | 16.8499 | -357042.3 | 13.6854 |
| 2400 | 19.7109 | 42671.3 | 102.7860 | 204015.0 | -182729.4 | -224051.6 | 15.9630 | -357089.7 | 12.2718 |
| 2500 | 19.7235 | 44643.0 | 103.5909 | 214334.1 | -180757.6 | -224108.0 | 15.1468 | -357140.3 | 10.9710 |
| 2600 | 19.7346 | 46616.0 | 104.3646 | 224732.1 | -178784.7 | -224166.0 | | -357195.0 | 9.7702 |
| 2700 | 19.7445 | 48589.9 | 105.1096 | 235206.1 | -176810.8 | | | -357254.4 | 8.6581 |
| 2800 | 19.7534 | 50564.8 | 105.8279 | 245753.2 | -174835.8 | | | -357319.1 | 7.6253 |
| 2900 | 19.7615 | 52540.6 | 106.5212 | 256370.8 | -172860.1 | | | -357389.5 | 6.6635 |
| 3000 | 19.7687 | 54517.1 | 107.1912 | 267056.6 | -170883.6 | | | -357466.2 | 5.7657 |
| 3100 | 19.7752 | 56494.3 | 107.8396 | 277808.3 | -168906.4 | | | -357549.4 | 4.9256 |
| 3200 | 19.7812 | 58472.1 | 108.4675 | 288623.9 | -166928.6 | | | -357639.5 | 4.1378 |
| 3300 | 19.7866 | 60450.5 | 109.0763 | 299501.2 | -164950.2 | | | -357736.6 | 3.3976 |
| 3400 | 19.7916 | 62429.4 | 109.6670 | 310438.5 | -162971.2 | | | -357840.9 | 2.7007 |
| 3500 | 19.7961 | 64408.8 | 110.2408 | 321434.0 | -160991.9 | | | -357952.6 | 2.0434 |
| 3600 | 19.8003 | 66388.6 | 110.7985 | 332486.1 | -159012.0 | | | -358071.6 | 1.4225 |
| 3700 | 19.8041 | 68368.9 | 111.3411 | 343593.2 | -157031.8 | | | -358197.9 | 0.8349 |
| 3800 | 19.8076 | 70349.4 | 111.8693 | 354753.9 | -155051.2 | | | -358331.5 | 0.2780 |
| 3900 | 19.8109 | 72330.4 | 112.3839 | 365966.6 | -153070.3 | | | -358472.1 | -0.2505 |
| 4000 | 19.8140 | 74311.6 | 112.8855 | 377230.2 | -151089.1 | | | -358619.8 | -0.7528 |
| 4100 | 19.8168 | 76293.2 | 113.3748 | 388543.3 | -149107.5 | | | -358774.2 | -1.2307 |
| 4200 | 19.8194 | 78275.0 | 113.8523 | 399904.8 | -147125.7 | | | -358935.1 | -1.6862 |
| 4300 | 19.8218 | 80257.0 | 114.3187 | 411313.4 | -145143.6 | | | -359102.3 | -2.1206 |
| 4400 | 19.8241 | 82239.3 | 114.7744 | 422768.2 | -143161.3 | | | -359275.5 | -2.5355 |
| 4500 | 19.8262 | 84221.8 | 115.2200 | 434268.0 | -141178.8 | | | -359454.5 | -2.9321 |
| 4600 | 19.8282 | 86204.6 | 115.6557 | 445811.8 | -139196.1 | | | -359638.8 | -3.3117 |
| 4700 | 19.8301 | 88187.5 | 116.0822 | 457398.8 | -137213.2 | | | -359828.3 | -3.6753 |
| 4800 | 19.8318 | 90170.6 | 116.4997 | 469028.0 | -135230.1 | | | -360022.5 | -4.0240 |
| 4900 | 19.8335 | 92153.8 | 116.9086 | 480698.5 | -133246.8 | | | -360221.2 | -4.3586 |
| 5000 | 19.8350 | 94137.3 | 117.3093 | 492409.4 | -131263.4 | | | -360423.9 | -4.6800 |
| 5100 | 19.8365 | 96120.8 | 117.7021 | 504160.0 | -129275.8 | | | -360630.5 | -4.9890 |
| 5200 | 19.8378 | 98104.6 | 118.0873 | 515949.6 | -127296.1 | | | -360840.5 | -5.2863 |
| 5300 | 19.8391 | 100088.4 | 118.4652 | 527777.3 | -125312.3 | | | -361053.6 | -5.5725 |
| 5400 | 19.8404 | 102072.4 | 118.8361 | 539642.4 | -123328.3 | | | -361269.6 | -5.8483 |
| 5500 | 19.8415 | 104056.5 | 119.2001 | 551544.3 | -121344.2 | | | -361488.0 | -6.1142 |
| 5600 | 19.8426 | 106040.7 | 119.5577 | 563482.2 | -119360.0 | | | -361708.7 | -6.3707 |
| 5700 | 19.8437 | 108025.0 | 119.9089 | 575455.6 | -117375.7 | | | -361931.2 | -6.6185 |
| 5800 | 19.8446 | 110009.4 | 120.2540 | 587463.8 | -115391.3 | | | -362155.4 | -6.8578 |
| 5900 | 19.8456 | 111993.9 | 120.5932 | 599506.2 | -113406.8 | | | -362381.0 | -7.0891 |
| 6000 | 19.8465 | 113978.5 | 120.9268 | 611582.2 | -111422.1 | | | -362607.6 | -7.3129 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of P, 317.30° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (171) PH (gas); molecular weight, 31.983

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 48215.2 | 50509.4 | ----- | -76100.0 | ----- |
| 100 | 6.9595 | 687.6 | 39.2632 | 3238.7 | 48902.9 | 50604.4 | -105.6342 | -76406.0 | 163.4249 |
| 200 | 6.9623 | 1383.7 | 44.0879 | 1433.9 | 49598.9 | 50458.1 | -50.3305 | -76703.6 | 79.8107 |
| 298.15 | 6.9687 | 2067.3 | 46.8687 | 11906.6 | 50282.5 | 50282.5 | -32.2050 | -76995.2 | 52.1740 |
| 300 | 6.9689 | 2080.2 | 46.9118 | 11993.4 | 50295.4 | 50278.6 | -31.9778 | -77000.7 | 51.8260 |
| 400 | 7.0003 | 2778.3 | 48.9200 | 16789.7 | 50993.5 | 49856.2 | -22.8648 | -77296.2 | 37.7785 |
| 500 | 7.0811 | 3481.9 | 50.4898 | 21762.9 | 51697.2 | 49586.4 | -17.4307 | -77586.2 | 29.3176 |
| 600 | 7.2099 | 4196.1 | 51.7916 | 26878.8 | 52411.4 | 49326.4 | -13.8274 | -77865.6 | 23.6561 |
| 700 | 7.3676 | 4924.9 | 52.9146 | 32115.3 | 53140.1 | 49079.8 | -11.2670 | -78130.5 | 19.5979 |
| 800 | 7.5345 | 5670.0 | 53.9093 | 37457.5 | 53885.2 | 48847.9 | -9.3561 | -78379.1 | 16.5442 |
| 900 | 7.6974 | 6431.6 | 54.8062 | 42894.0 | 54646.9 | 48629.8 | -7.8765 | -78611.0 | 14.1618 |
| 1000 | 7.8489 | 7209.1 | 55.6252 | 48416.1 | 55424.3 | 48424.0 | -6.6980 | -78827.2 | 12.2503 |
| 1100 | 7.9862 | 8000.9 | 56.3798 | 54016.8 | 56216.2 | 48228.5 | -5.7380 | -79029.0 | 10.6823 |
| 1200 | 8.1088 | 8805.8 | 57.0801 | 59690.3 | 57021.1 | 48041.3 | -4.9410 | -79217.8 | 9.3724 |
| 1300 | 8.2175 | 9622.2 | 57.7335 | 65431.3 | 57837.5 | 47860.7 | -4.2691 | -79395.2 | 8.2514 |
| 1400 | 8.3137 | 10448.9 | 58.3461 | 71235.6 | 58664.1 | 47685.1 | -3.6957 | -79562.6 | 7.3070 |
| 1500 | 8.3988 | 11284.6 | 58.9226 | 77099.3 | 59499.8 | 47513.0 | -3.2003 | -79721.3 | 6.4783 |
| 1600 | 8.4743 | 12128.3 | 59.4671 | 83019.0 | 60343.6 | 47343.8 | -2.7683 | -79872.7 | 5.7516 |
| 1700 | 8.5415 | 12979.2 | 59.9829 | 88991.8 | 61194.4 | 47176.9 | -2.3885 | -80017.9 | 5.1093 |
| 1800 | 8.6016 | 13836.4 | 60.4729 | 95014.8 | 62051.6 | 47011.9 | -2.0522 | -80158.1 | 4.5374 |
| 1900 | 8.6556 | 14699.3 | 60.9394 | 101085.6 | 62914.5 | 46847.4 | -1.7522 | -80294.5 | 4.0247 |
| 2000 | 8.7044 | 15567.3 | 61.3846 | 107201.9 | 63782.6 | 46683.7 | -1.4834 | -80428.1 | 3.5626 |
| 2100 | 8.7487 | 16440.0 | 61.8104 | 113361.8 | 64655.3 | 46520.3 | -1.2409 | -80560.0 | 3.1437 |
| 2200 | 8.7892 | 17317.0 | 62.2184 | 119563.4 | 65532.2 | 46357.4 | -1.0213 | -80691.1 | 2.7624 |
| 2300 | 8.8262 | 18197.8 | 62.6099 | 125805.0 | 66413.0 | 46194.3 | -0.8212 | -80822.4 | 2.4136 |
| 2400 | 8.8604 | 19082.1 | 62.9863 | 132084.9 | 67297.4 | 46031.2 | -0.6388 | -80954.8 | 2.0933 |
| 2500 | 8.8921 | 19969.8 | 63.3486 | 138401.8 | 68185.0 | 45868.1 | -0.4714 | -81089.2 | 1.7982 |
| 2600 | 8.9216 | 20860.5 | 63.6979 | 144754.2 | 69075.7 | 45709.7 | ----- | -81226.1 | 1.5254 |
| 2700 | 8.9492 | 21754.0 | 64.0352 | 151140.9 | 69969.3 | 45552.2 | ----- | -81366.4 | 1.2723 |
| 2800 | 8.9752 | 22650.3 | 64.3611 | 157560.8 | 70865.5 | 45394.7 | ----- | -81510.7 | 1.0369 |
| 2900 | 8.9997 | 23549.0 | 64.6765 | 164012.8 | 71764.2 | 45237.2 | ----- | -81659.4 | 0.8173 |
| 3000 | 9.0229 | 24450.1 | 64.9820 | 170495.8 | 72665.4 | 45079.7 | ----- | -81813.0 | 0.6120 |
| 3100 | 9.0451 | 25353.6 | 65.2782 | 177008.9 | 73568.8 | 44922.2 | ----- | -81971.9 | 0.4196 |
| 3200 | 9.0664 | 26259.1 | 65.5657 | 183551.2 | 74474.4 | 44764.7 | ----- | -82136.3 | 0.2388 |
| 3300 | 9.0869 | 27166.8 | 65.8450 | 190121.8 | 75382.0 | 44606.2 | ----- | -82306.6 | 0.0686 |
| 3400 | 9.1068 | 28076.5 | 66.1166 | 196719.9 | 76291.7 | 44447.7 | ----- | -82482.8 | -0.0918 |
| 3500 | 9.1261 | 28988.1 | 66.3809 | 203344.8 | 77203.4 | 44289.2 | ----- | -82665.1 | -0.2435 |
| 3600 | 9.1451 | 29901.7 | 66.6382 | 209995.8 | 78116.9 | 44130.7 | ----- | -82853.3 | -0.3870 |
| 3700 | 9.1638 | 30817.1 | 66.8890 | 216672.3 | 79032.4 | 43972.2 | ----- | -83047.6 | -0.5231 |
| 3800 | 9.1823 | 31734.5 | 67.1337 | 223373.4 | 79949.7 | 43813.7 | ----- | -83247.8 | -0.6524 |
| 3900 | 9.2007 | 32653.6 | 67.3724 | 230098.8 | 80868.8 | 43655.2 | ----- | -83453.8 | -0.7753 |
| 4000 | 9.2192 | 33574.6 | 67.6056 | 236847.7 | 81789.8 | 43496.7 | ----- | -83665.3 | -0.8923 |
| 4100 | 9.2377 | 34497.4 | 67.8335 | 243619.7 | 82712.7 | 43338.2 | ----- | -83882.2 | -1.0039 |
| 4200 | 9.2565 | 35422.2 | 68.0563 | 250414.3 | 83637.4 | 43179.7 | ----- | -84104.1 | -1.1105 |
| 4300 | 9.2755 | 36348.8 | 68.2743 | 257230.8 | 84564.0 | 43021.2 | ----- | -84330.8 | -1.2125 |
| 4400 | 9.2949 | 37277.3 | 68.4878 | 264069.0 | 85492.5 | 42862.7 | ----- | -84561.9 | -1.3100 |
| 4500 | 9.3146 | 38207.7 | 68.6969 | 270928.2 | 86423.0 | 42704.2 | ----- | -84797.1 | -1.4035 |
| 4600 | 9.3349 | 39140.2 | 68.9018 | 277808.2 | 87355.5 | 42545.7 | ----- | -85036.0 | -1.4931 |
| 4700 | 9.3556 | 40074.7 | 69.1028 | 284708.5 | 88290.0 | 42387.2 | ----- | -85278.3 | -1.5792 |
| 4800 | 9.3770 | 41011.4 | 69.3000 | 291628.7 | 89226.6 | 42228.7 | ----- | -85523.4 | -1.6619 |
| 4900 | 9.3990 | 41950.1 | 69.4936 | 298568.4 | 90165.4 | 42070.2 | ----- | -85771.1 | -1.7415 |
| 5000 | 9.4217 | 42891.2 | 69.6837 | 305527.3 | 91106.4 | 41911.7 | ----- | -86020.9 | -1.8181 |
| 5100 | 9.4451 | 43834.5 | 69.8705 | 312505.0 | 92049.7 | 41753.2 | ----- | -86272.4 | -1.8919 |
| 5200 | 9.4692 | 44780.2 | 70.0541 | 319501.2 | 92995.5 | 41594.7 | ----- | -86525.1 | -1.9631 |
| 5300 | 9.4941 | 45728.4 | 70.2347 | 326515.7 | 93943.6 | 41436.2 | ----- | -86778.8 | -2.0318 |
| 5400 | 9.5198 | 46679.1 | 70.4124 | 333548.1 | 94894.3 | 41277.7 | ----- | -87032.9 | -2.0982 |
| 5500 | 9.5463 | 47632.4 | 70.5874 | 340598.1 | 95847.6 | 41119.2 | ----- | -87287.0 | -2.1623 |
| 5600 | 9.5736 | 48588.3 | 70.7596 | 347665.5 | 96803.6 | 40960.7 | ----- | -87540.9 | -2.2244 |
| 5700 | 9.6018 | 49547.1 | 70.9293 | 354749.9 | 97762.4 | 40802.2 | ----- | -87794.0 | -2.2844 |
| 5800 | 9.6307 | 50508.7 | 71.0965 | 361851.3 | 98724.0 | 40643.7 | ----- | -88046.0 | -2.3425 |
| 5900 | 9.6605 | 51473.3 | 71.2614 | 368969.2 | 99688.5 | 40485.2 | ----- | -88296.7 | -2.3988 |
| 6000 | 9.6912 | 52440.9 | 71.4241 | 376103.5 | 100656.1 | 40326.7 | ----- | -88545.5 | -2.4534 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of P, 317.30° K.

TABLE III - Continued. THERMODYNAMIC PROPERTIES

(172) PH₃ (gas); molecular weight, 33.999

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -672.8 | 3645.2 | ----- | -226221.0 | ----- |
| 100 | 7.9494 | 794.9 | 41.3293 | 3338.0 | 122.1 | 3088.5 | -6.6715 | -227413.3 | 484.2865 |
| 200 | 8.1105 | 1594.1 | 46.8632 | 7778.6 | 921.3 | 2442.5 | -3.4906 | -228601.5 | 235.2900 |
| 298.15 | 8.8678 | 2422.8 | 50.2243 | 12551.6 | 1750.0 | 1750.0 | -2.7182 | -229723.3 | 152.8820 |
| 300 | 8.8865 | 2439.2 | 50.2792 | 12644.6 | 1766.4 | 1736.8 | -2.7107 | -229743.6 | 151.8436 |
| 400 | 9.9864 | 3381.9 | 52.9836 | 17811.6 | 2709.1 | 864.5 | -2.4768 | -230788.2 | 109.9159 |
| 500 | 11.1089 | 4437.0 | 55.3333 | 23229.7 | 3764.2 | 247.5 | -2.4143 | -231720.3 | 84.6496 |
| 600 | 12.1669 | 5601.5 | 57.4535 | 28870.6 | 4928.7 | -262.2 | -2.4142 | -232543.1 | 67.7408 |
| 700 | 13.1301 | 6867.2 | 59.4027 | 34714.7 | 6194.4 | -674.0 | -2.4387 | -233264.6 | 55.6226 |
| 800 | 13.9849 | 8273.9 | 61.2130 | 40746.6 | 7551.1 | -999.8 | -2.4713 | -233895.2 | 46.5075 |
| 900 | 14.7288 | 9660.4 | 62.9042 | 46953.3 | 8987.7 | -1254.2 | -2.5052 | -234445.9 | 39.3999 |
| 1000 | 15.3684 | 11166.1 | 64.4900 | 53323.9 | 10493.4 | -1449.9 | -2.5376 | -234927.5 | 33.7013 |
| 1100 | 15.9147 | 12731.0 | 65.9811 | 59848.2 | 12058.3 | -1598.8 | -2.5683 | -235349.9 | 29.0298 |
| 1200 | 16.3800 | 14346.4 | 67.3864 | 66517.3 | 13673.6 | -1711.1 | -2.5957 | -235721.8 | 25.1302 |
| 1300 | 16.7766 | 16004.7 | 68.7135 | 73322.9 | 15332.0 | -1795.6 | -2.6200 | -236050.9 | 21.8257 |
| 1400 | 17.1153 | 17699.8 | 69.9695 | 80257.6 | 17027.0 | -1858.9 | -2.6427 | -236343.6 | 18.9896 |
| 1500 | 17.4055 | 19426.2 | 71.1605 | 87314.6 | 18753.4 | -1907.5 | -2.6621 | -236605.2 | 16.5287 |
| 1600 | 17.6553 | 21179.5 | 72.2920 | 94487.7 | 20506.8 | -1944.4 | -2.6793 | -236840.6 | 14.3731 |
| 1700 | 17.8711 | 22956.1 | 73.3690 | 101771.2 | 22283.3 | -1972.7 | -2.6950 | -237053.7 | 12.4694 |
| 1800 | 18.0585 | 24752.8 | 74.3959 | 109159.8 | 24080.0 | -1994.4 | -2.7092 | -237248.1 | 10.7757 |
| 1900 | 18.2220 | 26567.0 | 75.3768 | 116648.8 | 25894.3 | -2013.8 | -2.7217 | -237426.8 | 9.2591 |
| 2000 | 18.3652 | 28396.5 | 76.3152 | 124233.8 | 27723.8 | -2031.2 | -2.7338 | -237592.5 | 7.8932 |
| 2100 | 18.4912 | 30239.5 | 77.2143 | 131910.6 | 29566.7 | -2048.0 | -2.7442 | -237747.8 | 6.6565 |
| 2200 | 18.6026 | 32094.3 | 78.0771 | 139675.4 | 31421.5 | -2064.5 | -2.7542 | -237894.7 | 5.5316 |
| 2300 | 18.7014 | 33959.6 | 78.9063 | 147524.9 | 33286.8 | -2082.5 | -2.7627 | -238035.1 | 4.5038 |
| 2400 | 18.7895 | 35834.2 | 79.7041 | 155455.6 | 35161.4 | -2101.7 | -2.7714 | -238170.9 | 3.5611 |
| 2500 | 18.8682 | 37717.1 | 80.4727 | 163464.7 | 37044.4 | -2122.8 | -2.7790 | -238303.5 | 2.6934 |
| 2600 | 18.9388 | 39607.6 | 81.2142 | 171549.3 | 38934.8 | ----- | ----- | -238434.4 | 1.8920 |
| 2700 | 19.0025 | 41504.7 | 81.9301 | 179706.7 | 40831.9 | ----- | ----- | -238564.8 | 1.1495 |
| 2800 | 19.0599 | 43407.9 | 82.6223 | 187934.5 | 42735.1 | ----- | ----- | -238695.7 | 0.4597 |
| 2900 | 19.1120 | 45316.5 | 83.2920 | 196230.4 | 44643.7 | ----- | ----- | -238828.2 | -0.1829 |
| 3000 | 19.1593 | 47230.1 | 83.9408 | 204592.2 | 46557.3 | ----- | ----- | -238962.9 | -0.7830 |
| 3100 | 19.2024 | 49148.2 | 84.5697 | 213017.9 | 48475.4 | ----- | ----- | -239100.7 | -1.3447 |
| 3200 | 19.2417 | 51070.4 | 85.1800 | 221505.5 | 50397.7 | ----- | ----- | -239242.2 | -1.8716 |
| 3300 | 19.2778 | 52996.4 | 85.7727 | 230053.3 | 52323.7 | ----- | ----- | -239387.8 | -2.3668 |
| 3400 | 19.3109 | 54925.9 | 86.3486 | 238659.5 | 54253.1 | ----- | ----- | -239537.8 | -2.8333 |
| 3500 | 19.3413 | 56858.5 | 86.9089 | 247322.5 | 56185.8 | ----- | ----- | -239692.7 | -3.2733 |
| 3600 | 19.3693 | 58794.1 | 87.4541 | 256040.8 | 58121.3 | ----- | ----- | -239852.7 | -3.6892 |
| 3700 | 19.3953 | 60732.3 | 87.9852 | 264812.9 | 60059.6 | ----- | ----- | -240017.8 | -4.0828 |
| 3800 | 19.4192 | 62673.1 | 88.5027 | 273637.4 | 62000.3 | ----- | ----- | -240188.2 | -4.4560 |
| 3900 | 19.4415 | 64616.1 | 89.0075 | 282513.0 | 63943.3 | ----- | ----- | -240363.8 | -4.8103 |
| 4000 | 19.4621 | 66561.3 | 89.4999 | 291438.5 | 65888.5 | ----- | ----- | -240544.8 | -5.1472 |
| 4100 | 19.4814 | 68508.5 | 89.9808 | 300412.6 | 67835.7 | ----- | ----- | -240731.0 | -5.4679 |
| 4200 | 19.4993 | 70457.5 | 90.4504 | 309434.2 | 69784.8 | ----- | ----- | -240922.2 | -5.7735 |
| 4300 | 19.5160 | 72408.3 | 90.9094 | 318502.3 | 71735.5 | ----- | ----- | -241118.3 | -6.0651 |
| 4400 | 19.5316 | 74360.7 | 91.3583 | 327615.8 | 73687.9 | ----- | ----- | -241319.2 | -6.3438 |
| 4500 | 19.5463 | 76314.6 | 91.7974 | 336773.6 | 75641.8 | ----- | ----- | -241524.6 | -6.6102 |
| 4600 | 19.5600 | 78269.9 | 92.2271 | 345974.9 | 77597.2 | ----- | ----- | -241734.3 | -6.8653 |
| 4700 | 19.5729 | 80226.6 | 92.6479 | 355218.8 | 79553.8 | ----- | ----- | -241948.0 | -7.1098 |
| 4800 | 19.5850 | 82184.5 | 93.0602 | 364504.3 | 81511.7 | ----- | ----- | -242165.5 | -7.3443 |
| 4900 | 19.5964 | 84143.5 | 93.4641 | 373830.5 | 83470.8 | ----- | ----- | -242386.6 | -7.5694 |
| 5000 | 19.6071 | 86103.7 | 93.8601 | 383196.8 | 85431.0 | ----- | ----- | -242610.8 | -7.7857 |
| 5100 | 19.6172 | 88064.9 | 94.2485 | 392602.3 | 87392.2 | ----- | ----- | -242838.1 | -7.9937 |
| 5200 | 19.6268 | 90027.1 | 94.6295 | 402046.3 | 89354.4 | ----- | ----- | -243068.0 | -8.1939 |
| 5300 | 19.6358 | 91990.3 | 95.0034 | 411528.0 | 91317.5 | ----- | ----- | -243300.2 | -8.3867 |
| 5400 | 19.6444 | 93954.3 | 95.3706 | 421046.7 | 93281.5 | ----- | ----- | -243534.7 | -8.5726 |
| 5500 | 19.6524 | 95919.1 | 95.7311 | 430601.9 | 95246.4 | ----- | ----- | -243770.9 | -8.7519 |
| 5600 | 19.6601 | 97884.8 | 96.0853 | 440192.7 | 97212.0 | ----- | ----- | -244008.7 | -8.9249 |
| 5700 | 19.6674 | 99851.1 | 96.4333 | 449818.7 | 99178.4 | ----- | ----- | -244247.9 | -9.0921 |
| 5800 | 19.6743 | 101818.2 | 96.7754 | 459479.2 | 101145.5 | ----- | ----- | -244488.1 | -9.2536 |
| 5900 | 19.6809 | 103786.0 | 97.1118 | 469173.6 | 103113.2 | ----- | ----- | -244729.1 | -9.4098 |
| 6000 | 19.6871 | 105754.4 | 97.4426 | 478901.4 | 105081.6 | ----- | ----- | -244970.8 | -9.5610 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of P, 317.30° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(173) PN (gas); molecular weight, 44.983

| T_f °K | C_p° cal/mole °K | $H_f^\circ - H_0^\circ$ cal/mole | S_f° cal/mole °K | $-(F_f^\circ - H_0^\circ)$ cal/mole | H_f° cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|----------------------------|-------------------------------------|----------------------------|----------------------------------------|-------------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$ cal/mole | $\log_{10} K_f$ | ΔH_f° cal/mole | $\log_{10} K$ |
| C | ----- | 0 | ----- | 0 | 21242.1 | 23560.6 | ----- | -164000.0 | ----- |
| 100 | 6.9564 | 694.8 | 42.8122 | 3586.4 | 21936.9 | 23695.4 | -47.5578 | -164298.8 | 354.2654 |
| 200 | 6.9707 | 1390.8 | 47.6359 | 8136.4 | 22632.9 | 23502.5 | -21.6822 | -164596.4 | 174.6109 |
| 298.15 | 7.0965 | 2079.9 | 50.4374 | 12958.0 | 23322.0 | 23322.0 | -13.2947 | -164882.6 | 115.3586 |
| 300 | 7.1003 | 2093.0 | 50.4813 | 13051.4 | 23335.1 | 23318.2 | -13.1493 | -164887.9 | 114.6133 |
| 400 | 7.3552 | 2815.2 | 52.9571 | 18207.7 | 24057.3 | 22918.6 | -8.9446 | -165159.3 | 84.5618 |
| 500 | 7.6362 | 3564.9 | 54.2288 | 23549.5 | 24807.0 | 22692.7 | -6.4519 | -165403.3 | 66.5023 |
| 600 | 7.8852 | 4341.3 | 55.6437 | 29044.9 | 25583.4 | 22488.5 | -4.8060 | -165620.5 | 54.4457 |
| 700 | 8.0881 | 5140.3 | 56.8750 | 34672.2 | 26382.4 | 22299.7 | -3.6405 | -165815.1 | 45.8230 |
| 800 | 8.2490 | 5957.5 | 57.9660 | 40415.3 | 27199.6 | 22121.0 | -2.7736 | -165991.5 | 39.3488 |
| 900 | 8.3760 | 6789.0 | 58.9452 | 46261.7 | 28031.1 | 21948.7 | -2.1047 | -166153.7 | 34.3081 |
| 1000 | 8.4769 | 7631.8 | 59.8331 | 52201.3 | 28873.9 | 21780.2 | -1.5737 | -166304.5 | 30.2718 |
| 1100 | 8.5579 | 8483.7 | 60.6450 | 58225.8 | 29725.8 | 21613.8 | -1.1426 | -166446.2 | 26.9664 |
| 1200 | 8.6239 | 9342.9 | 61.3925 | 64328.1 | 30585.0 | 21448.6 | -0.7861 | -166580.7 | 24.2096 |
| 1300 | 8.6783 | 10208.1 | 62.0850 | 70502.4 | 31450.2 | 21284.0 | -0.4868 | -166709.3 | 21.8751 |
| 1400 | 8.7237 | 11078.3 | 62.7299 | 76743.5 | 32320.4 | 21119.7 | -0.2322 | -166833.2 | 19.8726 |
| 1500 | 8.7621 | 11952.6 | 63.3331 | 83047.0 | 33194.7 | 20955.4 | -0.0132 | -166953.3 | 18.1358 |
| 1600 | 8.7951 | 12830.5 | 63.8997 | 89408.9 | 34072.6 | 20791.0 | 0.1769 | -167070.5 | 16.6150 |
| 1700 | 8.8235 | 13711.5 | 64.4337 | 95825.9 | 34953.6 | 20626.5 | 0.3433 | -167185.6 | 15.2722 |
| 1800 | 8.8485 | 14595.1 | 64.9388 | 102294.7 | 35837.2 | 20461.9 | 0.4900 | -167299.4 | 14.0778 |
| 1900 | 8.8705 | 15481.1 | 65.4178 | 108812.8 | 36723.2 | 20297.2 | 0.6202 | -167412.8 | 13.0084 |
| 2000 | 8.8902 | 16369.1 | 65.8733 | 115377.5 | 37611.2 | 20132.3 | 0.7365 | -167526.5 | 12.0453 |
| 2100 | 8.9079 | 17259.1 | 66.3075 | 121986.7 | 38501.2 | 19967.3 | 0.8408 | -167641.2 | 11.1733 |
| 2200 | 8.9239 | 18150.7 | 66.7223 | 128638.4 | 39392.8 | 19802.3 | 0.9349 | -167757.9 | 10.3801 |
| 2300 | 8.9386 | 19043.8 | 67.1193 | 135330.6 | 40285.9 | 19637.2 | 1.0201 | -167877.2 | 9.6553 |
| 2400 | 8.9521 | 19938.3 | 67.5000 | 142061.7 | 41180.4 | 19472.1 | 1.0975 | -167990.0 | 8.9904 |
| 2500 | 8.9646 | 20834.2 | 67.8657 | 148830.1 | 42076.3 | 19307.0 | 1.1681 | -168126.9 | 8.3783 |
| 2600 | 8.9763 | 21731.2 | 68.2175 | 155634.3 | 42973.3 | | | -168258.7 | 7.8128 |
| 2700 | 8.9872 | 22629.4 | 68.5565 | 162473.1 | 43871.5 | | | -168395.9 | 7.2888 |
| 2800 | 8.9975 | 23528.7 | 68.8835 | 169345.2 | 44770.8 | | | -168539.3 | 6.8018 |
| 2900 | 9.0072 | 24428.9 | 69.1994 | 176249.5 | 45671.0 | | | -168689.4 | 6.3480 |
| 3000 | 9.0165 | 25330.1 | 69.5050 | 183184.8 | 46572.2 | | | -168846.7 | 5.9240 |
| 3100 | 9.0253 | 26232.2 | 69.8007 | 190150.2 | 47474.3 | | | -169011.7 | 5.5271 |
| 3200 | 9.0337 | 27135.1 | 70.0874 | 197144.6 | 48377.2 | | | -169184.8 | 5.1545 |
| 3300 | 9.0419 | 28038.9 | 70.3655 | 204167.4 | 49281.0 | | | -169366.3 | 4.8042 |
| 3400 | 9.0497 | 28943.5 | 70.6356 | 211217.5 | 50185.6 | | | -169556.6 | 4.4742 |
| 3500 | 9.0574 | 29848.8 | 70.8980 | 218294.2 | 51090.9 | | | -169755.9 | 4.1626 |
| 3600 | 9.0647 | 30755.0 | 71.1533 | 225396.8 | 51997.1 | | | -169964.4 | 3.8680 |
| 3700 | 9.0720 | 31661.8 | 71.4017 | 232524.6 | 52903.9 | | | -170182.3 | 3.5890 |
| 3800 | 9.0790 | 32569.3 | 71.6438 | 239677.0 | 53811.4 | | | -170409.7 | 3.3243 |
| 3900 | 9.0859 | 33477.6 | 71.8797 | 246853.2 | 54719.7 | | | -170646.6 | 3.0728 |
| 4000 | 9.0927 | 34386.5 | 72.1098 | 254052.7 | 55628.6 | | | -170893.2 | 2.8336 |
| 4100 | 9.0994 | 35296.1 | 72.3344 | 261275.0 | 56538.2 | | | -171149.3 | 2.6057 |
| 4200 | 9.1061 | 36206.4 | 72.5538 | 268519.4 | 57448.5 | | | -171414.9 | 2.3883 |
| 4300 | 9.1127 | 37117.3 | 72.7681 | 275785.6 | 58359.4 | | | -171690.0 | 2.1807 |
| 4400 | 9.1193 | 38028.9 | 72.9777 | 283072.9 | 59271.0 | | | -171974.5 | 1.9822 |
| 4500 | 9.1259 | 38941.2 | 73.1827 | 290380.9 | 60183.3 | | | -172268.1 | 1.7923 |
| 4600 | 9.1325 | 39854.1 | 73.3833 | 297709.3 | 61096.2 | | | -172570.8 | 1.6102 |
| 4700 | 9.1392 | 40767.7 | 73.5798 | 305057.5 | 62009.8 | | | -172882.3 | 1.4356 |
| 4800 | 9.1460 | 41682.0 | 73.7723 | 312425.1 | 62924.1 | | | -173202.5 | 1.2580 |
| 4900 | 9.1528 | 42596.9 | 73.9610 | 319811.8 | 63839.0 | | | -173531.2 | 1.1069 |
| 5000 | 9.1598 | 43512.5 | 74.1459 | 327217.2 | 64754.6 | | | -173868.0 | 0.9526 |
| 5100 | 9.1670 | 44428.9 | 74.3274 | 334640.9 | 65671.0 | | | -174212.7 | 0.8028 |
| 5200 | 9.1743 | 45345.9 | 74.5055 | 342082.5 | 66588.0 | | | -174565.1 | 0.6591 |
| 5300 | 9.1818 | 46263.7 | 74.6803 | 349541.9 | 67505.8 | | | -174925.0 | 0.5206 |
| 5400 | 9.1895 | 47182.3 | 74.8520 | 357018.5 | 68424.4 | | | -175291.9 | 0.3869 |
| 5500 | 9.1975 | 48101.6 | 75.0207 | 364512.2 | 69343.7 | | | -175665.7 | 0.2577 |
| 5600 | 9.2058 | 49021.8 | 75.1865 | 372022.5 | 70263.9 | | | -176046.0 | 0.1330 |
| 5700 | 9.2143 | 49942.8 | 75.3495 | 379549.4 | 71184.9 | | | -176432.5 | 0.0123 |
| 5800 | 9.2231 | 50864.7 | 75.5098 | 387092.4 | 72106.8 | | | -176824.9 | -0.1044 |
| 5900 | 9.2323 | 51787.4 | 75.6676 | 394651.2 | 73029.5 | | | -177223.0 | -0.2175 |
| 6000 | 9.2419 | 52711.2 | 75.8228 | 402225.8 | 73953.3 | | | -177626.4 | -0.3270 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of P, 317.30° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(174) PO (gas); molecular weight, 46.975

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -8352.1 | -6032.4 | ----- | -140000.0 | ----- |
| 100 | 7.7217 | 719.8 | 44.7861 | 3758.8 | -7632.3 | -5872.6 | 17.1388 | -140304.5 | 301.9804 |
| 200 | 7.6929 | 1497.9 | 50.1825 | 8538.6 | -6854.2 | -5983.4 | 10.7409 | -140580.6 | 148.5519 |
| 298.15 | 7.5874 | 2245.4 | 53.2245 | 13623.5 | -6106.7 | -6106.7 | 8.5716 | -140843.4 | 97.9421 |
| 300 | 7.5882 | 2259.4 | 53.2714 | 13722.0 | -6092.7 | -6109.7 | 8.5440 | -140848.2 | 97.3055 |
| 400 | 7.7241 | 3023.8 | 55.4695 | 19164.0 | -5328.3 | -6473.5 | 7.3926 | -141098.5 | 71.6338 |
| 500 | 7.9314 | 3806.5 | 57.2151 | 24801.1 | -4545.6 | -6680.6 | 6.6747 | -141323.2 | 56.2044 |
| 600 | 8.1262 | 4609.6 | 58.6788 | 30597.7 | -3742.5 | -6879.3 | 6.1812 | -141523.3 | 45.9025 |
| 700 | 8.2873 | 5430.6 | 59.9440 | 36530.3 | -2921.5 | -7071.5 | 5.8185 | -141703.0 | 38.5341 |
| 800 | 8.4155 | 6265.9 | 61.0594 | 42581.5 | -2086.2 | -7259.2 | 5.5390 | -141866.6 | 33.0010 |
| 900 | 8.5168 | 7112.8 | 62.0566 | 48738.2 | -1239.3 | -7443.6 | 5.3160 | -142017.6 | 28.6928 |
| 1000 | 8.5975 | 7968.6 | 62.9583 | 54989.7 | -383.5 | -7625.8 | 5.1331 | -142158.8 | 25.2426 |
| 1100 | 8.6624 | 8831.7 | 63.7809 | 61327.3 | 479.6 | -7806.3 | 4.9799 | -142292.1 | 22.4170 |
| 1200 | 8.7154 | 9700.7 | 64.5370 | 67743.7 | 1348.6 | -7985.8 | 4.8492 | -142419.2 | 20.0602 |
| 1300 | 8.7593 | 10574.5 | 65.2364 | 74232.8 | 2222.4 | -8164.5 | 4.7361 | -142541.2 | 18.0642 |
| 1400 | 8.7962 | 11452.3 | 65.8869 | 80789.3 | 3100.2 | -8342.9 | 4.6370 | -142659.2 | 16.3519 |
| 1500 | 8.8276 | 12333.6 | 66.4949 | 87408.7 | 3981.5 | -8521.2 | 4.5493 | -142773.9 | 14.8667 |
| 1600 | 8.8548 | 13217.7 | 67.0655 | 94087.0 | 4865.6 | -8699.7 | 4.4709 | -142886.2 | 13.5662 |
| 1700 | 8.8784 | 14104.4 | 67.6030 | 100820.7 | 5752.3 | -8878.7 | 4.4003 | -142996.7 | 12.4177 |
| 1800 | 8.8993 | 14993.3 | 68.1111 | 107606.7 | 6641.2 | -9058.3 | 4.3362 | -143106.3 | 11.3961 |
| 1900 | 8.9180 | 15884.2 | 68.5928 | 114442.1 | 7532.1 | -9238.8 | 4.2778 | -143215.8 | 10.4813 |
| 2000 | 8.9348 | 16776.8 | 69.0506 | 121324.4 | 8424.7 | -9420.4 | 4.2241 | -143325.7 | 9.6573 |
| 2100 | 8.9501 | 17671.1 | 69.4869 | 128251.5 | 9319.0 | -9603.1 | 4.1747 | -143437.0 | 8.9113 |
| 2200 | 8.9641 | 18566.8 | 69.9036 | 135221.1 | 10214.7 | -9787.2 | 4.1288 | -143550.3 | 8.2325 |
| 2300 | 8.9770 | 19463.9 | 70.3024 | 142231.6 | 11111.8 | -9972.6 | 4.0861 | -143666.5 | 7.6123 |
| 2400 | 8.9890 | 20362.2 | 70.6847 | 149281.1 | 12010.1 | -10159.5 | 4.0463 | -143786.2 | 7.0433 |
| 2500 | 9.0003 | 21261.7 | 71.0519 | 156368.0 | 12909.5 | -10347.9 | 4.0090 | -143910.1 | 6.5193 |
| 2600 | 9.0109 | 22162.2 | 71.4051 | 163491.0 | 13810.1 | -10532.2 | - | -144038.9 | 6.0353 |
| 2700 | 9.0209 | 23063.8 | 71.7453 | 170648.6 | 14711.7 | -10717.5 | - | -144173.2 | 5.5867 |
| 2800 | 9.0305 | 23966.4 | 72.0736 | 177839.6 | 15614.3 | -10903.8 | - | -144313.4 | 5.1697 |
| 2900 | 9.0396 | 24869.9 | 72.3906 | 185062.9 | 16517.8 | -11090.1 | - | -144460.2 | 4.7811 |
| 3000 | 9.0484 | 25774.3 | 72.6972 | 192317.4 | 17422.2 | -11276.4 | - | -144613.9 | 4.4180 |
| 3100 | 9.0569 | 26679.6 | 72.9941 | 199602.1 | 18327.5 | -11462.7 | - | -144774.8 | 4.0780 |
| 3200 | 9.0651 | 27585.7 | 73.2818 | 206915.9 | 19233.6 | -11649.0 | - | -144943.3 | 3.7589 |
| 3300 | 9.0731 | 28492.6 | 73.5608 | 214258.1 | 20140.5 | -11835.3 | - | -145119.6 | 3.4588 |
| 3400 | 9.0808 | 29400.3 | 73.8318 | 221627.8 | 21048.2 | -12021.6 | - | -145303.9 | 3.1759 |
| 3500 | 9.0885 | 30308.7 | 74.0951 | 229024.2 | 21956.6 | -12207.9 | - | -145496.2 | 2.9089 |
| 3600 | 9.0959 | 31218.0 | 74.3513 | 236446.6 | 22865.9 | -12394.2 | - | -145696.5 | 2.6564 |
| 3700 | 9.1033 | 32127.9 | 74.6006 | 243894.3 | 23775.8 | -12580.5 | - | -145905.0 | 2.4172 |
| 3800 | 9.1106 | 33038.6 | 74.8435 | 251366.5 | 24686.5 | -12766.8 | - | -146121.5 | 2.1902 |
| 3900 | 9.1178 | 33950.1 | 75.0802 | 258862.8 | 25597.9 | -12953.1 | - | -146345.9 | 1.9746 |
| 4000 | 9.1250 | 34862.2 | 75.3111 | 266382.4 | 26510.1 | -13139.4 | - | -146578.1 | 1.7694 |
| 4100 | 9.1322 | 35775.1 | 75.5366 | 273924.8 | 27423.0 | -13325.7 | - | -146817.8 | 1.5739 |
| 4200 | 9.1394 | 36688.6 | 75.7567 | 281489.5 | 28336.5 | -13512.0 | - | -147064.9 | 1.3874 |
| 4300 | 9.1466 | 37602.9 | 75.9718 | 289076.0 | 29250.8 | -13698.3 | - | -147319.1 | 1.2093 |
| 4400 | 9.1539 | 38518.0 | 76.1822 | 296683.7 | 30165.9 | -13884.6 | - | -147580.0 | 1.0390 |
| 4500 | 9.1612 | 39433.7 | 76.3880 | 304312.3 | 31081.6 | -14070.9 | - | -147847.5 | 0.8760 |
| 4600 | 9.1686 | 40350.2 | 76.5894 | 311961.2 | 31998.1 | -14257.2 | - | -148121.1 | 0.7197 |
| 4700 | 9.1761 | 41267.5 | 76.7867 | 319630.0 | 32915.4 | -14443.5 | - | -148400.6 | 0.5699 |
| 4800 | 9.1837 | 42185.4 | 76.9800 | 327318.4 | 33833.3 | -14629.8 | - | -148685.6 | 0.4260 |
| 4900 | 9.1915 | 43104.2 | 77.1694 | 335025.9 | 34752.1 | -14816.1 | - | -148975.7 | 0.2877 |
| 5000 | 9.1993 | 44023.7 | 77.3552 | 342752.1 | 35671.6 | -15002.4 | - | -149270.6 | 0.1547 |
| 5100 | 9.2074 | 44944.1 | 77.5374 | 350496.8 | 36592.0 | -15188.7 | - | -149569.9 | 0.0266 |
| 5200 | 9.2155 | 45865.2 | 77.7163 | 358259.5 | 37513.1 | -15375.0 | - | -149873.2 | -0.0967 |
| 5300 | 9.2239 | 46787.2 | 77.8919 | 366039.9 | 38435.1 | -15561.3 | - | -150180.2 | -0.2157 |
| 5400 | 9.2324 | 47710.0 | 78.0644 | 373837.8 | 39357.9 | -15747.6 | - | -150490.5 | -0.3305 |
| 5500 | 9.2411 | 48633.7 | 78.2339 | 381652.7 | 40281.6 | -15933.9 | - | -150803.9 | -0.4413 |
| 5600 | 9.2501 | 49558.2 | 78.4005 | 389484.5 | 41206.1 | -16120.2 | - | -151119.8 | -0.5485 |
| 5700 | 9.2592 | 50483.7 | 78.5643 | 397332.7 | 42131.6 | -16306.5 | - | -151438.0 | -0.6520 |
| 5800 | 9.2685 | 51410.1 | 78.7254 | 405197.2 | 43058.0 | -16492.8 | - | -151758.2 | -0.7522 |
| 5900 | 9.2781 | 52337.4 | 78.8839 | 413077.7 | 43985.3 | -16679.1 | - | -152080.0 | -0.8493 |
| 6000 | 9.2878 | 53265.7 | 79.0399 | 420973.9 | 44913.6 | -16865.4 | - | -152403.1 | -0.9432 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of P, 317.30° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(175) PS (gas); molecular weight, 63.041

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 8548.5 | 10884.5 | ----- | -130000.0 | ----- |
| 100 | 7.3713 | 704.3 | 47.2850 | 4024.2 | 9252.8 | 11210.9 | -15.7916 | -130291.7 | 280.2815 |
| 200 | 8.1169 | 1484.7 | 52.6643 | 9048.1 | 10033.2 | 11057.7 | -3.5336 | -130545.4 | 137.8031 |
| 298.15 | 8.4226 | 2298.0 | 55.9688 | 14389.1 | 10846.5 | 10846.5 | 0.4143 | -130774.3 | 90.8079 |
| 300 | 8.4268 | 2313.6 | 56.0209 | 14492.7 | 10862.1 | 10841.6 | 0.4632 | -130778.4 | 90.2168 |
| 400 | 8.6039 | 3165.8 | 58.4715 | 20222.7 | 11714.3 | 9822.3 | 2.3177 | -130984.0 | 66.3825 |
| 500 | 8.7153 | 4032.2 | 60.4042 | 26169.9 | 12580.7 | 9126.5 | 3.4172 | -131163.8 | 52.0607 |
| 600 | 8.7889 | 4907.7 | 62.0002 | 32292.4 | 13456.1 | 8521.0 | 4.0609 | -131323.8 | 42.5003 |
| 700 | 8.8401 | 5789.2 | 63.3590 | 38562.1 | 14337.7 | 7978.5 | 4.4906 | -131469.1 | 35.6634 |
| 800 | 8.8775 | 6675.2 | 64.5420 | 44958.4 | 15223.7 | 7469.9 | 4.7925 | -131603.7 | 30.5303 |
| 900 | 8.9062 | 7564.5 | 65.5894 | 51466.0 | 16112.9 | 6965.6 | 5.0118 | -131730.2 | 26.5339 |
| 1000 | 8.9289 | 8456.3 | 66.5290 | 58072.7 | 17004.7 | 6463.8 | 5.1751 | -131850.4 | 23.3338 |
| 1100 | 8.9477 | 9350.1 | 67.3809 | 64768.9 | 17898.6 | 5964.0 | 5.2987 | -131965.7 | 20.7132 |
| 1200 | 8.9637 | 10245.7 | 68.1601 | 71546.5 | 18794.2 | 5466.0 | 5.3934 | -132077.2 | 18.5275 |
| 1300 | 8.9775 | 11142.8 | 68.8782 | 78398.8 | 19691.2 | 4969.5 | 5.4666 | -132185.7 | 16.6765 |
| 1400 | 8.9899 | 12041.2 | 69.5439 | 85320.3 | 20589.6 | 4474.3 | 5.5234 | -132291.9 | 15.0886 |
| 1500 | 9.0012 | 12940.7 | 70.1646 | 92306.1 | 21489.2 | 3980.2 | 5.5674 | -132396.5 | 13.7114 |
| 1600 | 9.0115 | 13841.4 | 70.7458 | 99352.0 | 22389.8 | 3487.3 | 5.6015 | -132500.5 | 12.5053 |
| 1700 | 9.0212 | 14743.0 | 71.2924 | 106454.1 | 23291.5 | 2995.3 | 5.6276 | -132604.4 | 11.4403 |
| 1800 | 9.0303 | 15645.6 | 71.8083 | 113609.4 | 24194.1 | 2504.3 | 5.6472 | -132709.0 | 10.4929 |
| 1900 | 9.0390 | 16549.1 | 72.2968 | 120814.9 | 25097.5 | 2014.2 | 5.6617 | -132815.1 | 9.5446 |
| 2000 | 9.0474 | 17453.4 | 72.7607 | 128068.0 | 26001.8 | 1524.9 | 5.6719 | -132923.6 | 8.8805 |
| 2100 | 9.0554 | 18358.5 | 73.2023 | 135366.3 | 26907.0 | 1036.4 | 5.6786 | -133035.4 | 8.1885 |
| 2200 | 9.0632 | 19264.5 | 73.6237 | 142707.7 | 27812.9 | 548.7 | 5.6824 | -133151.1 | 7.5590 |
| 2300 | 9.0708 | 20171.2 | 74.0268 | 150090.4 | 28719.6 | 61.9 | 5.6837 | -133271.6 | 6.9836 |
| 2400 | 9.0783 | 21078.6 | 74.4130 | 157512.5 | 29627.1 | -424.3 | 5.6830 | -133397.7 | 6.4558 |
| 2500 | 9.0856 | 21986.8 | 74.7837 | 164972.5 | 30535.3 | -909.7 | 5.6806 | -133530.0 | 5.9697 |
| 2600 | 9.0928 | 22895.7 | 75.1402 | 172468.8 | 31444.2 | | | -133669.1 | 5.5205 |
| 2700 | 9.0999 | 23805.4 | 75.4835 | 180000.1 | 32353.8 | | | -133815.5 | 5.1041 |
| 2800 | 9.1068 | 24715.7 | 75.8146 | 187565.1 | 33264.2 | | | -133969.8 | 4.7171 |
| 2900 | 9.1138 | 25626.7 | 76.1343 | 195162.6 | 34175.2 | | | -134132.4 | 4.3563 |
| 3000 | 9.1206 | 26538.4 | 76.4433 | 202791.6 | 35086.9 | | | -134303.4 | 4.0192 |
| 3100 | 9.1274 | 27450.8 | 76.7425 | 210451.0 | 35999.3 | | | -134483.3 | 3.7034 |
| 3200 | 9.1341 | 28363.9 | 77.0324 | 218139.8 | 36912.4 | | | -134672.1 | 3.4069 |
| 3300 | 9.1408 | 29277.7 | 77.3136 | 225857.2 | 37826.1 | | | -134869.9 | 3.1280 |
| 3400 | 9.1475 | 30192.1 | 77.5866 | 233602.2 | 38740.6 | | | -135076.8 | 2.8651 |
| 3500 | 9.1541 | 31107.2 | 77.8518 | 241374.2 | 39655.6 | | | -135292.7 | 2.6168 |
| 3600 | 9.1607 | 32022.9 | 78.1098 | 249172.4 | 40571.4 | | | -135517.5 | 2.3820 |
| 3700 | 9.1673 | 32939.3 | 78.3609 | 256996.0 | 41487.8 | | | -135751.1 | 2.1595 |
| 3800 | 9.1738 | 33856.4 | 78.6054 | 264844.3 | 42404.8 | | | -135993.2 | 1.9483 |
| 3900 | 9.1803 | 34774.1 | 78.8438 | 272716.8 | 43322.5 | | | -136243.8 | 1.7475 |
| 4000 | 9.1868 | 35692.4 | 79.0763 | 280612.9 | 44240.9 | | | -136502.3 | 1.5565 |
| 4100 | 9.1933 | 36611.4 | 79.3033 | 288531.9 | 45159.9 | | | -136768.7 | 1.3744 |
| 4200 | 9.1997 | 37531.1 | 79.5249 | 296473.4 | 46079.5 | | | -137042.4 | 1.2007 |
| 4300 | 9.2062 | 38451.4 | 79.7414 | 304436.7 | 46999.8 | | | -137323.3 | 1.0347 |
| 4400 | 9.2126 | 39372.3 | 79.9531 | 312421.5 | 47920.8 | | | -137610.8 | 0.8759 |
| 4500 | 9.2190 | 40293.9 | 80.1602 | 320427.2 | 48842.3 | | | -137904.6 | 0.7239 |
| 4600 | 9.2254 | 41216.1 | 80.3629 | 328453.4 | 49764.6 | | | -138204.3 | 0.5781 |
| 4700 | 9.2318 | 42139.0 | 80.5614 | 336499.6 | 50687.4 | | | -138509.5 | 0.4383 |
| 4800 | 9.2382 | 43062.5 | 80.7558 | 344565.5 | 51610.9 | | | -138819.8 | 0.3039 |
| 4900 | 9.2445 | 43986.6 | 80.9464 | 352650.7 | 52535.1 | | | -139134.7 | 0.1748 |
| 5000 | 9.2509 | 44911.4 | 81.1332 | 360754.7 | 53459.8 | | | -139453.9 | 0.0506 |
| 5100 | 9.2572 | 45836.8 | 81.3165 | 368877.2 | 54385.2 | | | -139777.0 | -0.0691 |
| 5200 | 9.2636 | 46762.8 | 81.4963 | 377017.9 | 55311.3 | | | -140103.5 | -0.1844 |
| 5300 | 9.2699 | 47689.5 | 81.6728 | 385176.3 | 56237.9 | | | -140433.1 | -0.2956 |
| 5400 | 9.2763 | 48616.8 | 81.8461 | 393352.3 | 57165.3 | | | -140765.4 | -0.4030 |
| 5500 | 9.2826 | 49544.7 | 82.0164 | 401545.5 | 58093.2 | | | -141100.1 | -0.5067 |
| 5600 | 9.2889 | 50473.3 | 82.1837 | 409755.5 | 59021.8 | | | -141436.7 | -0.6069 |
| 5700 | 9.2952 | 51402.5 | 82.3482 | 417982.1 | 59951.0 | | | -141775.0 | -0.7039 |
| 5800 | 9.3015 | 52332.4 | 82.5099 | 426225.0 | 60880.8 | | | -142114.6 | -0.7977 |
| 5900 | 9.3079 | 53262.8 | 82.6690 | 434484.0 | 61811.3 | | | -142455.2 | -0.8886 |
| 6000 | 9.3142 | 54193.9 | 82.8254 | 442758.7 | 62742.4 | | | -142796.5 | -0.9766 |

^aA change in phase of each of the assigned reference elements has occurred between this temperature and the preceding temperature. Melting point of P, 317.30° K and of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(176) S (gas); molecular weight, 32.066

| T, °K | C _p ^o , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| C | ----- | 0 | ----- | C | 64846.7 | 65903.4 | ----- | 0 | ----- |
| 1CC | 5.1635 | 459.2 | 34.1267 | 2513.5 | 65348.9 | 66237.9 | -137.9634 | 0 | 0 |
| 2CC | 5.5894 | 1036.5 | 37.8310 | 6529.7 | 65886.2 | 66382.6 | -65.5151 | 0 | 0 |
| 298.15 | 5.6587 | 1591.1 | 40.0861 | 10360.6 | 66440.8 | 66440.8 | -41.6253 | 0 | 0 |
| 3CC | 5.6576 | 1661.5 | 40.1211 | 10434.8 | 66451.3 | 66441.3 | -41.3251 | 0 | 0 |
| 4CC | 5.5537 | 2162.6 | 41.7359 | 14531.8 | 67012.3 | 65903.9 | -29.2362 | 0 | 0 |
| 5CC | 5.4361 | 2712.0 | 42.9622 | 18769.2 | 67561.7 | 65511.4 | -22.0529 | 0 | 0 |
| 6CC | 5.3358 | 3250.5 | 43.9445 | 23116.1 | 68100.3 | 65197.2 | -17.2916 | 0 | 0 |
| 7CC | 5.2664 | 3780.7 | 44.7618 | 27552.6 | 68630.4 | 64927.4 | -13.9060 | 0 | 0 |
| 8CC | 5.2105 | 4304.4 | 45.4613 | 32064.6 | 69154.1 | 64680.8 | -11.3768 | 0 | 0 |
| 9CC | 5.1688 | 4823.3 | 46.0725 | 36641.9 | 69673.0 | 64430.3 | -9.4172 | 0 | 0 |
| 10CC | 5.1366 | 5338.5 | 46.6153 | 41276.8 | 70188.2 | 64176.1 | -7.8557 | 0 | 0 |
| 11CC | 5.1118 | 5850.9 | 47.1037 | 45963.2 | 70700.6 | 63915.1 | -6.5832 | 0 | 0 |
| 12CC | 5.0930 | 6361.1 | 47.5476 | 50696.1 | 71210.8 | 63659.9 | -5.5270 | 0 | 0 |
| 13CC | 5.0791 | 6869.6 | 47.9547 | 55471.5 | 71719.4 | 63399.0 | -4.6370 | 0 | 0 |
| 14CC | 5.0695 | 7377.0 | 48.3307 | 60286.0 | 72226.7 | 63137.0 | -3.8772 | 0 | 0 |
| 15CC | 5.0639 | 7883.7 | 48.6802 | 65136.7 | 72733.4 | 62874.3 | -3.2215 | 0 | 0 |
| 16CC | 5.0619 | 8389.5 | 49.0070 | 70021.3 | 73239.6 | 62611.1 | -2.6502 | 0 | 0 |
| 17CC | 5.0634 | 8896.2 | 49.3135 | 74937.5 | 73745.9 | 62348.0 | -2.1482 | 0 | 0 |
| 18CC | 5.0679 | 9402.7 | 49.6034 | 79883.5 | 74252.4 | 62085.1 | -1.7038 | 0 | 0 |
| 19CC | 5.0753 | 9909.8 | 49.8776 | 84857.7 | 74759.6 | 61822.8 | -1.3079 | 0 | 0 |
| 20CC | 5.0853 | 10417.5 | 50.1382 | 89858.6 | 75267.6 | 61561.4 | -0.9531 | 0 | 0 |
| 21CC | 5.0975 | 10927.0 | 50.3866 | 94884.9 | 75776.7 | 61301.2 | -0.6334 | 0 | 0 |
| 22CC | 5.1116 | 11437.4 | 50.6241 | 99935.5 | 76287.1 | 61042.2 | -0.3441 | 0 | 0 |
| 2300 | 5.1273 | 11949.3 | 50.8516 | 105009.4 | 76795.1 | 60784.7 | -0.0810 | 0 | 0 |
| 24CC | 5.1443 | 12462.9 | 51.0702 | 110105.6 | 77312.6 | 60528.9 | 0.1592 | 0 | 0 |
| 25CC | 5.1623 | 12978.2 | 51.2806 | 115223.2 | 77828.0 | 60274.8 | 0.3792 | 0 | 0 |
| 26CC | 5.1810 | 13495.4 | 51.4834 | 120361.4 | 78345.1 | 60000.0 | 0 | 0 | 0 |
| 27CC | 5.2001 | 14014.5 | 51.6792 | 125519.6 | 78864.2 | 60000.0 | 0 | 0 | 0 |
| 28CC | 5.2195 | 14535.4 | 51.8687 | 130697.1 | 79385.2 | 60000.0 | 0 | 0 | 0 |
| 29CC | 5.2389 | 15058.4 | 52.0522 | 135893.1 | 79908.1 | 60000.0 | 0 | 0 | 0 |
| 30CC | 5.2581 | 15583.2 | 52.2302 | 141107.3 | 80432.9 | 60000.0 | 0 | 0 | 0 |
| 31CC | 5.2770 | 16110.0 | 52.4029 | 146339.0 | 80959.7 | 60000.0 | 0 | 0 | 0 |
| 32CC | 5.2955 | 16638.6 | 52.5707 | 151587.7 | 81488.3 | 60000.0 | 0 | 0 | 0 |
| 33CC | 5.3134 | 17169.0 | 52.7340 | 156853.0 | 82018.8 | 60000.0 | 0 | 0 | 0 |
| 34CC | 5.3307 | 17701.3 | 52.8928 | 162134.4 | 82551.0 | 60000.0 | 0 | 0 | 0 |
| 35CC | 5.3473 | 18235.2 | 53.0476 | 167431.4 | 83084.9 | 60000.0 | 0 | 0 | 0 |
| 36CC | 5.3632 | 18770.7 | 53.1985 | 172743.8 | 83620.4 | 60000.0 | 0 | 0 | 0 |
| 37CC | 5.3782 | 19307.8 | 53.3456 | 178071.0 | 84157.5 | 60000.0 | 0 | 0 | 0 |
| 38CC | 5.3925 | 19846.3 | 53.4892 | 183412.8 | 84696.0 | 60000.0 | 0 | 0 | 0 |
| 39CC | 5.4059 | 20386.2 | 53.6295 | 188768.7 | 85236.0 | 60000.0 | 0 | 0 | 0 |
| 40CC | 5.4185 | 20927.5 | 53.7665 | 194138.6 | 85777.2 | 60000.0 | 0 | 0 | 0 |
| 41CC | 5.4303 | 21469.9 | 53.9005 | 199521.9 | 86319.6 | 60000.0 | 0 | 0 | 0 |
| 42CC | 5.4412 | 22013.5 | 54.0314 | 204918.5 | 86863.2 | 60000.0 | 0 | 0 | 0 |
| 43CC | 5.4515 | 22558.1 | 54.1596 | 210328.1 | 87407.9 | 60000.0 | 0 | 0 | 0 |
| 44CC | 5.4605 | 23103.8 | 54.2850 | 215750.4 | 87953.5 | 60000.0 | 0 | 0 | 0 |
| 45CC | 5.4695 | 23650.3 | 54.4075 | 221185.0 | 88500.0 | 60000.0 | 0 | 0 | 0 |
| 46CC | 5.4774 | 24197.7 | 54.5282 | 226631.9 | 89047.4 | 60000.0 | 0 | 0 | 0 |
| 47CC | 5.4847 | 24745.8 | 54.6460 | 232090.6 | 89595.5 | 60000.0 | 0 | 0 | 0 |
| 48CC | 5.4912 | 25294.6 | 54.7616 | 237561.0 | 90144.3 | 60000.0 | 0 | 0 | 0 |
| 49CC | 5.4971 | 25844.0 | 54.8745 | 243042.8 | 90693.7 | 60000.0 | 0 | 0 | 0 |
| 50CC | 5.5024 | 26394.0 | 54.9860 | 248535.9 | 91243.7 | 60000.0 | 0 | 0 | 0 |
| 51CC | 5.5071 | 26944.4 | 55.0950 | 254040.0 | 91794.2 | 60000.0 | 0 | 0 | 0 |
| 52CC | 5.5113 | 27495.4 | 55.2020 | 259554.8 | 92345.1 | 60000.0 | 0 | 0 | 0 |
| 53CC | 5.5149 | 28046.7 | 55.3070 | 265080.3 | 92896.4 | 60000.0 | 0 | 0 | 0 |
| 54CC | 5.5181 | 28598.3 | 55.4101 | 270616.2 | 93448.0 | 60000.0 | 0 | 0 | 0 |
| 55CC | 5.5208 | 29150.3 | 55.5114 | 276162.2 | 94000.0 | 60000.0 | 0 | 0 | 0 |
| 56CC | 5.5231 | 29702.5 | 55.6105 | 281718.4 | 94552.2 | 60000.0 | 0 | 0 | 0 |
| 57CC | 5.5250 | 30254.9 | 55.7086 | 287284.4 | 95104.6 | 60000.0 | 0 | 0 | 0 |
| 58CC | 5.5266 | 30807.5 | 55.8047 | 292860.0 | 95657.2 | 60000.0 | 0 | 0 | 0 |
| 59CC | 5.5279 | 31360.2 | 55.8992 | 298445.3 | 96209.9 | 60000.0 | 0 | 0 | 0 |
| 60CC | 5.5287 | 31913.0 | 55.9921 | 304039.8 | 96762.7 | 60000.0 | 0 | 0 | 0 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (177) S (crystal II, crystal I, liquid); molecular weight, 32.066

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$ ^a , cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$ ^a , cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------------------|------------------------------|----------------------------------------------------|------------------------------|-------------------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | 0 | 0 | -1053.7 | 0 | ----- | -65903.4 | ----- |
| 100 | 3.060 | 164.7 | 3.046 | 139.9 | -889.0 | 0 | 0 | -66237.9 | 137.9634 |
| 200 | 4.639 | 557.3 | 5.704 | 583.5 | -496.4 | 0 | 0 | -66382.6 | 65.5151 |
| 298.15 | 5.401 | 1053.7 | 7.713 | 1245.9 | 0 | 0 | 0 | -66440.8 | 41.6253 |
| 300 | 5.412 | 1063.7 | 7.747 | 1260.4 | 10.0 | 0 | 0 | -66441.3 | 41.3251 |
| ^b 388.357 | 6.053 | 1662.5 | 9.473 | 2016.4 | 608.8 | 0 | 0 | -119216.3 | 30.2779 |
| 388.357 | 7.579 | 2073.0 | 10.530 | 2016.4 | 1019.3 | 0 | 0 | -65884.7 | 30.2779 |
| 400 | 7.731 | 2162.1 | 10.756 | 2140.3 | 1108.4 | 0 | 0 | -65903.9 | 29.2362 |
| 500 | 9.079 | 3100.0 | 12.842 | 3321.0 | 2046.3 | 0 | 0 | -65515.4 | 22.0529 |
| 600 | 8.200 | 3956.8 | 14.406 | 4686.8 | 2903.1 | 0 | 0 | -65197.2 | 17.2916 |
| 700 | 7.801 | 4756.7 | 15.640 | 6191.3 | 3703.0 | 0 | 0 | -64927.4 | 13.9060 |
| 800 | 7.694 | 5527.0 | 16.6687 | 7807.9 | 4473.3 | 0 | 0 | -64680.8 | 11.3768 |
| 900 | 7.694 | 6296.4 | 17.5749 | 9521.0 | 5242.7 | 0 | 0 | -64430.3 | 9.4172 |
| 1000 | 7.694 | 7065.8 | 18.3856 | 11319.8 | 6012.1 | 0 | 0 | -64176.1 | 7.8557 |
| 1100 | 7.694 | 7835.2 | 19.1189 | 13195.6 | 6781.5 | 0 | 0 | -63919.1 | 6.5832 |
| 1200 | 7.694 | 8604.6 | 19.7884 | 15141.4 | 7550.9 | 0 | 0 | -63659.9 | 5.5270 |
| 1300 | 7.694 | 9374.0 | 20.4042 | 17151.5 | 8320.3 | 0 | 0 | -63399.0 | 4.6370 |
| 1400 | 7.694 | 10143.4 | 20.9744 | 19220.7 | 9089.7 | 0 | 0 | -63137.0 | 3.8772 |
| 1500 | 7.694 | 10912.8 | 21.5052 | 21345.0 | 9859.1 | 0 | 0 | -62874.3 | 3.2215 |
| 1600 | 7.694 | 11682.2 | 22.0018 | 23520.6 | 10628.5 | 0 | 0 | -62611.1 | 2.6502 |
| 1700 | 7.694 | 12451.6 | 22.4682 | 25744.4 | 11397.9 | 0 | 0 | -62348.0 | 2.1482 |
| 1800 | 7.694 | 13221.0 | 22.9080 | 28013.4 | 12167.3 | 0 | 0 | -62085.1 | 1.7038 |
| 1900 | 7.694 | 13990.4 | 23.3240 | 30325.2 | 12936.7 | 0 | 0 | -61822.8 | 1.3079 |
| 2000 | 7.694 | 14759.8 | 23.7187 | 32677.5 | 13706.1 | 0 | 0 | -61561.4 | 0.9531 |
| 2100 | 7.694 | 15529.2 | 24.0941 | 35068.3 | 14475.5 | 0 | 0 | -61301.2 | 0.6334 |
| 2200 | 7.694 | 16298.6 | 24.4520 | 37495.7 | 15244.9 | 0 | 0 | -61042.2 | 0.3441 |
| 2300 | 7.694 | 17068.0 | 24.7940 | 39958.1 | 16014.3 | 0 | 0 | -60784.7 | 0.0810 |
| 2400 | 7.694 | 17837.4 | 25.1214 | 42454.0 | 16783.7 | 0 | 0 | -60528.9 | -0.1592 |
| 2500 | 7.694 | 18606.8 | 25.4355 | 44982.0 | 17553.1 | 0 | 0 | -60274.8 | -0.3792 |

^a H_0° refers to rhombic II crystal state.

^bMelting point.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(178) S₂ (gas); molecular weight, 64.132

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 28699.4 | 30806.8 | ----- | -101000.0 | ----- |
| 100 | 6.9636 | 695.4 | 46.6236 | 3967.0 | 29394.8 | 31172.8 | -59.2672 | -101302.9 | 216.6597 |
| 200 | 7.2648 | 1402.9 | 51.5156 | 8900.3 | 30102.3 | 31095.1 | -25.2124 | -101670.2 | 105.8177 |
| 298.15 | 7.7592 | 2140.6 | 54.5100 | 14111.6 | 30840.0 | 30840.0 | -14.0639 | -102041.6 | 69.1857 |
| 300 | 7.7677 | 2154.9 | 54.5580 | 14212.5 | 30854.4 | 30834.4 | -13.3247 | -102048.2 | 68.7254 |
| 400 | 8.1442 | 2951.8 | 56.8479 | 19787.3 | 31651.2 | 29434.4 | -8.3592 | -102373.4 | 50.1132 |
| 500 | 8.3891 | 3779.4 | 58.6935 | 25567.4 | 32478.8 | 28336.2 | -5.1931 | -102644.5 | 38.9127 |
| 600 | 8.5493 | 4626.8 | 60.2382 | 31516.1 | 33326.3 | 27520.1 | -3.1558 | -102874.3 | 31.4273 |
| 700 | 8.6582 | 5487.5 | 61.5647 | 37607.8 | 34187.0 | 26781.0 | -1.7426 | -103073.8 | 26.0694 |
| 800 | 8.7355 | 6357.4 | 62.7262 | 43823.5 | 35056.9 | 26110.2 | -0.7100 | -103251.4 | 22.0636 |
| 900 | 8.7926 | 7234.0 | 63.7585 | 50148.7 | 35933.4 | 25447.9 | 0.3728 | -103412.7 | 18.9073 |
| 1000 | 8.8364 | 8115.5 | 64.6873 | 56571.8 | 36814.9 | 24790.7 | 0.6830 | -103561.5 | 16.3944 |
| 1100 | 8.8710 | 9000.9 | 65.5312 | 63083.4 | 37700.4 | 24137.3 | 1.1693 | -103700.3 | 14.3356 |
| 1200 | 8.8993 | 9889.5 | 66.3043 | 69675.7 | 38589.9 | 23487.1 | 1.5637 | -103832.6 | 12.6176 |
| 1300 | 8.9229 | 10780.6 | 67.0176 | 76342.2 | 39480.1 | 22839.4 | 1.8883 | -103958.6 | 11.1622 |
| 1400 | 8.9431 | 11674.0 | 67.6796 | 83077.5 | 40373.4 | 22193.9 | 2.1587 | -104080.1 | 9.9132 |
| 1500 | 8.9607 | 12569.2 | 68.2972 | 89876.7 | 41268.6 | 21550.4 | 2.3864 | -104198.2 | 8.8295 |
| 1600 | 8.9764 | 13466.0 | 68.8761 | 96735.6 | 42165.5 | 20908.4 | 2.5798 | -104313.8 | 7.8801 |
| 1700 | 8.9905 | 14364.4 | 69.4207 | 103650.8 | 43063.8 | 20268.0 | 2.7453 | -104427.9 | 7.0416 |
| 1800 | 9.0034 | 15264.1 | 69.9349 | 110618.8 | 43963.5 | 19628.9 | 2.8878 | -104541.3 | 6.2954 |
| 1900 | 9.0153 | 16165.1 | 70.4220 | 117636.8 | 44864.5 | 18991.0 | 3.0112 | -104654.6 | 5.6270 |
| 2000 | 9.0264 | 17067.1 | 70.8848 | 124702.4 | 45766.6 | 18354.3 | 3.1186 | -104768.6 | 5.0248 |
| 2100 | 9.0369 | 17970.3 | 71.3254 | 131813.1 | 46669.8 | 17718.7 | 3.2125 | -104883.6 | 4.4794 |
| 2200 | 9.0469 | 18874.5 | 71.7460 | 138966.8 | 47573.9 | 17084.1 | 3.2948 | -105000.3 | 3.9830 |
| 2300 | 9.0564 | 19779.7 | 72.1484 | 146161.7 | 48479.1 | 16450.5 | 3.3673 | -105119.0 | 3.5292 |
| 2400 | 9.0655 | 20685.8 | 72.5340 | 153395.9 | 49385.2 | 15817.7 | 3.4312 | -105240.1 | 3.1128 |
| 2500 | 9.0743 | 21592.8 | 72.9043 | 160667.9 | 50292.2 | 15185.9 | 3.4876 | -105363.7 | 2.7293 |
| 2600 | 9.0828 | 22500.6 | 73.2604 | 167976.3 | 51200.1 | ----- | ----- | -105490.2 | 2.3748 |
| 2700 | 9.0912 | 23409.3 | 73.6033 | 175319.6 | 52108.8 | ----- | ----- | -105619.6 | 2.0462 |
| 2800 | 9.0993 | 24318.8 | 73.9341 | 182696.5 | 53018.3 | ----- | ----- | -105752.0 | 1.7407 |
| 2900 | 9.1072 | 25229.2 | 74.2535 | 190106.0 | 53928.6 | ----- | ----- | -105887.5 | 1.4559 |
| 3000 | 9.1150 | 26140.3 | 74.5624 | 197546.9 | 54839.7 | ----- | ----- | -106026.1 | 1.1897 |
| 3100 | 9.1227 | 27052.2 | 74.8614 | 205018.2 | 55751.6 | ----- | ----- | -106167.8 | 0.9404 |
| 3200 | 9.1302 | 27964.8 | 75.1511 | 212518.9 | 56664.2 | ----- | ----- | -106312.4 | 0.7064 |
| 3300 | 9.1376 | 28878.2 | 75.4322 | 220048.1 | 57577.6 | ----- | ----- | -106459.9 | 0.4862 |
| 3400 | 9.1450 | 29792.3 | 75.7051 | 227605.0 | 58491.8 | ----- | ----- | -106610.2 | 0.2787 |
| 3500 | 9.1523 | 30707.2 | 75.9703 | 235188.9 | 59406.6 | ----- | ----- | -106763.1 | 0.0828 |
| 3600 | 9.1595 | 31622.8 | 76.2282 | 242798.9 | 60322.2 | ----- | ----- | -106918.6 | -0.1025 |
| 3700 | 9.1666 | 32539.1 | 76.4793 | 250434.3 | 61238.5 | ----- | ----- | -107076.4 | -0.2781 |
| 3800 | 9.1737 | 33456.1 | 76.7238 | 258094.5 | 62155.6 | ----- | ----- | -107236.5 | -0.4446 |
| 3900 | 9.1807 | 34373.8 | 76.9622 | 265778.9 | 63073.3 | ----- | ----- | -107398.6 | -0.6029 |
| 4000 | 9.1877 | 35292.3 | 77.1948 | 273486.7 | 63991.7 | ----- | ----- | -107562.7 | -0.7534 |
| 4100 | 9.1947 | 36211.4 | 77.4217 | 281217.6 | 64910.8 | ----- | ----- | -107728.4 | -0.8969 |
| 4200 | 9.2016 | 37131.2 | 77.6434 | 288970.9 | 65830.6 | ----- | ----- | -107895.8 | -1.0337 |
| 4300 | 9.2085 | 38051.7 | 77.8600 | 296746.1 | 66751.1 | ----- | ----- | -108064.6 | -1.1644 |
| 4400 | 9.2153 | 38972.9 | 78.0717 | 304542.7 | 67672.3 | ----- | ----- | -108234.7 | -1.2893 |
| 4500 | 9.2221 | 39894.8 | 78.2789 | 312360.3 | 68594.2 | ----- | ----- | -108405.8 | -1.4088 |
| 4600 | 9.2289 | 40817.3 | 78.4817 | 320198.4 | 69516.7 | ----- | ----- | -108578.0 | -1.5234 |
| 4700 | 9.2357 | 41740.5 | 78.6802 | 328056.5 | 70440.0 | ----- | ----- | -108751.0 | -1.6332 |
| 4800 | 9.2424 | 42664.4 | 78.8747 | 335934.3 | 71363.9 | ----- | ----- | -108924.7 | -1.7386 |
| 4900 | 9.2491 | 43589.0 | 79.0654 | 343831.3 | 72288.5 | ----- | ----- | -109098.9 | -1.8399 |
| 5000 | 9.2558 | 44514.3 | 79.2523 | 351747.2 | 73213.7 | ----- | ----- | -109273.7 | -1.9373 |
| 5100 | 9.2625 | 45440.2 | 79.4357 | 359681.7 | 74139.6 | ----- | ----- | -109448.7 | -2.0311 |
| 5200 | 9.2692 | 46366.8 | 79.6156 | 367634.3 | 75066.2 | ----- | ----- | -109624.0 | -2.1213 |
| 5300 | 9.2756 | 47294.0 | 79.7922 | 375604.7 | 75993.4 | ----- | ----- | -109799.3 | -2.2083 |
| 5400 | 9.2825 | 48221.9 | 79.9657 | 383592.6 | 76921.4 | ----- | ----- | -109974.7 | -2.2922 |
| 5500 | 9.2891 | 49150.5 | 80.1360 | 391597.7 | 77849.9 | ----- | ----- | -110150.0 | -2.3732 |
| 5600 | 9.2957 | 50079.7 | 80.3035 | 399619.7 | 78779.2 | ----- | ----- | -110325.2 | -2.4514 |
| 5700 | 9.3023 | 51009.6 | 80.4681 | 407658.3 | 79709.1 | ----- | ----- | -110500.1 | -2.5270 |
| 5800 | 9.3089 | 51940.2 | 80.6299 | 415713.2 | 80639.6 | ----- | ----- | -110674.7 | -2.6001 |
| 5900 | 9.3155 | 52871.4 | 80.7891 | 423784.2 | 81570.9 | ----- | ----- | -110849.0 | -2.6709 |
| 6000 | 9.3221 | 53803.3 | 80.9457 | 431870.9 | 82502.7 | ----- | ----- | -111022.6 | -2.7393 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(179) SCl (gas); molecular weight, 67.523

| T, °K | C _p ^o , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | C | ----- | 0 | 29792.7 | 31943.2 | ----- | -625C8.6 | ----- |
| 100 | 7.0186 | 656.2 | 49.0463 | 4208.4 | 30489.0 | 32126.7 | -65.09C3 | -628C8.4 | 133.1009 |
| 200 | 7.6555 | 1427.3 | 54.0875 | 9390.2 | 31220.0 | 32102.4 | -29.9851 | -63113.7 | 64.3409 |
| 298.15 | 8.1925 | 2207.2 | 57.2534 | 14862.9 | 32000.0 | 32000.0 | -18.4520 | -63351.4 | 41.5939 |
| 300 | 8.2000 | 2222.4 | 57.3041 | 14968.8 | 32015.2 | 31957.7 | -18.3075 | -63356.4 | 41.3074 |
| 400 | 8.5103 | 3059.4 | 59.7098 | 20824.5 | 32852.1 | 31321.6 | -12.5031 | -63650.8 | 29.7405 |
| 500 | 8.6529 | 3920.3 | 61.6301 | 26894.8 | 33713.0 | 30817.6 | -9.1047 | -63880.2 | 22.7736 |
| 600 | 8.8101 | 4755.8 | 63.2260 | 33139.8 | 34588.6 | 30401.9 | -6.8744 | -64087.6 | 18.1129 |
| 700 | 8.8920 | 5681.1 | 64.5906 | 39532.3 | 35473.9 | 30048.1 | -5.3015 | -64276.1 | 14.7735 |
| 800 | 8.9535 | 6573.5 | 65.7822 | 46052.2 | 36366.3 | 29727.5 | -4.1349 | -64448.1 | 12.2619 |
| 900 | 9.0025 | 7471.4 | 66.8396 | 52684.3 | 37264.2 | 29410.7 | -3.2372 | -64606.2 | 10.3034 |
| 1000 | 9.0435 | 8373.8 | 67.7903 | 59416.6 | 38166.5 | 29096.5 | -2.5267 | -64752.3 | 8.7329 |
| 1100 | 9.0791 | 9279.9 | 68.6540 | 66239.4 | 39072.7 | 28784.4 | -1.9516 | -64888.1 | 7.4451 |
| 1200 | 9.1110 | 10189.5 | 69.4453 | 73144.9 | 39982.2 | 28474.3 | -1.4776 | -65015.2 | 6.3698 |
| 1300 | 9.1402 | 11102.0 | 70.1758 | 80126.5 | 40894.8 | 28166.0 | -1.0808 | -65134.6 | 5.4582 |
| 1400 | 9.1675 | 12017.4 | 70.8542 | 87178.4 | 41810.2 | 27855.5 | -0.7444 | -65247.5 | 4.6754 |
| 1500 | 9.1933 | 12935.5 | 71.4875 | 94295.8 | 42728.2 | 27554.6 | -0.4560 | -65354.6 | 3.9958 |
| 1600 | 9.2180 | 13856.1 | 72.0816 | 101474.6 | 43648.8 | 27251.3 | -0.2065 | -65456.9 | 3.4003 |
| 1700 | 9.2418 | 14779.1 | 72.6412 | 108711.0 | 44571.8 | 26945.6 | 0.0113 | -65554.9 | 2.8740 |
| 1800 | 9.2650 | 15704.4 | 73.1701 | 116001.8 | 45497.2 | 26645.4 | 0.2027 | -65649.3 | 2.4055 |
| 1900 | 9.2876 | 16632.0 | 73.6717 | 123344.1 | 46424.8 | 26350.7 | 0.3721 | -65740.7 | 1.9857 |
| 2000 | 9.3098 | 17561.9 | 74.1486 | 130735.3 | 47354.7 | 26053.4 | 0.5228 | -65829.5 | 1.6073 |
| 2100 | 9.3316 | 18494.0 | 74.6034 | 138173.1 | 48286.7 | 25757.6 | 0.6576 | -65916.1 | 1.2646 |
| 2200 | 9.3531 | 19428.2 | 75.0380 | 145655.3 | 49221.0 | 25463.2 | 0.7787 | -66000.9 | 0.9526 |
| 2300 | 9.3744 | 20364.6 | 75.4542 | 153180.1 | 50157.3 | 25170.3 | 0.8881 | -66084.2 | 0.6674 |
| 2400 | 9.3954 | 21303.1 | 75.8536 | 160745.6 | 51095.8 | 24878.8 | 0.9872 | -66166.2 | 0.4056 |
| 2500 | 9.4163 | 22243.7 | 76.2376 | 168350.3 | 52036.4 | 24586.6 | 1.0773 | -66247.2 | 0.1644 |
| 2600 | 9.4370 | 23186.3 | 76.6073 | 175992.6 | 52979.1 | | | -66327.3 | -0.0584 |
| 2700 | 9.4577 | 24131.1 | 76.9638 | 183671.3 | 53923.8 | | | -66406.7 | -0.2651 |
| 2800 | 9.4782 | 25077.9 | 77.3082 | 191385.0 | 54870.6 | | | -66485.4 | -0.4571 |
| 2900 | 9.4986 | 26026.7 | 77.6411 | 199132.5 | 55819.5 | | | -66563.5 | -0.6362 |
| 3000 | 9.5189 | 26977.6 | 77.9635 | 206912.8 | 56770.3 | | | -66641.2 | -0.8035 |
| 3100 | 9.5392 | 27930.5 | 78.2759 | 214724.9 | 57723.2 | | | -66718.3 | -0.9602 |
| 3200 | 9.5593 | 28885.4 | 78.5791 | 222567.7 | 58678.2 | | | -66794.8 | -1.1072 |
| 3300 | 9.5795 | 29842.4 | 78.8736 | 230440.4 | 59635.1 | | | -66870.9 | -1.2455 |
| 3400 | 9.5996 | 30801.3 | 79.1598 | 238342.2 | 60594.1 | | | -66946.4 | -1.3759 |
| 3500 | 9.6196 | 31762.3 | 79.4384 | 246272.1 | 61555.0 | | | -67021.3 | -1.4989 |
| 3600 | 9.6396 | 32725.2 | 79.7097 | 254229.6 | 62518.0 | | | -67095.5 | -1.6152 |
| 3700 | 9.6596 | 33690.2 | 79.9741 | 262213.8 | 63482.9 | | | -67169.1 | -1.7253 |
| 3800 | 9.6795 | 34657.1 | 80.2319 | 270224.2 | 64449.9 | | | -67241.9 | -1.8298 |
| 3900 | 9.6994 | 35626.1 | 80.4836 | 278260.0 | 65418.8 | | | -67313.9 | -1.9290 |
| 4000 | 9.7193 | 36597.0 | 80.7294 | 286320.7 | 66385.8 | | | -67385.1 | -2.0233 |
| 4100 | 9.7392 | 37570.0 | 80.9697 | 294405.7 | 67362.7 | | | -67455.2 | -2.1132 |
| 4200 | 9.7590 | 38544.9 | 81.2046 | 302514.5 | 68337.6 | | | -67524.4 | -2.1988 |
| 4300 | 9.7789 | 39521.8 | 81.4345 | 310646.5 | 69314.5 | | | -67592.4 | -2.2806 |
| 4400 | 9.7987 | 40500.6 | 81.6595 | 318801.2 | 70293.4 | | | -67659.4 | -2.3587 |
| 4500 | 9.8185 | 41481.5 | 81.8799 | 326978.2 | 71274.2 | | | -67725.1 | -2.4334 |
| 4600 | 9.8382 | 42464.3 | 82.0960 | 335177.1 | 72257.1 | | | -67789.5 | -2.5049 |
| 4700 | 9.8580 | 43449.1 | 82.3078 | 343397.3 | 73241.9 | | | -67852.5 | -2.5735 |
| 4800 | 9.8777 | 44435.9 | 82.5155 | 351638.5 | 74226.7 | | | -67914.2 | -2.6393 |
| 4900 | 9.8975 | 45424.7 | 82.7194 | 359900.3 | 75217.4 | | | -67974.4 | -2.7024 |
| 5000 | 9.9172 | 46415.4 | 82.9195 | 368182.2 | 76208.2 | | | -68033.1 | -2.7630 |
| 5100 | 9.9369 | 47408.1 | 83.1161 | 376484.0 | 77200.9 | | | -68090.2 | -2.8214 |
| 5200 | 9.9566 | 48402.8 | 83.3093 | 384805.3 | 78195.6 | | | -68145.7 | -2.8775 |
| 5300 | 9.9764 | 49359.5 | 83.4991 | 393145.8 | 79192.2 | | | -68199.6 | -2.9316 |
| 5400 | 9.9960 | 50358.1 | 83.6858 | 401505.1 | 80190.8 | | | -68251.7 | -2.9837 |
| 5500 | 10.0157 | 51398.7 | 83.8694 | 409882.8 | 81191.4 | | | -68302.0 | -3.0339 |
| 5600 | 10.0354 | 52401.2 | 84.0500 | 418278.8 | 82194.0 | | | -68350.6 | -3.0824 |
| 5700 | 10.0551 | 53405.8 | 84.2278 | 426692.7 | 83198.5 | | | -68397.4 | -3.1292 |
| 5800 | 10.0748 | 54412.2 | 84.4029 | 435124.3 | 84205.0 | | | -68442.2 | -3.1744 |
| 5900 | 10.0944 | 55420.7 | 84.5752 | 443573.2 | 85213.5 | | | -68485.3 | -3.2181 |
| 6000 | 10.1141 | 56431.1 | 84.7451 | 452039.3 | 86222.5 | | | -68526.3 | -3.2604 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(180) SCl_2 (gas); molecular weight, 102.980

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -8123.5 | -4876.3 | ----- | -121876.6 | ----- |
| 100 | 9.0587 | 827.9 | 55.6851 | 4740.6 | -7295.6 | -4905.1 | 12.3647 | -126541.4 | 270.7837 |
| 200 | 10.9664 | 1832.1 | 62.5684 | 10681.6 | -6291.4 | -5023.1 | 6.9545 | -129072.7 | 130.0914 |
| 298.15 | 12.1691 | 2973.5 | 67.1958 | 17060.9 | -5150.0 | -5150.0 | 5.1281 | -129492.1 | 83.5947 |
| 300 | 12.1853 | 2996.0 | 67.2711 | 17185.3 | -5127.5 | -5152.5 | 5.1047 | -129499.3 | 83.0094 |
| 400 | 12.8251 | 4249.9 | 70.8739 | 24099.6 | -3873.6 | -5826.3 | 4.1434 | -129867.1 | 59.3545 |
| 500 | 13.1767 | 5551.6 | 73.7771 | 31336.9 | -2571.9 | -6316.5 | 3.4833 | -130196.6 | 45.1870 |
| 600 | 13.3850 | 6860.6 | 76.1995 | 38839.1 | -1243.0 | -6713.2 | 3.0051 | -130495.1 | 35.6923 |
| 700 | 13.5172 | 8226.1 | 78.2734 | 46565.3 | 102.6 | -7046.0 | 2.6514 | -130766.9 | 28.8954 |
| 800 | 13.6057 | 9582.5 | 80.0845 | 54485.1 | 1459.0 | -7345.3 | 2.3708 | -131015.6 | 23.7875 |
| 900 | 13.6676 | 10946.4 | 81.6908 | 62575.4 | 2822.9 | -7641.3 | 2.1435 | -131244.8 | 19.8074 |
| 1000 | 13.7126 | 12315.5 | 83.1333 | 70817.8 | 4192.0 | -7936.0 | 1.9545 | -131457.4 | 16.6180 |
| 1100 | 13.7463 | 13688.5 | 84.4419 | 79197.6 | 5565.0 | -8230.1 | 1.7940 | -131656.0 | 14.0044 |
| 1200 | 13.7721 | 15064.5 | 85.6391 | 87702.5 | 6941.0 | -8523.9 | 1.6554 | -131843.0 | 11.8232 |
| 1300 | 13.7923 | 16442.8 | 86.7423 | 96322.3 | 8315.2 | -8818.0 | 1.5340 | -132020.2 | 9.9750 |
| 1400 | 13.8084 | 17822.8 | 87.7651 | 105048.3 | 9695.3 | -9112.4 | 1.4264 | -132189.2 | 8.3887 |
| 1500 | 13.8214 | 19204.3 | 88.7182 | 113873.0 | 11080.8 | -9407.3 | 1.3301 | -132351.5 | 7.0123 |
| 1600 | 13.8321 | 20587.0 | 89.6106 | 122789.9 | 12463.5 | -9702.9 | 1.2431 | -132508.2 | 5.8064 |
| 1700 | 13.8410 | 21970.7 | 90.4494 | 131793.3 | 13847.2 | -9999.3 | 1.1635 | -132660.3 | 4.7411 |
| 1800 | 13.8485 | 23355.2 | 91.2408 | 140878.2 | 15231.7 | -10296.5 | 1.0915 | -132808.9 | 3.7932 |
| 1900 | 13.8549 | 24740.4 | 91.9897 | 150040.0 | 16616.9 | -10594.7 | 1.0248 | -132954.5 | 2.9441 |
| 2000 | 13.8603 | 26126.1 | 92.7005 | 159274.8 | 18002.6 | -10893.8 | 0.9630 | -133098.1 | 2.1790 |
| 2100 | 13.8649 | 27512.4 | 93.3768 | 168579.0 | 19388.9 | -11193.8 | 0.9055 | -133240.1 | 1.4861 |
| 2200 | 13.8690 | 28899.1 | 94.0219 | 177949.2 | 20775.6 | -11494.9 | 0.8515 | -133381.0 | 0.8555 |
| 2300 | 13.8725 | 30286.2 | 94.6385 | 187382.4 | 22162.7 | -11797.1 | 0.8016 | -133521.3 | 0.2792 |
| 2400 | 13.8756 | 31673.6 | 95.2290 | 196876.0 | 23550.1 | -12100.3 | 0.7543 | -133661.3 | -0.2497 |
| 2500 | 13.8784 | 33061.3 | 95.7955 | 206427.4 | 24937.8 | -12404.6 | 0.7097 | -133801.5 | -0.7368 |
| 2600 | 13.8808 | 34449.3 | 96.3399 | 216034.4 | 26325.8 | | | -133941.9 | -1.1869 |
| 2700 | 13.8830 | 35837.5 | 96.8638 | 225694.7 | 27713.9 | | | -134082.9 | -1.6041 |
| 2800 | 13.8849 | 37225.9 | 97.3687 | 235406.5 | 29102.3 | | | -134224.5 | -1.9919 |
| 2900 | 13.8867 | 38614.4 | 97.8560 | 245167.9 | 30490.9 | | | -134367.0 | -2.3533 |
| 3000 | 13.8883 | 40003.2 | 98.3268 | 254977.1 | 31879.7 | | | -134510.4 | -2.6910 |
| 3100 | 13.8897 | 41392.1 | 98.7822 | 264832.7 | 33268.6 | | | -134654.7 | -3.0073 |
| 3200 | 13.8910 | 42781.1 | 99.2232 | 274733.1 | 34657.6 | | | -134800.1 | -3.3041 |
| 3300 | 13.8922 | 44170.3 | 99.6507 | 284676.9 | 36046.8 | | | -134946.4 | -3.5832 |
| 3400 | 13.8933 | 45559.6 | 100.0654 | 294662.8 | 37436.0 | | | -135093.9 | -3.8462 |
| 3500 | 13.8942 | 46948.9 | 100.4681 | 304689.6 | 38825.4 | | | -135242.3 | -4.0944 |
| 3600 | 13.8951 | 48338.4 | 100.8596 | 314756.0 | 40214.9 | | | -135391.8 | -4.3291 |
| 3700 | 13.8960 | 49728.0 | 101.2403 | 324861.1 | 41604.4 | | | -135542.2 | -4.5514 |
| 3800 | 13.8968 | 51117.6 | 101.6109 | 335003.8 | 42994.1 | | | -135693.5 | -4.7622 |
| 3900 | 13.8975 | 52507.3 | 101.9719 | 345183.0 | 44383.8 | | | -135845.8 | -4.9624 |
| 4000 | 13.8981 | 53897.1 | 102.3237 | 355397.8 | 45773.6 | | | -135998.9 | -5.1528 |
| 4100 | 13.8987 | 55286.9 | 102.6669 | 365647.4 | 47163.4 | | | -136152.8 | -5.3341 |
| 4200 | 13.8993 | 56676.8 | 103.0018 | 375930.9 | 48553.3 | | | -136307.4 | -5.5070 |
| 4300 | 13.8998 | 58066.8 | 103.3289 | 386247.5 | 49943.3 | | | -136462.8 | -5.6720 |
| 4400 | 13.9003 | 59456.8 | 103.6485 | 396596.5 | 51333.3 | | | -136618.7 | -5.8298 |
| 4500 | 13.9008 | 60846.8 | 103.9609 | 406977.0 | 52723.3 | | | -136775.2 | -5.9806 |
| 4600 | 13.9012 | 62236.9 | 104.2664 | 417388.4 | 54113.4 | | | -136932.3 | -6.1251 |
| 4700 | 13.9016 | 63627.1 | 104.5653 | 427830.0 | 55503.6 | | | -137089.8 | -6.2636 |
| 4800 | 13.9020 | 65017.3 | 104.8580 | 438301.3 | 56893.8 | | | -137247.7 | -6.3965 |
| 4900 | 13.9024 | 66407.5 | 105.1447 | 448801.4 | 58284.0 | | | -137406.0 | -6.5241 |
| 5000 | 13.9027 | 67797.7 | 105.4256 | 459330.0 | 59674.2 | | | -137564.6 | -6.6467 |
| 5100 | 13.9030 | 69188.0 | 105.7009 | 469886.4 | 61064.5 | | | -137723.5 | -6.7647 |
| 5200 | 13.9033 | 70578.3 | 105.9708 | 480470.0 | 62454.8 | | | -137882.7 | -6.8782 |
| 5300 | 13.9036 | 71968.7 | 106.2357 | 491080.4 | 63845.2 | | | -138042.0 | -6.9876 |
| 5400 | 13.9038 | 73359.1 | 106.4956 | 501717.0 | 65235.5 | | | -138201.4 | -7.0931 |
| 5500 | 13.9041 | 74749.5 | 106.7507 | 512379.3 | 66625.9 | | | -138361.0 | -7.1949 |
| 5600 | 13.9043 | 76139.9 | 107.0012 | 523067.0 | 68016.4 | | | -138520.6 | -7.2931 |
| 5700 | 13.9046 | 77530.3 | 107.2473 | 533779.4 | 69406.8 | | | -138680.3 | -7.3880 |
| 5800 | 13.9048 | 78920.8 | 107.4892 | 544516.3 | 70797.3 | | | -138840.0 | -7.4797 |
| 5900 | 13.9050 | 80311.3 | 107.7268 | 555277.1 | 72187.8 | | | -138999.7 | -7.5684 |
| 6000 | 13.9052 | 81701.8 | 107.9606 | 566061.5 | 73578.3 | | | -139159.4 | -7.6543 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
(181) S_2Cl_2 (gas); molecular weight, 135.046

| T, °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| C | ----- | 0 | ----- | 0 | -8692.6 | -4391.7 | ----- | -193295.3 | ----- |
| 100 | 11.6950 | 937.5 | 60.4964 | 5112.1 | -7755.0 | -4479.5 | 11.8117 | -194349.7 | 408.1942 |
| 200 | 15.5106 | 2315.2 | 69.8916 | 11663.1 | -6377.4 | -4612.7 | 6.8598 | -195044.8 | 195.5118 |
| 298.15 | 17.4169 | 3942.6 | 76.4866 | 18861.9 | -4750.0 | -4750.0 | 5.1797 | -195532.9 | 125.2716 |
| 300 | 17.4411 | 3974.8 | 76.5944 | 19003.5 | -4717.8 | -4752.8 | 5.1580 | -195540.9 | 124.3878 |
| 400 | 18.3746 | 5770.8 | 81.7549 | 26931.1 | -2921.7 | -5982.9 | 4.2562 | -195927.5 | 88.7435 |
| 500 | 18.8702 | 7635.5 | 85.9136 | 35321.4 | -1057.1 | -6848.0 | 3.5614 | -196243.5 | 67.3181 |
| 600 | 19.1589 | 9538.1 | 89.3818 | 44091.0 | 845.6 | -7527.7 | 3.0384 | -196506.8 | 53.0131 |
| 700 | 19.3402 | 11463.7 | 92.3498 | 53181.1 | 2771.2 | -8080.5 | 2.6326 | -196728.7 | 42.7826 |
| 800 | 19.4609 | 13404.2 | 94.9407 | 62548.4 | 4711.6 | -8566.1 | 2.3081 | -196917.2 | 35.1017 |
| 900 | 19.5450 | 15354.7 | 97.2380 | 72159.5 | 6662.1 | -9044.8 | 2.0412 | -197078.5 | 29.1223 |
| 1000 | 19.6060 | 17312.4 | 99.3006 | 81988.2 | 8619.8 | -9520.3 | 1.8160 | -197217.8 | 24.3351 |
| 1100 | 19.6514 | 19275.4 | 101.1714 | 92013.2 | 10582.8 | -9993.8 | 1.6223 | -197338.8 | 20.4158 |
| 1200 | 19.6862 | 21242.3 | 102.8829 | 102217.2 | 12549.8 | -10466.1 | 1.4530 | -197445.0 | 17.1478 |
| 1300 | 19.7134 | 23212.4 | 104.4598 | 112585.3 | 14519.8 | -10937.7 | 1.3032 | -197539.0 | 14.3811 |
| 1400 | 19.7351 | 25184.8 | 105.9215 | 123105.3 | 16492.3 | -11409.1 | 1.1691 | -197623.0 | 12.0086 |
| 1500 | 19.7527 | 27159.3 | 107.2837 | 133766.3 | 18466.7 | -11880.6 | 1.0479 | -197699.0 | 9.9517 |
| 1600 | 19.7671 | 29135.3 | 108.5590 | 144559.1 | 20442.7 | -12352.3 | 0.9377 | -197768.6 | 8.1511 |
| 1700 | 19.7790 | 31112.6 | 109.7577 | 155475.6 | 22420.0 | -12824.4 | 0.8366 | -197833.4 | 6.5619 |
| 1800 | 19.7891 | 33091.0 | 110.8886 | 166508.4 | 24398.5 | -13297.1 | 0.7433 | -197894.5 | 5.1488 |
| 1900 | 19.7976 | 35070.4 | 111.9587 | 177651.2 | 26377.8 | -13770.5 | 0.6569 | -197953.2 | 3.8841 |
| 2000 | 19.8049 | 37050.5 | 112.9744 | 188898.3 | 28357.9 | -14244.6 | 0.5763 | -198010.3 | 2.7455 |
| 2100 | 19.8111 | 39031.3 | 113.9408 | 200244.5 | 30338.7 | -14719.5 | 0.5010 | -198066.9 | 1.7150 |
| 2200 | 19.8166 | 41012.7 | 114.8626 | 211685.0 | 32320.1 | -15195.3 | 0.4303 | -198123.6 | 0.7780 |
| 2300 | 19.8213 | 42994.6 | 115.7436 | 223215.6 | 34302.0 | -15672.1 | 0.3636 | -198181.0 | -0.0779 |
| 2400 | 19.8255 | 44976.9 | 116.5873 | 234832.5 | 36284.4 | -16149.8 | 0.3006 | -198239.7 | -0.8626 |
| 2500 | 19.8292 | 46959.7 | 117.3966 | 246532.0 | 38267.1 | -16628.4 | 0.2409 | -198300.1 | -1.5847 |
| 2600 | 19.8324 | 48942.7 | 118.1744 | 258310.8 | 40250.2 | -17119.5 | 0.1853 | -198362.6 | -2.2516 |
| 2700 | 19.8353 | 50926.1 | 118.9230 | 270165.9 | 42233.6 | -17619.5 | 0.1366 | -198427.4 | -2.8692 |
| 2800 | 19.8379 | 52909.8 | 119.6444 | 282094.4 | 44217.2 | -18119.5 | 0.0933 | -198494.8 | -3.4429 |
| 2900 | 19.8403 | 54893.7 | 120.3406 | 294093.9 | 46201.2 | -18619.5 | 0.0566 | -198564.8 | -3.9712 |
| 3000 | 19.8424 | 56877.9 | 121.0132 | 306161.8 | 48185.3 | -19119.5 | 0.0240 | -198637.7 | -4.4761 |
| 3100 | 19.8443 | 58862.2 | 121.6639 | 318295.8 | 50169.6 | -19619.5 | 0.0000 | -198713.3 | -4.9429 |
| 3200 | 19.8461 | 60846.7 | 122.2939 | 330493.9 | 52154.2 | -20119.5 | 0.0000 | -198791.8 | -5.3888 |
| 3300 | 19.8476 | 62831.4 | 122.9047 | 342754.0 | 54138.8 | -20619.5 | 0.0000 | -198873.1 | -5.7923 |
| 3400 | 19.8491 | 64816.2 | 123.4972 | 355074.2 | 56123.7 | -21119.5 | 0.0000 | -198957.2 | -6.1797 |
| 3500 | 19.8504 | 66801.2 | 124.0726 | 367452.8 | 58108.7 | -21619.5 | 0.0000 | -199044.0 | -6.5452 |
| 3600 | 19.8516 | 68786.3 | 124.6318 | 379888.2 | 60093.8 | -22119.5 | 0.0000 | -199133.3 | -6.8905 |
| 3700 | 19.8527 | 70771.5 | 125.1757 | 392378.7 | 62079.0 | -22619.5 | 0.0000 | -199225.1 | -7.2172 |
| 3800 | 19.8538 | 72756.9 | 125.7052 | 404922.8 | 64064.3 | -23119.5 | 0.0000 | -199319.4 | -7.5270 |
| 3900 | 19.8547 | 74742.3 | 126.2209 | 417519.2 | 66049.7 | -23619.5 | 0.0000 | -199415.8 | -7.8210 |
| 4000 | 19.8556 | 76727.8 | 126.7236 | 430166.6 | 68035.2 | -24119.5 | 0.0000 | -199514.4 | -8.1004 |
| 4100 | 19.8564 | 78713.4 | 127.2139 | 442863.6 | 70020.8 | -24619.5 | 0.0000 | -199615.0 | -8.3653 |
| 4200 | 19.8572 | 80699.1 | 127.6924 | 455609.0 | 72006.5 | -25119.5 | 0.0000 | -199717.5 | -8.6197 |
| 4300 | 19.8579 | 82684.8 | 128.1596 | 468401.7 | 73992.3 | -25619.5 | 0.0000 | -199821.6 | -8.8615 |
| 4400 | 19.8585 | 84670.7 | 128.6162 | 481240.5 | 75978.1 | -26119.5 | 0.0000 | -199927.4 | -9.0923 |
| 4500 | 19.8592 | 86656.5 | 129.0625 | 494124.5 | 77964.0 | -26619.5 | 0.0000 | -200034.6 | -9.3131 |
| 4600 | 19.8597 | 88642.5 | 129.4990 | 507052.7 | 79949.9 | -27119.5 | 0.0000 | -200143.2 | -9.5243 |
| 4700 | 19.8603 | 90628.5 | 129.9261 | 520024.0 | 81935.9 | -27619.5 | 0.0000 | -200252.9 | -9.7257 |
| 4800 | 19.8608 | 92614.5 | 130.3442 | 533037.6 | 83922.0 | -28119.5 | 0.0000 | -200363.8 | -9.9207 |
| 4900 | 19.8613 | 94600.6 | 130.7537 | 546092.6 | 85908.1 | -28619.5 | 0.0000 | -200475.6 | -10.1069 |
| 5000 | 19.8617 | 96586.8 | 131.1550 | 559188.1 | 87894.2 | -29119.5 | 0.0000 | -200588.3 | -10.2858 |
| 5100 | 19.8621 | 98573.0 | 131.5483 | 572323.3 | 89880.4 | -29619.5 | 0.0000 | -200701.8 | -10.4578 |
| 5200 | 19.8625 | 100559.2 | 131.9340 | 585497.5 | 91866.7 | -30119.5 | 0.0000 | -200815.9 | -10.6232 |
| 5300 | 19.8629 | 102545.5 | 132.3123 | 598709.9 | 93852.9 | -30619.5 | 0.0000 | -200930.6 | -10.7825 |
| 5400 | 19.8633 | 104531.8 | 132.6836 | 611959.7 | 95839.2 | -31119.5 | 0.0000 | -201045.8 | -10.9359 |
| 5500 | 19.8636 | 106518.1 | 133.0481 | 625246.4 | 97825.6 | -31619.5 | 0.0000 | -201161.3 | -11.0839 |
| 5600 | 19.8639 | 108504.5 | 133.4060 | 638569.1 | 99812.0 | -32119.5 | 0.0000 | -201277.2 | -11.2267 |
| 5700 | 19.8642 | 110490.9 | 133.7576 | 651927.3 | 101798.4 | -32619.5 | 0.0000 | -201393.4 | -11.3645 |
| 5800 | 19.8645 | 112477.4 | 134.1031 | 665320.4 | 103784.8 | -33119.5 | 0.0000 | -201509.7 | -11.4977 |
| 5900 | 19.8648 | 114463.8 | 134.4426 | 678747.8 | 105771.3 | -33619.5 | 0.0000 | -201626.1 | -11.6264 |
| 6000 | 19.8650 | 116450.3 | 134.7765 | 692208.8 | 107757.8 | -34119.5 | 0.0000 | -201742.6 | -11.7509 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(182) SF (gas); molecular weight, 51.066

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 5166.7 | 7275.2 | ----- | -76983.3 | ----- |
| 100 | 6.9589 | 695.1 | 46.5503 | 3959.9 | 5861.8 | 7458.2 | -11.2385 | -77285.8 | 164.5964 |
| 200 | 7.1361 | 1396.8 | 51.4072 | 8884.7 | 6563.4 | 7417.2 | -3.0933 | -77647.4 | 79.9999 |
| 298.15 | 7.5597 | 2117.3 | 54.3330 | 14082.0 | 7284.0 | 7284.0 | -0.4444 | -78015.0 | 52.0109 |
| 300 | 7.5678 | 2131.3 | 54.3797 | 14182.6 | 7298.0 | 7281.1 | -0.4117 | -78021.5 | 51.6582 |
| a 400 | 7.9607 | 2908.7 | 56.6133 | 19736.6 | 8075.3 | 6574.9 | 0.8889 | -78345.3 | 37.4217 |
| 500 | 8.2433 | 3719.7 | 58.4219 | 25491.2 | 8886.4 | 6045.4 | 1.5819 | -78615.7 | 28.8469 |
| 600 | 8.4391 | 4554.4 | 59.9432 | 31411.5 | 9721.1 | 5607.6 | 2.0069 | -78844.5 | 23.1119 |
| 700 | 8.5772 | 5405.6 | 61.2551 | 37472.9 | 10572.3 | 5233.7 | 2.2892 | -79042.7 | 19.0044 |
| 800 | 8.6777 | 6268.6 | 62.4073 | 43657.2 | 11435.3 | 4894.3 | 2.4871 | -79218.5 | 15.9164 |
| 900 | 8.7534 | 7140.4 | 63.4340 | 49950.2 | 12307.0 | 4559.3 | 2.6307 | -79377.5 | 13.5096 |
| 1000 | 8.8123 | 8018.8 | 64.3594 | 56340.6 | 13185.4 | 4226.7 | 2.7375 | -79523.6 | 11.5804 |
| 1100 | 8.8596 | 8902.4 | 65.2016 | 62819.3 | 14069.1 | 3896.1 | 2.8183 | -79659.7 | 9.9992 |
| 1200 | 8.8986 | 9790.4 | 65.9742 | 69378.7 | 14957.1 | 3566.9 | 2.8802 | -79787.8 | 8.6793 |
| 1300 | 8.9315 | 10682.0 | 66.6878 | 76102.2 | 15848.6 | 3238.8 | 2.9279 | -79909.4 | 7.5607 |
| 1400 | 8.9600 | 11576.6 | 67.3508 | 82714.5 | 16743.2 | 2911.6 | 2.9649 | -80025.9 | 6.6005 |
| 1500 | 8.9850 | 12473.8 | 67.9698 | 89480.9 | 17640.5 | 2585.2 | 2.9935 | -80138.0 | 5.7671 |
| 1600 | 9.0074 | 13373.5 | 68.5504 | 96307.2 | 18540.1 | 2259.5 | 3.0156 | -80246.8 | 5.0369 |
| 1700 | 9.0277 | 14275.2 | 69.0971 | 103189.9 | 19441.9 | 1934.2 | 3.0325 | -80352.8 | 4.3917 |
| 1800 | 9.0464 | 15179.0 | 69.6137 | 110125.6 | 20345.6 | 1609.4 | 3.0452 | -80456.8 | 3.8175 |
| 1900 | 9.0638 | 16084.5 | 70.1032 | 117111.7 | 21251.1 | 1284.9 | 3.0544 | -80559.0 | 3.3031 |
| 2000 | 9.0801 | 16991.7 | 70.5686 | 124145.5 | 22158.3 | 960.8 | 3.0609 | -80660.2 | 2.8395 |
| 2100 | 9.0955 | 17900.5 | 71.0120 | 131224.7 | 23067.1 | 637.0 | 3.0651 | -80760.5 | 2.4195 |
| 2200 | 9.1102 | 18810.8 | 71.4354 | 138347.2 | 23977.4 | 313.5 | 3.0673 | -80850.3 | 2.0373 |
| 2300 | 9.1243 | 19722.5 | 71.8407 | 145511.2 | 24889.1 | -9.9 | 3.0680 | -80960.0 | 1.6878 |
| 2400 | 9.1380 | 20635.6 | 72.2293 | 152714.8 | 25802.3 | -333.0 | 3.0673 | -81059.8 | 1.3671 |
| 2500 | 9.1511 | 21550.1 | 72.6026 | 159956.5 | 26716.7 | -655.9 | 3.0655 | -81159.7 | 1.0717 |
| 2600 | 9.1640 | 22465.8 | 72.9618 | 167234.8 | 27632.5 | | | -81260.0 | 0.7986 |
| 2700 | 9.1765 | 23382.8 | 73.3079 | 174548.4 | 28549.5 | | | -81360.8 | 0.5455 |
| 2800 | 9.1887 | 24301.1 | 73.6418 | 181896.0 | 29467.8 | | | -81462.2 | 0.3102 |
| 2900 | 9.2007 | 25220.6 | 73.9645 | 189276.4 | 30387.2 | | | -81564.2 | 0.0908 |
| 3000 | 9.2125 | 26141.2 | 74.2766 | 196688.6 | 31307.9 | | | -81666.8 | -0.1142 |
| 3100 | 9.2241 | 27063.1 | 74.5789 | 204131.4 | 32229.7 | | | -81770.0 | -0.3062 |
| 3200 | 9.2356 | 27986.0 | 74.8719 | 211604.0 | 33152.7 | | | -81873.9 | -0.4865 |
| 3300 | 9.2469 | 28910.2 | 75.1563 | 219105.5 | 34076.8 | | | -81978.3 | -0.6560 |
| 3400 | 9.2581 | 29835.4 | 75.4325 | 226635.0 | 35002.1 | | | -82083.3 | -0.8158 |
| 3500 | 9.2692 | 30761.8 | 75.7010 | 234191.7 | 35928.4 | | | -82188.9 | -0.9667 |
| 3600 | 9.2802 | 31689.3 | 75.9623 | 241775.0 | 36855.9 | | | -82294.9 | -1.1093 |
| 3700 | 9.2911 | 32617.8 | 76.2167 | 249384.0 | 37784.5 | | | -82401.3 | -1.2444 |
| 3800 | 9.3019 | 33547.5 | 76.4646 | 257018.1 | 38714.1 | | | -82508.0 | -1.3726 |
| 3900 | 9.3127 | 34478.2 | 76.7064 | 264676.7 | 39644.9 | | | -82614.9 | -1.4943 |
| 4000 | 9.3234 | 35410.0 | 76.9423 | 272359.2 | 40576.7 | | | -82722.1 | -1.6101 |
| 4100 | 9.3340 | 36342.9 | 77.1726 | 280065.0 | 41509.5 | | | -82829.3 | -1.7204 |
| 4200 | 9.3446 | 37276.8 | 77.3977 | 287793.5 | 42443.5 | | | -82936.6 | -1.8256 |
| 4300 | 9.3551 | 38211.8 | 77.6177 | 295544.3 | 43378.4 | | | -83043.9 | -1.9260 |
| 4400 | 9.3656 | 39147.8 | 77.8329 | 303316.9 | 44314.5 | | | -83151.1 | -2.0220 |
| 4500 | 9.3761 | 40084.9 | 78.0435 | 311110.8 | 45251.6 | | | -83258.0 | -2.1138 |
| 4600 | 9.3865 | 41023.0 | 78.2497 | 318925.5 | 46189.7 | | | -83364.8 | -2.2018 |
| 4700 | 9.3969 | 41962.2 | 78.4517 | 326760.6 | 47128.9 | | | -83471.2 | -2.2861 |
| 4800 | 9.4073 | 42902.4 | 78.6496 | 334615.6 | 48069.1 | | | -83577.2 | -2.3670 |
| 4900 | 9.4176 | 43843.7 | 78.8437 | 342490.3 | 49013.3 | | | -83682.8 | -2.4447 |
| 5000 | 9.4279 | 44785.9 | 79.0340 | 350384.3 | 49952.6 | | | -83787.9 | -2.5194 |
| 5100 | 9.4382 | 45729.3 | 79.2208 | 358297.0 | 50895.9 | | | -83892.4 | -2.5913 |
| 5200 | 9.4485 | 46673.6 | 79.4042 | 366228.3 | 51840.2 | | | -83996.4 | -2.6605 |
| 5300 | 9.4587 | 47618.9 | 79.5843 | 374177.8 | 52785.6 | | | -84099.7 | -2.7271 |
| 5400 | 9.4689 | 48565.3 | 79.7612 | 382145.1 | 53732.0 | | | -84202.3 | -2.7914 |
| 5500 | 9.4791 | 49512.7 | 79.9350 | 390129.9 | 54679.4 | | | -84304.1 | -2.8534 |
| 5600 | 9.4893 | 50461.2 | 80.1059 | 398132.0 | 55627.8 | | | -84405.2 | -2.9132 |
| 5700 | 9.4995 | 51410.6 | 80.2740 | 406151.0 | 56577.3 | | | -84505.4 | -2.9710 |
| 5800 | 9.5097 | 52361.1 | 80.4393 | 414186.7 | 57527.7 | | | -84604.8 | -3.0269 |
| 5900 | 9.5198 | 53312.5 | 80.6019 | 422238.8 | 58479.2 | | | -84703.3 | -3.0810 |
| 6000 | 9.5299 | 54265.0 | 80.7620 | 430307.0 | 59431.7 | | | -84800.8 | -3.1333 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(183) SF₂ (gas); molecular weight, 70.066

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|---------------------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -54463.0 | -51299.7 | ----- | -153913.1 | ----- |
| 100 | 8.00660 | 795.6 | 51.2521 | 4329.6 | -55667.4 | -51363.5 | 113.8909 | -154613.7 | 327.5972 |
| 200 | 9.0214 | 1637.4 | 57.0464 | 9771.9 | -52625.7 | -51614.5 | 57.6663 | -155361.0 | 158.3377 |
| 293.15 ^a | 10.4192 | 2593.0 | 60.9154 | 15568.9 | -51870.0 | -51870.0 | 39.0594 | -156027.1 | 102.3448 |
| 300 | 10.4427 | 2612.3 | 60.9799 | 15631.7 | -51850.7 | -51874.6 | 38.8245 | -156038.4 | 101.5395 |
| 400 | 11.4553 | 3712.8 | 64.1384 | 21942.6 | -50750.3 | -52642.6 | 29.3463 | -156579.3 | 73.1709 |
| 500 | 12.1823 | 4899.1 | 66.7829 | 26492.3 | -49563.9 | -53199.6 | 23.5671 | -157006.5 | 56.0440 |
| 600 | 12.6303 | 6141.3 | 69.0464 | 35286.5 | -48321.7 | -53645.7 | 19.6759 | -157352.7 | 44.5944 |
| 700 | 12.9311 | 7420.3 | 71.0174 | 42291.9 | -47042.7 | -54016.8 | 16.8751 | -157642.3 | 36.3995 |
| 800 | 13.1403 | 8724.5 | 72.7586 | 49482.4 | -45738.5 | -54347.1 | 14.7609 | -157891.9 | 30.2428 |
| 900 | 13.2935 | 10046.4 | 74.3154 | 56837.5 | -44416.6 | -54669.4 | 13.1066 | -158112.5 | 25.4470 |
| 1000 | 13.4015 | 11381.3 | 75.7216 | 64340.5 | -43081.7 | -54937.0 | 11.7754 | -158311.5 | 21.6654 |
| 1100 | 13.4856 | 12725.8 | 77.0032 | 71977.7 | -41737.2 | -55301.7 | 10.6799 | -158494.1 | 18.4584 |
| 1200 | 13.5507 | 14077.8 | 78.1795 | 79737.6 | -40385.2 | -55614.7 | 9.7618 | -158664.1 | 15.8330 |
| 1300 | 13.6021 | 15435.5 | 79.2662 | 87610.6 | -39027.5 | -55926.8 | 8.9836 | -158824.2 | 13.6091 |
| 1400 | 13.6434 | 16797.9 | 80.2758 | 95588.3 | -37665.1 | -56238.6 | 8.3072 | -158976.6 | 11.7011 |
| 1500 | 13.6769 | 18164.0 | 81.2183 | 103663.5 | -36299.1 | -56550.5 | 7.7203 | -159122.8 | 10.0460 |
| 1600 | 13.7046 | 19533.1 | 82.1019 | 111830.0 | -34936.0 | -56862.8 | 7.2040 | -159264.2 | 8.5964 |
| 1700 | 13.7276 | 20904.7 | 82.9334 | 120062.1 | -33558.3 | -57175.8 | 6.7459 | -159401.9 | 7.3162 |
| 1800 | 13.7471 | 22278.5 | 83.7187 | 128415.1 | -32184.6 | -57489.7 | 6.3365 | -159536.9 | 6.1774 |
| 1900 | 13.7636 | 23654.0 | 84.4624 | 136824.5 | -30809.0 | -57804.7 | 5.9681 | -159669.8 | 5.1575 |
| 2000 | 13.7777 | 25031.1 | 85.1687 | 145306.3 | -29431.9 | -58120.8 | 5.6380 | -159801.3 | 4.2389 |
| 2100 | 13.7899 | 26409.5 | 85.8413 | 153857.1 | -28053.5 | -58438.2 | 5.3316 | -159932.0 | 3.4070 |
| 2200 | 13.8005 | 27789.0 | 86.4830 | 162473.6 | -26674.0 | -58757.0 | 5.0544 | -160062.4 | 2.6502 |
| 2300 | 13.8098 | 29169.6 | 87.0967 | 171152.8 | -25293.5 | -59077.2 | 4.7999 | -160192.7 | 1.9580 |
| 2400 | 13.8180 | 30551.0 | 87.6846 | 179892.1 | -23912.1 | -59398.8 | 4.5654 | -160323.5 | 1.3241 |
| 2500 | 13.8252 | 31933.1 | 88.2488 | 188688.9 | -22529.9 | -59722.1 | 4.3485 | -160454.8 | 0.7400 |
| 2600 | 13.8316 | 33316.0 | 88.7912 | 197541.1 | -21147.1 | -60046.5 | 4.1444 | -160586.9 | 0.2003 |
| 2700 | 13.8373 | 34699.4 | 89.3133 | 206446.5 | -19763.6 | -60371.8 | 3.9509 | -160720.1 | -0.2999 |
| 2800 | 13.8424 | 36083.4 | 89.8166 | 215403.1 | -18379.6 | -60698.8 | 3.7665 | -160854.4 | -0.7646 |
| 2900 | 13.8470 | 37467.9 | 90.3025 | 224409.2 | -16995.1 | -61026.8 | 3.5909 | -160989.8 | -1.1977 |
| 3000 | 13.8512 | 38852.8 | 90.7720 | 233463.1 | -15610.2 | -61356.0 | 3.4244 | -161126.6 | -1.6023 |
| 3100 | 13.8549 | 40238.1 | 91.2262 | 242563.1 | -14224.9 | -61686.4 | 3.2665 | -161264.7 | -1.9811 |
| 3200 | 13.8583 | 41623.8 | 91.6661 | 251707.8 | -12839.3 | -62018.0 | 3.1168 | -161404.1 | -2.3365 |
| 3300 | 13.8615 | 43009.8 | 92.0926 | 260895.9 | -11453.3 | -62350.6 | 2.9741 | -161544.8 | -2.6707 |
| 3400 | 13.8643 | 44396.1 | 92.5065 | 270125.9 | -10067.0 | -62684.2 | 2.8374 | -161686.8 | -2.9855 |
| 3500 | 13.8669 | 45782.6 | 92.9084 | 279396.8 | -8680.4 | -63018.8 | 2.7056 | -161830.2 | -3.2825 |
| 3600 | 13.8693 | 47169.4 | 93.2991 | 288707.2 | -7293.6 | -63354.4 | 2.5786 | -161974.8 | -3.5634 |
| 3700 | 13.8715 | 48556.5 | 93.6791 | 298056.2 | -5906.6 | -63691.0 | 2.4561 | -162120.5 | -3.8292 |
| 3800 | 13.8735 | 49943.7 | 94.0491 | 307442.7 | -4519.3 | -64028.6 | 2.3380 | -162267.5 | -4.0813 |
| 3900 | 13.8754 | 51331.2 | 94.4095 | 316865.7 | -3131.8 | -64367.2 | 2.2241 | -162415.5 | -4.3207 |
| 4000 | 13.8772 | 52718.8 | 94.7608 | 326324.3 | -1744.2 | -64706.8 | 2.1144 | -162564.5 | -4.5483 |
| 4100 | 13.8788 | 54106.6 | 95.1035 | 335817.6 | -356.4 | -65047.4 | 2.0080 | -162714.5 | -4.7651 |
| 4200 | 13.8803 | 55494.6 | 95.4379 | 345344.7 | 1031.5 | -65389.0 | 1.9049 | -162865.4 | -4.9717 |
| 4300 | 13.8817 | 56882.7 | 95.7646 | 354904.9 | 2419.6 | -65731.6 | 1.8049 | -163017.2 | -5.1688 |
| 4400 | 13.8830 | 58270.9 | 96.0837 | 364497.4 | 3807.9 | -66075.2 | 1.7070 | -163169.7 | -5.3572 |
| 4500 | 13.8842 | 59659.3 | 96.3957 | 374121.4 | 5196.2 | -66420.0 | 1.6111 | -163322.9 | -5.5374 |
| 4600 | 13.8853 | 61047.7 | 96.7009 | 383776.3 | 6584.7 | -66765.8 | 1.5161 | -163476.8 | -5.7099 |
| 4700 | 13.8864 | 62436.3 | 96.9995 | 393461.4 | 7973.3 | -67112.8 | 1.4220 | -163631.3 | -5.8752 |
| 4800 | 13.8874 | 63825.0 | 97.2919 | 403176.0 | 9362.0 | -67460.8 | 1.3288 | -163786.3 | -6.0338 |
| 4900 | 13.8884 | 65213.8 | 97.5782 | 412919.6 | 10750.8 | -67810.0 | 1.2365 | -163941.8 | -6.1861 |
| 5000 | 13.8893 | 66602.7 | 97.8588 | 422691.5 | 12139.7 | -68160.4 | 1.1450 | -164097.7 | -6.3324 |
| 5100 | 13.8901 | 67991.7 | 98.1339 | 432491.1 | 13528.6 | -68512.0 | 1.0544 | -164253.9 | -6.4731 |
| 5200 | 13.8909 | 69380.7 | 98.4036 | 442318.1 | 14917.7 | -68864.8 | 0.9647 | -164410.5 | -6.6085 |
| 5300 | 13.8916 | 70769.8 | 98.6682 | 452171.7 | 16306.8 | -69218.8 | 0.8750 | -164567.4 | -6.7389 |
| 5400 | 13.8923 | 72159.0 | 98.9279 | 462051.5 | 17696.0 | -69574.0 | 0.7861 | -164724.5 | -6.8646 |
| 5500 | 13.8930 | 73548.3 | 99.1828 | 471957.1 | 19085.3 | -70000.0 | 0.6971 | -164881.7 | -6.9859 |
| 5600 | 13.8936 | 74937.6 | 99.4331 | 481887.9 | 20474.6 | -70427.0 | 0.6080 | -165039.2 | -7.1030 |
| 5700 | 13.8942 | 76327.0 | 99.6791 | 491843.6 | 21864.0 | -70854.0 | 0.5189 | -165196.7 | -7.2166 |
| 5800 | 13.8948 | 77716.5 | 99.9207 | 501823.6 | 23253.4 | -71282.0 | 0.4298 | -165354.4 | -7.3253 |
| 5900 | 13.8953 | 79106.0 | 100.1582 | 511827.6 | 24642.9 | -71710.0 | 0.3407 | -165512.1 | -7.4309 |
| 6000 | 13.8958 | 80495.5 | 100.3918 | 521855.1 | 26032.5 | -72139.0 | 0.2516 | -165669.7 | -7.5331 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(184) SF₄ (gas); molecular weight, 108.066

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -173684.6 | -168411.7 | ----- | -307735.1 | ----- |
| 100 | 9.1881 | 824.2 | 56.2291 | 4798.7 | -172860.4 | -169141.6 | 363.4764 | -309404.2 | 652.9256 |
| 200 | 13.5514 | 1951.5 | 63.8673 | 10822.0 | -171733.1 | -169807.3 | 178.3526 | -310917.5 | 314.1803 |
| 298.15 | 17.4729 | 3484.6 | 70.0518 | 17401.3 | -170200.0 | -170200.0 | 117.2027 | -312073.5 | 202.1483 |
| 300 | 17.5338 | 3517.0 | 70.1601 | 17531.0 | -170167.6 | -170205.3 | 116.4333 | -312091.8 | 200.7376 |
| 400 | 20.1652 | 5412.1 | 75.5938 | 24825.4 | -168272.5 | -170946.9 | 65.4051 | -312918.2 | 143.8281 |
| 500 | 21.8148 | 7517.4 | 80.2849 | 32625.0 | -166167.2 | -171392.3 | 66.7037 | -313490.6 | 109.6047 |
| 600 | 22.8713 | 9755.5 | 84.3624 | 40862.0 | -163929.1 | -171674.0 | 54.2080 | -313890.7 | 86.7535 |
| 700 | 23.5741 | 12080.0 | 87.9443 | 49481.0 | -161604.6 | -171845.9 | 45.2755 | -314173.5 | 70.4134 |
| 800 | 24.0600 | 14463.1 | 91.1258 | 58437.5 | -159221.5 | -171965.4 | 38.5619 | -314374.2 | 58.1488 |
| 900 | 24.4077 | 16887.5 | 93.9808 | 67695.3 | -156797.2 | -172060.0 | 33.3468 | -314516.0 | 48.6046 |
| 1000 | 24.6641 | 19341.7 | 96.5663 | 77224.7 | -154343.0 | -172141.4 | 29.1619 | -314614.3 | 40.9662 |
| 1100 | 24.8580 | 21818.2 | 98.9266 | 87001.1 | -151866.4 | -172214.0 | 25.7412 | -314679.7 | 34.7150 |
| 1200 | 25.0080 | 24311.8 | 101.0962 | 97003.7 | -149372.8 | -172280.9 | 22.8895 | -314719.8 | 29.5048 |
| 1300 | 25.1262 | 26818.7 | 103.1028 | 107214.9 | -146865.9 | -172344.2 | 20.4756 | -314740.0 | 25.0958 |
| 1400 | 25.2210 | 29336.3 | 104.9684 | 117619.5 | -144348.4 | -172405.5 | 18.4558 | -314744.4 | 21.3164 |
| 1500 | 25.2981 | 31862.3 | 106.7112 | 128204.5 | -141822.3 | -172465.9 | 16.6113 | -314736.3 | 18.0410 |
| 1600 | 25.3616 | 34395.4 | 108.3460 | 138958.2 | -139289.2 | -172526.3 | 15.0466 | -314718.0 | 15.1752 |
| 1700 | 25.4146 | 36934.3 | 109.8852 | 149870.5 | -136750.3 | -172587.3 | 13.6542 | -314691.7 | 12.6467 |
| 1800 | 25.4591 | 39478.1 | 111.3391 | 160932.4 | -134206.6 | -172649.5 | 12.4214 | -314658.8 | 10.3993 |
| 1900 | 25.4970 | 42025.9 | 112.7167 | 172135.8 | -131658.7 | -172713.3 | 11.3175 | -314620.7 | 8.3888 |
| 2000 | 25.5294 | 44577.3 | 114.0253 | 183473.4 | -129107.3 | -172778.9 | 10.3245 | -314578.6 | 6.5795 |
| 2100 | 25.5574 | 47131.7 | 115.2716 | 194938.7 | -126553.0 | -172846.8 | 9.4253 | -314533.3 | 4.9427 |
| 2200 | 25.5817 | 49688.6 | 116.4611 | 206525.8 | -123996.0 | -172917.0 | 8.6075 | -314485.6 | 3.4550 |
| 2300 | 25.6030 | 52247.9 | 117.5988 | 218229.2 | -121436.7 | -172989.8 | 7.8605 | -314436.2 | 2.0969 |
| 2400 | 25.6217 | 54809.2 | 118.6888 | 230044.0 | -118875.5 | -173065.3 | 7.1755 | -314385.6 | 0.8521 |
| 2500 | 25.6382 | 57372.2 | 119.7351 | 241965.5 | -116312.5 | -173143.7 | 6.5450 | -314334.3 | -0.2929 |
| 2600 | 25.6529 | 59936.7 | 120.7409 | 253989.7 | -113747.9 | | | -314282.6 | -1.3496 |
| 2700 | 25.6660 | 62502.7 | 121.7093 | 266112.5 | -111181.9 | | | -314230.7 | -2.3280 |
| 2800 | 25.6777 | 65069.9 | 122.6429 | 278330.4 | -108614.7 | | | -314179.1 | -3.2362 |
| 2900 | 25.6883 | 67638.2 | 123.5442 | 290640.0 | -106046.4 | | | -314127.8 | -4.0817 |
| 3000 | 25.6978 | 70207.5 | 124.4152 | 303038.2 | -103477.1 | | | -314076.9 | -4.8708 |
| 3100 | 25.7064 | 72777.7 | 125.2580 | 315522.1 | -100906.9 | | | -314026.7 | -5.6087 |
| 3200 | 25.7142 | 75348.8 | 126.0743 | 328088.9 | -98335.9 | | | -313977.2 | -6.3005 |
| 3300 | 25.7214 | 77920.5 | 126.8657 | 340736.1 | -95764.1 | | | -313928.4 | -6.9502 |
| 3400 | 25.7279 | 80493.0 | 127.6336 | 353461.3 | -93191.6 | | | -313880.4 | -7.5616 |
| 3500 | 25.7338 | 83066.1 | 128.3795 | 366262.1 | -90618.5 | | | -313833.2 | -8.1380 |
| 3600 | 25.7393 | 85639.8 | 129.1045 | 379136.5 | -88044.9 | | | -313786.8 | -8.6823 |
| 3700 | 25.7444 | 88214.0 | 129.8098 | 392082.3 | -85470.7 | | | -313741.2 | -9.1971 |
| 3800 | 25.7490 | 90788.6 | 130.4964 | 405097.8 | -82896.0 | | | -313696.3 | -9.6847 |
| 3900 | 25.7533 | 93363.8 | 131.1653 | 418181.0 | -80320.9 | | | -313652.2 | -10.1473 |
| 4000 | 25.7573 | 95939.3 | 131.8174 | 431330.3 | -77745.3 | | | -313608.7 | -10.5866 |
| 4100 | 25.7610 | 98515.2 | 132.4535 | 444544.0 | -75165.4 | | | -313566.0 | -11.0045 |
| 4200 | 25.7645 | 101091.5 | 133.0743 | 457820.5 | -72593.1 | | | -313523.9 | -11.4024 |
| 4300 | 25.7677 | 103668.1 | 133.6806 | 471158.4 | -70016.5 | | | -313482.3 | -11.7818 |
| 4400 | 25.7707 | 106245.0 | 134.2730 | 484556.2 | -67439.6 | | | -313441.3 | -12.1439 |
| 4500 | 25.7735 | 108822.2 | 134.8522 | 498012.5 | -64862.4 | | | -313400.7 | -12.4898 |
| 4600 | 25.7761 | 111399.7 | 135.4187 | 511526.2 | -62284.9 | | | -313360.6 | -12.8206 |
| 4700 | 25.7785 | 113977.4 | 135.9730 | 525095.8 | -59707.2 | | | -313320.9 | -13.1374 |
| 4800 | 25.7808 | 116555.4 | 136.5158 | 538720.4 | -57129.2 | | | -313281.5 | -13.4409 |
| 4900 | 25.7830 | 119133.6 | 137.0474 | 552398.6 | -54551.0 | | | -313242.4 | -13.7319 |
| 5000 | 25.7850 | 121712.0 | 137.5683 | 566129.5 | -51972.6 | | | -313203.6 | -14.0113 |
| 5100 | 25.7869 | 124290.6 | 138.0789 | 579911.9 | -49394.0 | | | -313165.0 | -14.2797 |
| 5200 | 25.7887 | 126869.4 | 138.5797 | 593745.0 | -46815.3 | | | -313126.6 | -14.5378 |
| 5300 | 25.7904 | 129448.3 | 139.0709 | 607627.6 | -44236.3 | | | -313088.3 | -14.7861 |
| 5400 | 25.7920 | 132027.4 | 139.5530 | 621558.8 | -41657.2 | | | -313050.1 | -15.0251 |
| 5500 | 25.7936 | 134606.7 | 140.0263 | 635537.9 | -39077.9 | | | -313011.9 | -15.2555 |
| 5600 | 25.7950 | 137186.2 | 140.4911 | 649563.8 | -36498.5 | | | -312973.8 | -15.4775 |
| 5700 | 25.7964 | 139765.7 | 140.9476 | 663635.8 | -33918.9 | | | -312935.7 | -15.6918 |
| 5800 | 25.7977 | 142345.4 | 141.3963 | 677753.1 | -31339.2 | | | -312897.6 | -15.8987 |
| 5900 | 25.7989 | 144925.3 | 141.8373 | 691914.8 | -28759.4 | | | -312859.4 | -16.0985 |
| 6000 | 25.8001 | 147505.2 | 142.2709 | 706120.3 | -26179.4 | | | -312821.2 | -16.2916 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
(185) SF₆ (gas); molecular weight, 146.066

| T, °K | C _p ^o , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -292556.5 | -285173.9 | ----- | -461207.4 | ----- |
| 100 | 9.2853 | 819.5 | 53.2996 | 4510.4 | -291737.0 | -286603.3 | 610.6426 | -463878.2 | 975.8348 |
| 200 | 16.5162 | 2086.3 | 61.7886 | 10271.5 | -290470.2 | -287829.6 | 296.9079 | -466303.7 | 467.8920 |
| 298.15 | 23.2616 | 4056.5 | 69.7137 | 16728.6 | -288500.0 | -288500.0 | 193.2535 | -458089.8 | 299.8592 |
| 300 | 23.3664 | 4099.6 | 69.8579 | 16857.7 | -288456.9 | -288508.4 | 191.9493 | -463117.5 | 297.7434 |
| 400 | 27.8996 | 6680.3 | 77.2508 | 24220.0 | -285876.2 | -289336.5 | 139.3671 | -469338.5 | 212.3834 |
| 500 | 30.7506 | 9623.7 | 83.8069 | 32279.8 | -282932.8 | -289747.4 | 107.7303 | -470137.2 | 161.0554 |
| 600 | 32.5827 | 12796.8 | 89.5871 | 40955.5 | -279759.7 | -289925.4 | 86.6161 | -470652.0 | 126.7886 |
| 700 | 33.8050 | 16120.1 | 94.7075 | 50175.2 | -276436.4 | -289952.8 | 71.5291 | -470974.5 | 102.2904 |
| 800 | 34.6517 | 19545.4 | 99.2801 | 59878.7 | -273011.1 | -289890.3 | 60.2147 | -471163.1 | 83.9068 |
| 900 | 35.2586 | 23042.5 | 103.3984 | 70016.1 | -269514.0 | -289786.9 | 51.4172 | -471255.7 | 69.6042 |
| 1000 | 35.7066 | 26591.8 | 107.1376 | 80545.8 | -265964.7 | -289656.2 | 44.3821 | -471277.5 | 58.1607 |
| 1100 | 36.0458 | 30180.2 | 110.5574 | 91433.0 | -262376.3 | -289506.9 | 38.6288 | -471245.9 | 48.7980 |
| 1200 | 36.3083 | 33798.4 | 113.7055 | 102648.2 | -258758.1 | -289344.7 | 33.8370 | -471173.1 | 40.9965 |
| 1300 | 36.5154 | 37440.0 | 116.6203 | 114166.3 | -255116.5 | -289173.8 | 29.7848 | -471068.0 | 34.3966 |
| 1400 | 36.6815 | 41100.2 | 119.3326 | 125965.5 | -251456.3 | -288997.2 | 26.3135 | -470937.1 | 28.7409 |
| 1500 | 36.8166 | 44775.3 | 121.8682 | 138027.0 | -247781.2 | -288817.1 | 23.3069 | -470785.5 | 23.8408 |
| 1600 | 36.9280 | 48462.7 | 124.2479 | 150334.0 | -244093.8 | -288635.2 | 20.6778 | -470617.2 | 19.5546 |
| 1700 | 37.0209 | 52160.3 | 126.4895 | 162871.9 | -240396.2 | -288452.8 | 18.3595 | -470435.3 | 15.7742 |
| 1800 | 37.0990 | 55866.4 | 128.6079 | 175627.8 | -236690.1 | -288270.9 | 16.3000 | -470242.2 | 12.4151 |
| 1900 | 37.1655 | 59579.7 | 130.6155 | 188589.8 | -232976.8 | -288090.3 | 14.4585 | -470040.0 | 9.4108 |
| 2000 | 37.2224 | 63299.2 | 132.5234 | 201747.6 | -229257.3 | -287911.7 | 12.6022 | -469830.4 | 6.7082 |
| 2100 | 37.2715 | 67023.9 | 134.3407 | 215091.5 | -225532.6 | -287735.5 | 11.3046 | -469614.7 | 4.2641 |
| 2200 | 37.3142 | 70753.2 | 136.0755 | 228612.9 | -221803.3 | -287562.3 | 9.9439 | -469394.2 | 2.0432 |
| 2300 | 37.3515 | 74486.6 | 137.7351 | 242304.1 | -218069.9 | -287392.4 | 8.7023 | -469169.7 | 0.0164 |
| 2400 | 37.3843 | 78223.4 | 139.3254 | 256157.7 | -214333.1 | -287226.0 | 7.5648 | -468942.0 | -1.8407 |
| 2500 | 37.4134 | 81963.3 | 140.8521 | 270167.0 | -210593.2 | -287063.5 | 6.5190 | -468712.0 | -3.5483 |
| 2600 | 37.4391 | 85706.0 | 142.3200 | 284326.1 | -206850.5 | -286880.0 | ----- | -468480.0 | -5.1238 |
| 2700 | 37.4621 | 89451.0 | 143.7334 | 298629.2 | -203105.4 | -286696.6 | ----- | -468246.6 | -6.5818 |
| 2800 | 37.4827 | 93198.3 | 145.0962 | 313071.1 | -199358.2 | -286513.2 | ----- | -468012.1 | -7.9351 |
| 2900 | 37.5012 | 96947.5 | 146.4119 | 327646.9 | -195609.0 | -286329.8 | ----- | -467776.9 | -9.1944 |
| 3000 | 37.5179 | 100698.5 | 147.6835 | 342352.0 | -191858.0 | -286146.4 | ----- | -467541.3 | -10.3691 |
| 3100 | 37.5331 | 104451.1 | 148.9140 | 357182.2 | -188105.4 | -285963.0 | ----- | -467305.3 | -11.4675 |
| 3200 | 37.5468 | 108205.1 | 150.1058 | 372133.5 | -184351.4 | -285779.6 | ----- | -467069.3 | -12.4967 |
| 3300 | 37.5594 | 111960.4 | 151.2614 | 387202.2 | -180596.1 | -285596.1 | ----- | -466833.2 | -13.4631 |
| 3400 | 37.5708 | 115716.9 | 152.3828 | 402384.7 | -176839.5 | -285412.6 | ----- | -466597.3 | -14.3721 |
| 3500 | 37.5813 | 119474.5 | 153.4721 | 417677.7 | -173082.0 | -285229.1 | ----- | -466361.5 | -15.2288 |
| 3600 | 37.5909 | 123233.1 | 154.5309 | 433078.1 | -169323.4 | -285045.6 | ----- | -466126.0 | -16.0375 |
| 3700 | 37.5998 | 126992.7 | 155.5610 | 448582.9 | -165563.8 | -284862.1 | ----- | -465890.8 | -16.8021 |
| 3800 | 37.6080 | 130753.1 | 156.5638 | 464189.4 | -161803.4 | -284678.6 | ----- | -465655.8 | -17.5260 |
| 3900 | 37.6155 | 134514.3 | 157.5408 | 479894.8 | -158042.2 | -284495.1 | ----- | -465421.2 | -18.2125 |
| 4000 | 37.6226 | 138276.2 | 158.4932 | 495696.7 | -154280.3 | -284311.6 | ----- | -465186.9 | -18.8644 |
| 4100 | 37.6291 | 142038.8 | 159.4223 | 511592.7 | -150517.7 | -284128.1 | ----- | -464952.8 | -19.4841 |
| 4200 | 37.6351 | 145802.0 | 160.3291 | 527580.4 | -146754.5 | -283944.6 | ----- | -464719.0 | -20.0740 |
| 4300 | 37.6407 | 149565.8 | 161.2148 | 543657.8 | -142990.7 | -283761.1 | ----- | -464485.5 | -20.6362 |
| 4400 | 37.6460 | 153330.1 | 162.0802 | 559822.7 | -139226.4 | -283577.6 | ----- | -464251.1 | -21.1726 |
| 4500 | 37.6509 | 157094.9 | 162.9263 | 576073.2 | -135461.6 | -283394.1 | ----- | -464017.0 | -21.6849 |
| 4600 | 37.6555 | 160860.3 | 163.7538 | 592407.3 | -131696.2 | -283210.6 | ----- | -463782.6 | -22.1747 |
| 4700 | 37.6598 | 164626.0 | 164.5637 | 608823.3 | -127930.5 | -283027.1 | ----- | -463548.1 | -22.6433 |
| 4800 | 37.6638 | 168392.2 | 165.3566 | 625319.5 | -124164.3 | -282843.6 | ----- | -463313.6 | -23.0923 |
| 4900 | 37.6676 | 172158.8 | 166.1333 | 641894.1 | -120398.1 | -282660.1 | ----- | -463079.1 | -23.5227 |
| 5000 | 37.6712 | 175925.7 | 166.8943 | 658545.6 | -116630.8 | -282476.6 | ----- | -462844.6 | -23.9356 |
| 5100 | 37.6745 | 179693.0 | 167.6403 | 675272.5 | -112863.5 | -282293.1 | ----- | -462610.1 | -24.3322 |
| 5200 | 37.6777 | 183460.6 | 168.3719 | 692073.2 | -109095.9 | -282109.6 | ----- | -462375.6 | -24.7133 |
| 5300 | 37.6807 | 187228.6 | 169.0896 | 708946.4 | -105327.9 | -281926.1 | ----- | -462141.1 | -25.0799 |
| 5400 | 37.6835 | 190996.8 | 169.7940 | 725890.7 | -101559.7 | -281742.6 | ----- | -461906.6 | -25.4327 |
| 5500 | 37.6862 | 194765.3 | 170.4855 | 742904.8 | -97791.2 | -281559.1 | ----- | -461672.1 | -25.7725 |
| 5600 | 37.6887 | 198534.0 | 171.1645 | 759987.4 | -94022.5 | -281375.6 | ----- | -461437.6 | -26.1000 |
| 5700 | 37.6911 | 202303.0 | 171.8316 | 777137.3 | -90253.5 | -281192.1 | ----- | -461203.1 | -26.4159 |
| 5800 | 37.6934 | 206072.2 | 172.4872 | 794353.3 | -86484.3 | -281008.6 | ----- | -460968.6 | -26.7207 |
| 5900 | 37.6956 | 209841.7 | 173.1315 | 811634.3 | -82714.8 | -280825.1 | ----- | -460734.1 | -27.0150 |
| 6000 | 37.6976 | 213611.3 | 173.7651 | 828979.3 | -78945.1 | -280641.6 | ----- | -460500.0 | -27.2994 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
(186) S₂F₂ (gas); molecular weight, 102.132

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -5788C.5 | -53663.4 | ----- | -222180.3 | ----- |
| 100 | 9.4879 | 833.5 | 56.0164 | 4768.1 | -57046.9 | -53854.0 | 119.7051 | -223342.1 | 471.3789 |
| 200 | 12.8829 | 1957.1 | 63.6677 | 10776.5 | -55923.4 | -54215.9 | 60.7092 | -224344.9 | 226.8957 |
| 298.15 | 15.2929 | 3348.4 | 69.2958 | 17312.1 | -54532.0 | -54532.0 | 41.1564 | -225130.0 | 146.0671 |
| 300 | 15.3285 | 3376.8 | 69.3905 | 17440.4 | -54503.7 | -54537.6 | 40.9097 | -225142.7 | 145.0495 |
| 400 | 16.8300 | 4991.0 | 74.0241 | 24618.6 | -52889.4 | -55890.2 | 30.9304 | -225730.7 | 103.9961 |
| 500 | 17.7394 | 6723.2 | 77.8855 | 32219.6 | -51157.3 | -56839.3 | 24.7778 | -226161.5 | 79.3076 |
| 600 | 18.3108 | 8527.8 | 81.1741 | 40176.7 | -49352.7 | -57575.7 | 20.6109 | -226483.9 | 62.8210 |
| 700 | 18.6865 | 10378.9 | 84.0269 | 48439.9 | -47501.6 | -58178.7 | 17.5995 | -226731.6 | 51.0300 |
| 800 | 18.9443 | 12261.2 | 86.5399 | 56970.8 | -45619.3 | -58701.2 | 15.3193 | -226926.8 | 42.1780 |
| 900 | 19.1278 | 14165.3 | 88.7824 | 65738.9 | -43715.2 | -59210.7 | 13.5301 | -227084.1 | 35.2878 |
| 1000 | 19.2626 | 16085.1 | 90.8051 | 74719.9 | -41795.3 | -59712.7 | 12.0664 | -227213.3 | 29.7721 |
| 1100 | 19.3642 | 18016.7 | 92.6460 | 83893.9 | -39863.8 | -60209.8 | 10.8953 | -227321.3 | 25.2570 |
| 1200 | 19.4427 | 19957.2 | 94.3344 | 93244.0 | -37922.3 | -60703.7 | 9.8945 | -227412.9 | 21.4927 |
| 1300 | 19.5045 | 21904.7 | 95.8932 | 102756.4 | -35975.8 | -61195.4 | 9.0408 | -227491.9 | 18.3063 |
| 1400 | 19.5539 | 23857.7 | 97.3405 | 112419.0 | -34022.8 | -61685.9 | 8.3031 | -227560.9 | 15.5743 |
| 1500 | 19.5941 | 25815.2 | 98.6910 | 122221.3 | -32065.3 | -62175.8 | 7.6586 | -227622.4 | 13.2058 |
| 1600 | 19.6272 | 27776.3 | 99.9566 | 132154.3 | -30104.2 | -62665.5 | 7.0903 | -227678.1 | 11.1329 |
| 1700 | 19.6547 | 29740.4 | 101.1474 | 142210.1 | -28140.0 | -63155.4 | 6.5849 | -227729.5 | 9.3034 |
| 1800 | 19.6779 | 31767.1 | 102.2715 | 152381.6 | -26173.4 | -63645.8 | 6.1321 | -227778.1 | 7.6768 |
| 1900 | 19.6976 | 33675.9 | 103.3360 | 162662.4 | -24204.6 | -64137.0 | 5.7239 | -227824.9 | 6.2211 |
| 2000 | 19.7145 | 35646.5 | 104.3468 | 173047.0 | -22232.9 | -64628.9 | 5.3536 | -227870.9 | 4.9108 |
| 2100 | 19.7290 | 37618.7 | 105.3090 | 183530.2 | -20261.8 | -65122.0 | 5.0161 | -227916.9 | 3.7250 |
| 2200 | 19.7416 | 39592.3 | 106.2271 | 194107.3 | -18288.2 | -65616.1 | 4.7069 | -227963.7 | 2.6468 |
| 2300 | 19.7527 | 41567.0 | 107.1049 | 204774.2 | -16313.5 | -66111.5 | 4.4224 | -228011.8 | 1.6621 |
| 2400 | 19.7624 | 43542.7 | 107.9458 | 215527.1 | -14337.7 | -66608.2 | 4.1597 | -228061.8 | 0.7593 |
| 2500 | 19.7709 | 45519.4 | 108.7527 | 226362.3 | -12361.0 | -67106.4 | 3.9162 | -228113.9 | -0.0715 |
| 2600 | 19.7786 | 47496.9 | 109.5283 | 237276.6 | -10383.6 | -67605.4 | ----- | -228168.6 | -0.8385 |
| 2700 | 19.7853 | 49475.1 | 110.2748 | 248267.0 | -8405.4 | -68105.4 | ----- | -228226.0 | -1.5489 |
| 2800 | 19.7914 | 51453.9 | 110.9945 | 259330.6 | -6426.5 | -68605.4 | ----- | -228286.4 | -2.2088 |
| 2900 | 19.7969 | 53433.4 | 111.6891 | 270465.0 | -4447.1 | -69105.4 | ----- | -228349.9 | -2.8232 |
| 3000 | 19.8018 | 55413.3 | 112.3603 | 281667.7 | -2467.2 | -69605.4 | ----- | -228416.4 | -3.3969 |
| 3100 | 19.8063 | 57393.7 | 113.0097 | 292936.4 | -486.7 | -70105.4 | ----- | -228486.2 | -3.9338 |
| 3200 | 19.8104 | 59374.6 | 113.6386 | 304268.9 | 1494.1 | -70605.4 | ----- | -228559.0 | -4.4372 |
| 3300 | 19.8141 | 61355.8 | 114.2482 | 315663.4 | 3475.3 | -71105.4 | ----- | -228635.0 | -4.9103 |
| 3400 | 19.8174 | 63337.4 | 114.8398 | 327118.0 | 5456.9 | -71605.4 | ----- | -228714.0 | -5.3557 |
| 3500 | 19.8205 | 65319.3 | 115.4143 | 338630.8 | 7438.8 | -72105.4 | ----- | -228795.9 | -5.7758 |
| 3600 | 19.8234 | 67301.5 | 115.9727 | 350200.3 | 9421.0 | -72605.4 | ----- | -228880.6 | -6.1727 |
| 3700 | 19.8260 | 69283.9 | 116.5159 | 361824.9 | 11403.5 | -73105.4 | ----- | -228968.0 | -6.5483 |
| 3800 | 19.8284 | 71266.6 | 117.0446 | 373503.0 | 13386.2 | -73605.4 | ----- | -229058.0 | -6.9042 |
| 3900 | 19.8306 | 73249.6 | 117.5597 | 385233.3 | 15369.1 | -74105.4 | ----- | -229150.4 | -7.2421 |
| 4000 | 19.8327 | 75232.8 | 118.0618 | 397014.5 | 17352.3 | -74605.4 | ----- | -229245.2 | -7.5632 |
| 4100 | 19.8346 | 77216.1 | 118.5516 | 408845.3 | 19335.7 | -75105.4 | ----- | -229342.1 | -7.8687 |
| 4200 | 19.8364 | 79199.7 | 119.0296 | 420724.4 | 21319.2 | -75605.4 | ----- | -229441.0 | -8.1598 |
| 4300 | 19.8381 | 81183.4 | 119.4963 | 432650.8 | 23302.9 | -76105.4 | ----- | -229541.7 | -8.4375 |
| 4400 | 19.8396 | 83167.3 | 119.9524 | 444623.4 | 25286.8 | -76605.4 | ----- | -229644.2 | -8.7027 |
| 4500 | 19.8410 | 85151.3 | 120.3983 | 456641.0 | 27270.9 | -77105.4 | ----- | -229748.3 | -8.9562 |
| 4600 | 19.8424 | 87135.5 | 120.8344 | 468702.7 | 29255.0 | -77605.4 | ----- | -229853.9 | -9.1989 |
| 4700 | 19.8437 | 89119.8 | 121.2611 | 480807.5 | 31239.3 | -78105.4 | ----- | -229960.7 | -9.4313 |
| 4800 | 19.8449 | 91104.2 | 121.6789 | 492954.6 | 33223.8 | -78605.4 | ----- | -230068.8 | -9.6541 |
| 4900 | 19.8460 | 93088.8 | 122.0881 | 505143.0 | 35208.3 | -79105.4 | ----- | -230177.9 | -9.8679 |
| 5000 | 19.8470 | 95073.4 | 122.4891 | 517372.0 | 37193.0 | -79605.4 | ----- | -230288.0 | -10.0733 |
| 5100 | 19.8480 | 97058.2 | 122.8821 | 529640.6 | 39177.7 | -80105.4 | ----- | -230399.0 | -10.2707 |
| 5200 | 19.8490 | 99043.0 | 123.2673 | 541948.1 | 41162.6 | -80605.4 | ----- | -230510.7 | -10.4606 |
| 5300 | 19.8498 | 101028.0 | 123.6456 | 554293.8 | 43147.5 | -81105.4 | ----- | -230623.1 | -10.6434 |
| 5400 | 19.8507 | 103013.0 | 124.0167 | 566677.0 | 45132.5 | -81605.4 | ----- | -230736.0 | -10.8195 |
| 5500 | 19.8515 | 104998.1 | 124.3809 | 579096.9 | 47117.6 | -82105.4 | ----- | -230849.4 | -10.9894 |
| 5600 | 19.8522 | 106983.3 | 124.7386 | 591553.0 | 49102.8 | -82605.4 | ----- | -230963.1 | -11.1532 |
| 5700 | 19.8529 | 108968.5 | 125.0900 | 604044.5 | 51088.1 | -83105.4 | ----- | -231077.2 | -11.3114 |
| 5800 | 19.8536 | 110953.9 | 125.4353 | 616570.8 | 53073.4 | -83605.4 | ----- | -231191.6 | -11.4642 |
| 5900 | 19.8542 | 112939.3 | 125.7747 | 629131.3 | 55058.8 | -84105.4 | ----- | -231306.1 | -11.6118 |
| 6000 | 19.8548 | 114924.7 | 126.1084 | 641725.5 | 57044.3 | -84605.4 | ----- | -231420.7 | -11.7547 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(187) SO (gas); molecular weight, 48.066

| T , °K | C_p , cal/mole °K | $H_T^0 - H_0^0$, cal/mole | S_T^0 , cal/mole °K | $-(F_T^0 - H_0^0)$, cal/mole | H_T^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -776.1 | 1314.9 | ----- | -123575.0 | ----- |
| 100 | 6.9567 | 694.9 | 45.3701 | 3842.1 | -81.2 | 1498.4 | 1.4515 | -123906.7 | 266.1469 |
| 200 | 6.9958 | 1391.6 | 50.1977 | 8648.0 | 615.4 | 1454.5 | 3.0839 | -124304.8 | 130.5883 |
| 298.15 | 7.2123 | 2087.3 | 53.0252 | 13722.1 | 1311.2 | 1311.2 | 3.5864 | -124686.2 | 85.8139 |
| 300 | 7.2179 | 2100.7 | 53.0698 | 13820.3 | 1324.6 | 1308.1 | 3.5922 | -124693.0 | 85.2503 |
| 400 | 7.5438 | 2838.6 | 55.1904 | 19237.6 | 2062.5 | 592.5 | 3.8041 | -125034.1 | 62.5128 |
| 500 | 7.8465 | 3608.6 | 56.9073 | 24845.1 | 2832.4 | 59.0 | 3.8432 | -125324.0 | 48.8352 |
| 600 | 8.0882 | 4405.8 | 58.3602 | 30610.3 | 3629.7 | -378.2 | 3.9321 | -125571.7 | 39.6971 |
| 700 | 8.2729 | 5224.3 | 59.6215 | 36510.8 | 4448.2 | -748.6 | 3.8030 | -125787.2 | 33.1578 |
| 800 | 8.4133 | 6058.9 | 60.7358 | 42529.7 | 5282.8 | -1083.1 | 3.7675 | -125978.5 | 28.2453 |
| 900 | 8.5212 | 6905.9 | 61.7332 | 48654.0 | 6129.7 | -1412.6 | 3.7298 | -126151.5 | 24.4190 |
| 1000 | 8.6054 | 7762.4 | 62.6356 | 54873.2 | 6986.2 | -1739.3 | 3.6917 | -126310.4 | 21.3539 |
| 1100 | 8.6724 | 8626.4 | 63.4590 | 61178.5 | 7850.3 | -2064.2 | 3.6540 | -126458.4 | 18.8430 |
| 1200 | 8.7266 | 9496.4 | 64.2160 | 67562.8 | 8720.3 | -2387.8 | 3.6172 | -126597.7 | 16.7482 |
| 1300 | 8.7712 | 10371.4 | 64.9163 | 74019.8 | 9595.3 | -2710.6 | 3.5816 | -126730.1 | 14.9738 |
| 1400 | 8.8086 | 11250.4 | 65.5677 | 80544.4 | 10474.3 | -3032.9 | 3.5472 | -126857.0 | 13.4513 |
| 1500 | 8.8404 | 12132.9 | 66.1766 | 87132.0 | 11356.8 | -3355.2 | 3.5140 | -126979.5 | 12.1305 |
| 1600 | 8.8678 | 13018.4 | 66.7480 | 93778.5 | 12242.2 | -3677.6 | 3.4820 | -127098.5 | 10.9738 |
| 1700 | 8.8917 | 13906.4 | 67.2864 | 100480.5 | 13130.2 | -4000.4 | 3.4512 | -127214.7 | 9.9521 |
| 1800 | 8.9129 | 14796.6 | 67.7952 | 107234.8 | 14020.5 | -4323.9 | 3.4215 | -127328.9 | 9.0432 |
| 1900 | 8.9318 | 15688.9 | 68.2776 | 114038.6 | 14912.7 | -4648.3 | 3.3928 | -127441.6 | 8.2292 |
| 2000 | 8.9488 | 16582.9 | 68.7362 | 120889.5 | 15806.8 | -4973.6 | 3.3652 | -127553.3 | 7.4960 |
| 2100 | 8.9644 | 17478.6 | 69.1732 | 127785.2 | 16702.4 | -5300.2 | 3.3384 | -127664.6 | 6.8320 |
| 2200 | 8.9787 | 18375.7 | 69.5906 | 134723.5 | 17599.6 | -5628.0 | 3.3126 | -127775.7 | 6.2278 |
| 2300 | 8.9920 | 19274.3 | 69.9900 | 141702.7 | 18498.2 | -5957.1 | 3.2876 | -127887.0 | 5.6757 |
| 2400 | 9.0043 | 20174.1 | 70.3725 | 148720.9 | 19398.0 | -6287.7 | 3.2634 | -127998.8 | 5.1692 |
| 2500 | 9.0160 | 21075.1 | 70.7407 | 155776.7 | 20299.0 | -6619.8 | 3.2399 | -128111.3 | 4.7028 |
| 2600 | 9.0269 | 21977.3 | 71.0946 | 162868.6 | 21201.1 | -6953.2 | 3.2172 | -128224.8 | 4.2719 |
| 2700 | 9.0373 | 22880.5 | 71.4355 | 169995.2 | 22104.4 | -7287.6 | 3.1954 | -128339.5 | 3.8725 |
| 2800 | 9.0473 | 23784.7 | 71.7643 | 177155.3 | 23008.6 | -7622.9 | 3.1746 | -128455.4 | 3.5014 |
| 2900 | 9.0568 | 24689.9 | 72.0819 | 184347.7 | 23913.8 | -7959.1 | 3.1547 | -128572.8 | 3.1555 |
| 3000 | 9.0660 | 25596.1 | 72.3891 | 191571.4 | 24819.9 | -8296.2 | 3.1356 | -128691.6 | 2.8324 |
| 3100 | 9.0748 | 26503.1 | 72.6866 | 198825.2 | 25727.0 | -8634.2 | 3.1172 | -128812.1 | 2.5298 |
| 3200 | 9.0834 | 27411.0 | 72.9748 | 206108.4 | 26634.9 | -8973.1 | 3.1004 | -128934.2 | 2.2459 |
| 3300 | 9.0917 | 28319.8 | 73.2544 | 213419.9 | 27543.6 | -9312.9 | 3.0851 | -129057.9 | 1.9789 |
| 3400 | 9.0998 | 29229.4 | 73.5260 | 220759.0 | 28453.2 | -9653.6 | 3.0712 | -129183.4 | 1.7275 |
| 3500 | 9.1077 | 30139.7 | 73.7895 | 228124.8 | 29363.6 | -9995.1 | 3.0587 | -129310.7 | 1.4901 |
| 3600 | 9.1154 | 31050.9 | 74.0466 | 235516.7 | 30274.8 | -10337.5 | 3.0474 | -129439.6 | 1.2657 |
| 3700 | 9.1230 | 31962.8 | 74.2964 | 242933.9 | 31186.7 | -10680.7 | 3.0371 | -129570.3 | 1.0532 |
| 3800 | 9.1304 | 32875.5 | 74.5398 | 250375.8 | 32099.3 | -11024.7 | 3.0277 | -129702.7 | 0.8517 |
| 3900 | 9.1377 | 33788.9 | 74.7771 | 257841.7 | 33012.7 | -11369.5 | 3.0192 | -129836.7 | 0.6604 |
| 4000 | 9.1449 | 34703.0 | 75.0085 | 265331.0 | 33926.9 | -11715.1 | 3.0116 | -129972.4 | 0.4784 |
| 4100 | 9.1520 | 35617.9 | 75.2344 | 272843.2 | 34841.7 | -12061.4 | 3.0048 | -130109.7 | 0.3051 |
| 4200 | 9.1590 | 36533.4 | 75.4550 | 280377.7 | 35757.3 | -12408.3 | 3.0000 | -130248.6 | 0.1399 |
| 4300 | 9.1659 | 37449.6 | 75.6706 | 287934.0 | 36673.5 | -12755.7 | 2.9961 | -130389.0 | -0.0178 |
| 4400 | 9.1727 | 38366.6 | 75.8814 | 295511.7 | 37590.5 | -13103.6 | 2.9930 | -130530.9 | -0.1685 |
| 4500 | 9.1795 | 39284.2 | 76.0876 | 303110.2 | 38508.1 | -13452.0 | 2.9907 | -130674.1 | -0.3126 |
| 4600 | 9.1862 | 40202.5 | 76.2895 | 310729.1 | 39426.3 | -13800.8 | 2.9892 | -130818.8 | -0.4507 |
| 4700 | 9.1928 | 41121.4 | 76.4871 | 318367.9 | 40345.3 | -14150.1 | 2.9886 | -130964.7 | -0.5830 |
| 4800 | 9.1994 | 42041.0 | 76.6807 | 326026.3 | 41264.9 | -14500.0 | 2.9889 | -131111.9 | -0.7099 |
| 4900 | 9.2060 | 42961.3 | 76.8705 | 333703.9 | 42185.2 | -14850.4 | 2.9897 | -131260.2 | -0.8318 |
| 5000 | 9.2124 | 43882.2 | 77.0565 | 341400.3 | 43106.1 | -15202.3 | 2.9910 | -131409.7 | -0.9490 |
| 5100 | 9.2189 | 44803.8 | 77.2390 | 349115.1 | 44027.7 | -15554.6 | 2.9927 | -131560.3 | -1.0616 |
| 5200 | 9.2253 | 45726.0 | 77.4181 | 356848.0 | 44949.9 | -15907.3 | 2.9947 | -131711.8 | -1.1701 |
| 5300 | 9.2317 | 46648.9 | 77.5939 | 364598.6 | 45872.7 | -16260.5 | 2.9969 | -131864.3 | -1.2746 |
| 5400 | 9.2380 | 47572.3 | 77.7665 | 372366.7 | 46796.2 | -16614.2 | 2.9993 | -132017.6 | -1.3754 |
| 5500 | 9.2443 | 48496.5 | 77.9361 | 380151.8 | 47720.3 | -16968.4 | 3.0018 | -132171.8 | -1.4726 |
| 5600 | 9.2506 | 49421.2 | 78.1027 | 387953.8 | 48645.1 | -17323.1 | 3.0045 | -132326.7 | -1.5664 |
| 5700 | 9.2568 | 50346.6 | 78.2665 | 395772.3 | 49570.5 | -17678.2 | 3.0074 | -132482.4 | -1.6571 |
| 5800 | 9.2631 | 51272.6 | 78.4275 | 403607.0 | 50496.4 | -18033.7 | 3.0104 | -132638.6 | -1.7447 |
| 5900 | 9.2693 | 52199.2 | 78.5859 | 411457.7 | 51423.1 | -18389.6 | 3.0135 | -132795.5 | -1.8294 |
| 6000 | 9.2755 | 53126.4 | 78.7418 | 419324.1 | 52350.3 | -18745.9 | 3.0167 | -132952.9 | -1.9115 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
(188) SO₂ (gas); molecular weight, 64.066

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -73468.2 | -70339.8 | ----- | -254216.2 | ----- |
| 100 | 8.0134 | 795.5 | 49.9333 | 4197.8 | -72672.7 | -70402.5 | 155.0571 | -254974.8 | 546.4844 |
| 200 | 8.6948 | 1627.2 | 55.6711 | 9507.0 | -71840.9 | -70659.1 | 78.9280 | -255795.2 | 267.5219 |
| 298.15 | 9.5290 | 2521.2 | 59.2967 | 15158.1 | -70947.0 | -70947.0 | 52.5662 | -256501.1 | 175.3958 |
| 300 | 9.5451 | 2538.8 | 59.3557 | 15267.9 | -70929.4 | -70952.3 | 52.2453 | -256513.3 | 174.2364 |
| 400 | 10.3919 | 3536.2 | 62.2191 | 21351.4 | -69932.0 | -71763.5 | 39.2889 | -257112.8 | 127.4700 |
| 500 | 11.1292 | 4613.5 | 64.6199 | 27696.5 | -68854.7 | -72355.3 | 31.4185 | -257606.0 | 99.3496 |
| 600 | 11.7189 | 5757.1 | 66.7033 | 34264.9 | -67711.1 | -72823.8 | 26.1310 | -258013.7 | 80.5695 |
| 700 | 12.1755 | 6952.8 | 68.5456 | 41029.1 | -66515.4 | -73205.9 | 22.3320 | -258355.7 | 67.1356 |
| 800 | 12.5272 | 8188.7 | 70.1954 | 47967.6 | -65279.5 | -73538.0 | 19.4689 | -258647.9 | 57.0477 |
| 900 | 12.8004 | 9455.6 | 71.6873 | 55062.9 | -64012.6 | -73854.5 | 17.2322 | -258901.9 | 49.1932 |
| 1000 | 13.0156 | 10746.9 | 73.0475 | 62300.7 | -62721.3 | -74160.4 | 15.4352 | -259126.4 | 42.9038 |
| 1100 | 13.1877 | 12057.3 | 74.2964 | 69668.7 | -61410.9 | -74458.2 | 13.9590 | -259327.5 | 37.7538 |
| 1200 | 13.3277 | 13383.3 | 75.4501 | 77156.8 | -60084.9 | -74750.1 | 12.7239 | -259510.1 | 33.4588 |
| 1300 | 13.4434 | 14722.1 | 76.5216 | 84756.0 | -58746.1 | -75037.4 | 11.6748 | -259677.5 | 29.8222 |
| 1400 | 13.5405 | 16071.4 | 77.5215 | 92458.7 | -57396.8 | -75321.5 | 10.7721 | -259832.7 | 26.7032 |
| 1500 | 13.6231 | 17429.7 | 78.4586 | 100258.2 | -56038.5 | -75603.3 | 9.9868 | -259977.7 | 23.9985 |
| 1600 | 13.6944 | 18795.6 | 79.3402 | 108148.6 | -54672.6 | -75883.7 | 9.2971 | -260114.3 | 21.6305 |
| 1700 | 13.7567 | 20168.3 | 80.1723 | 116124.6 | -53299.9 | -76163.4 | 8.6863 | -260243.9 | 19.5401 |
| 1800 | 13.8117 | 21546.7 | 80.9602 | 124181.6 | -51921.5 | -76443.0 | 8.1414 | -260367.8 | 17.6811 |
| 1900 | 13.8608 | 22930.4 | 81.7083 | 132315.3 | -50537.8 | -76723.1 | 7.6520 | -260486.9 | 16.0159 |
| 2000 | 13.9052 | 24318.7 | 82.4204 | 140522.1 | -49149.5 | -77004.2 | 7.2100 | -260602.1 | 14.5185 |
| 2100 | 13.9455 | 25711.3 | 83.0998 | 148798.3 | -47756.9 | -77286.6 | 6.8086 | -260714.3 | 13.1623 |
| 2200 | 13.9826 | 27107.7 | 83.7494 | 157141.0 | -46360.5 | -77570.7 | 6.4424 | -260823.9 | 11.9287 |
| 2300 | 14.0163 | 28507.7 | 84.3718 | 165547.3 | -44960.5 | -77856.7 | 6.1067 | -260931.7 | 10.8020 |
| 2400 | 14.0487 | 29911.0 | 84.9690 | 174014.5 | -43557.2 | -78144.8 | 5.7979 | -261038.1 | 9.7688 |
| 2500 | 14.0786 | 31317.4 | 85.5431 | 182540.3 | -42150.8 | -78435.2 | 5.5128 | -261143.5 | 8.8178 |
| 2600 | 14.1068 | 32726.7 | 86.0958 | 191122.5 | -40741.5 | | | -261248.4 | 7.9396 |
| 2700 | 14.1336 | 34138.7 | 86.6287 | 199758.8 | -39329.5 | | | -261353.0 | 7.1262 |
| 2800 | 14.1590 | 35553.4 | 87.1432 | 208447.6 | -37914.8 | | | -261457.7 | 6.3705 |
| 2900 | 14.1834 | 36976.5 | 87.6405 | 217186.9 | -36497.7 | | | -261562.8 | 5.6667 |
| 3000 | 14.2068 | 38390.0 | 88.1217 | 225975.1 | -35078.2 | | | -261668.4 | 5.0095 |
| 3100 | 14.2293 | 39811.8 | 88.5879 | 234810.7 | -33656.4 | | | -261774.8 | 4.3945 |
| 3200 | 14.2511 | 41235.8 | 89.0400 | 243692.3 | -32232.4 | | | -261882.2 | 3.8177 |
| 3300 | 14.2722 | 42662.0 | 89.4789 | 252618.3 | -30806.2 | | | -261990.6 | 3.2756 |
| 3400 | 14.2928 | 44090.2 | 89.9053 | 261587.6 | -29377.9 | | | -262100.3 | 2.7652 |
| 3500 | 14.3128 | 45520.5 | 90.3199 | 270599.0 | -27947.7 | | | -262211.3 | 2.2838 |
| 3600 | 14.3324 | 46952.8 | 90.7233 | 279651.2 | -26515.4 | | | -262323.7 | 1.8289 |
| 3700 | 14.3515 | 48387.0 | 91.1163 | 288743.3 | -25081.2 | | | -262437.7 | 1.3984 |
| 3800 | 14.3703 | 49823.1 | 91.4993 | 297874.1 | -23645.1 | | | -262553.1 | 0.9904 |
| 3900 | 14.3887 | 51261.0 | 91.8726 | 307042.8 | -22207.2 | | | -262670.2 | 0.6032 |
| 4000 | 14.4069 | 52700.8 | 92.2373 | 316248.4 | -20767.4 | | | -262788.8 | 0.2351 |
| 4100 | 14.4247 | 54142.4 | 92.5933 | 325490.0 | -19325.8 | | | -262909.1 | -0.1151 |
| 4200 | 14.4423 | 55585.8 | 92.9411 | 334766.8 | -17882.4 | | | -263031.0 | -0.4489 |
| 4300 | 14.4597 | 57030.9 | 93.2811 | 344078.0 | -16437.3 | | | -263154.5 | -0.7672 |
| 4400 | 14.4769 | 58477.7 | 93.6137 | 353422.8 | -14990.5 | | | -263279.7 | -1.0713 |
| 4500 | 14.4939 | 59926.2 | 93.9393 | 362800.5 | -13542.0 | | | -263406.4 | -1.3619 |
| 4600 | 14.5107 | 61376.5 | 94.2580 | 372210.4 | -12091.7 | | | -263534.6 | -1.6401 |
| 4700 | 14.5274 | 62828.4 | 94.5703 | 381651.9 | -10639.8 | | | -263664.4 | -1.9065 |
| 4800 | 14.5439 | 64281.9 | 94.8763 | 391124.2 | -9186.3 | | | -263795.6 | -2.1620 |
| 4900 | 14.5603 | 65737.1 | 95.1763 | 400626.9 | -7731.1 | | | -263928.2 | -2.4072 |
| 5000 | 14.5765 | 67194.0 | 95.4707 | 410159.3 | -6274.2 | | | -264062.2 | -2.6427 |
| 5100 | 14.5927 | 68652.4 | 95.7595 | 419720.9 | -4815.8 | | | -264197.5 | -2.8690 |
| 5200 | 14.6087 | 70112.5 | 96.0430 | 429311.0 | -3355.7 | | | -264334.0 | -3.0868 |
| 5300 | 14.6246 | 71574.2 | 96.3214 | 438929.3 | -1894.0 | | | -264471.6 | -3.2965 |
| 5400 | 14.6405 | 73037.4 | 96.5949 | 448575.1 | -430.8 | | | -264610.4 | -3.4985 |
| 5500 | 14.6562 | 74502.3 | 96.8637 | 458248.1 | 1034.1 | | | -264750.2 | -3.6932 |
| 5600 | 14.6719 | 75968.7 | 97.1279 | 467947.7 | 2500.5 | | | -264890.9 | -3.8811 |
| 5700 | 14.6875 | 77436.6 | 97.3878 | 477673.6 | 3968.4 | | | -265032.6 | -4.0625 |
| 5800 | 14.7031 | 78906.2 | 97.6433 | 487425.1 | 5438.0 | | | -265175.0 | -4.2378 |
| 5900 | 14.7186 | 80377.3 | 97.8948 | 497202.1 | 6909.1 | | | -265318.2 | -4.4072 |
| 6000 | 14.7340 | 81849.9 | 93.1423 | 507004.0 | 8381.7 | | | -265462.0 | -4.5710 |

°A change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (189) SO₃ (gas); molecular weight, 80.066

| T, °K | C _p , cal/mole °K | H _T ⁰ - H ₀ ⁰ , cal/mole | S _T ⁰ , cal/mole °K | -(F _T ⁰ - H ₀ ⁰), cal/mole | H _T ⁰ , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ⁰) _f , cal/mole | log ₁₀ K _f | ΔH _T ⁰ , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -97265.8 | -93100.0 | ----- | -335963.0 | ----- |
| 100 | 8.1447 | 797.5 | 50.7332 | 4275.8 | -96468.3 | -93507.5 | 201.2019 | -337247.0 | 719.3611 |
| 200 | 10.1189 | 1701.8 | 56.9207 | 9682.4 | -95564.0 | -94039.5 | 98.7984 | -338552.3 | 350.2818 |
| 298.15 | 12.1085 | 2795.8 | 61.3445 | 15494.2 | -94470.0 | -94470.0 | 64.9008 | -339580.7 | 228.3326 |
| 300 | 12.1423 | 2818.3 | 61.4195 | 15607.7 | -94447.6 | -94477.1 | 64.4736 | -339597.8 | 226.7976 |
| 400 | 13.7843 | 4117.6 | 65.1464 | 21941.0 | -93148.3 | -95341.4 | 47.2276 | -340413.3 | 164.8811 |
| 500 | 15.0818 | 5563.6 | 68.3678 | 28620.3 | -91702.2 | -95930.0 | 36.7805 | -341048.2 | 127.6507 |
| 600 | 16.0747 | 7123.7 | 71.2095 | 35602.0 | -90142.1 | -96359.5 | 29.7769 | -341545.8 | 102.7889 |
| 700 | 16.8242 | 8770.4 | 73.7465 | 42852.1 | -88495.4 | -96679.6 | 24.7547 | -341940.7 | 85.0070 |
| 800 | 17.3508 | 10482.5 | 76.0317 | 50342.9 | -86783.3 | -96934.4 | 20.9769 | -342258.9 | 71.6567 |
| 900 | 17.8231 | 12244.1 | 78.1062 | 58051.4 | -85021.7 | -97163.3 | 18.0313 | -342519.2 | 61.2643 |
| 1000 | 18.1574 | 14043.9 | 80.0020 | 65958.2 | -83222.0 | -97374.4 | 15.6695 | -342735.4 | 52.9446 |
| 1100 | 18.4196 | 15873.2 | 81.7454 | 74046.7 | -81392.6 | -97572.8 | 13.7330 | -342917.3 | 46.1336 |
| 1200 | 18.6280 | 17726.0 | 83.3574 | 82302.9 | -79539.8 | -97762.2 | 12.1160 | -343072.2 | 40.4549 |
| 1300 | 18.7959 | 19597.5 | 84.8553 | 90714.4 | -77668.3 | -97945.1 | 10.7452 | -343205.8 | 35.6479 |
| 1400 | 18.9328 | 21484.1 | 86.2534 | 99270.6 | -75781.7 | -98123.9 | 9.5681 | -343322.1 | 31.5261 |
| 1500 | 19.0458 | 23383.2 | 87.5636 | 107962.2 | -73882.6 | -98300.2 | 8.5461 | -343424.6 | 27.9528 |
| 1600 | 19.1400 | 25292.7 | 88.7959 | 116780.8 | -71973.1 | -98475.5 | 7.6502 | -343515.9 | 24.8252 |
| 1700 | 19.2192 | 27210.7 | 89.9587 | 125719.0 | -70055.1 | -98651.2 | 6.8583 | -343598.1 | 22.0649 |
| 1800 | 19.2864 | 29136.1 | 91.0592 | 134770.4 | -68129.7 | -98828.3 | 6.1531 | -343672.9 | 19.6107 |
| 1900 | 19.3439 | 31067.7 | 92.1035 | 143929.0 | -66198.1 | -99007.7 | 5.5210 | -343741.9 | 17.4144 |
| 2000 | 19.3535 | 33004.6 | 93.0970 | 153189.4 | -64261.2 | -99190.2 | 4.9511 | -343806.4 | 15.4374 |
| 2100 | 19.4264 | 34946.2 | 94.0443 | 162546.9 | -62319.6 | -99376.4 | 4.4345 | -343867.3 | 13.6483 |
| 2200 | 19.4739 | 36891.7 | 94.9494 | 171996.9 | -60374.1 | -99566.9 | 3.9640 | -343925.7 | 12.0215 |
| 2300 | 19.5069 | 38840.8 | 95.8158 | 181535.4 | -58425.0 | -99762.1 | 3.5336 | -343982.3 | 10.5360 |
| 2400 | 19.5359 | 40793.0 | 96.6466 | 191158.9 | -56472.8 | -99962.4 | 3.1382 | -344037.8 | 9.1741 |
| 2500 | 19.5616 | 42747.9 | 97.4446 | 200863.7 | -54517.9 | -100168.0 | 2.7738 | -344093.0 | 7.9209 |
| 2600 | 19.5845 | 44705.2 | 98.2123 | 210646.8 | -52560.6 | | | -344148.3 | 6.7639 |
| 2700 | 19.6050 | 46664.7 | 98.9518 | 220505.2 | -50601.1 | | | -344204.3 | 5.6924 |
| 2800 | 19.6234 | 48626.2 | 99.6651 | 230436.3 | -48639.7 | | | -344261.4 | 4.6974 |
| 2900 | 19.6400 | 50589.3 | 100.3541 | 240437.4 | -46676.5 | | | -344320.1 | 3.7707 |
| 3000 | 19.6550 | 52554.1 | 101.0201 | 250506.3 | -44711.7 | | | -344380.6 | 2.9057 |
| 3100 | 19.6686 | 54520.3 | 101.6648 | 260640.7 | -42745.5 | | | -344443.3 | 2.0964 |
| 3200 | 19.6809 | 56487.8 | 102.2895 | 270838.6 | -40778.1 | | | -344508.6 | 1.3375 |
| 3300 | 19.6922 | 58456.4 | 102.8953 | 281098.0 | -38809.4 | | | -344576.7 | 0.6245 |
| 3400 | 19.7025 | 60426.2 | 103.4833 | 291417.1 | -36839.6 | | | -344647.7 | -0.0467 |
| 3500 | 19.7120 | 62396.9 | 104.0546 | 301794.1 | -34868.9 | | | -344722.0 | -0.6797 |
| 3600 | 19.7207 | 64368.5 | 104.6100 | 312227.5 | -32897.3 | | | -344799.6 | -1.2777 |
| 3700 | 19.7287 | 66341.0 | 105.1504 | 322715.6 | -30924.8 | | | -344880.7 | -1.8435 |
| 3800 | 19.7361 | 68314.3 | 105.6767 | 333257.1 | -28951.6 | | | -344965.6 | -2.3796 |
| 3900 | 19.7429 | 70288.2 | 106.1894 | 343850.5 | -26977.6 | | | -345054.1 | -2.8883 |
| 4000 | 19.7492 | 72262.8 | 106.6893 | 354494.5 | -25003.0 | | | -345146.6 | -3.3718 |
| 4100 | 19.7551 | 74238.0 | 107.1771 | 365187.9 | -23027.8 | | | -345242.9 | -3.8318 |
| 4200 | 19.7606 | 76213.8 | 107.6532 | 375929.6 | -21052.0 | | | -345343.2 | -4.2700 |
| 4300 | 19.7657 | 78190.1 | 108.1182 | 386718.2 | -19075.7 | | | -345447.5 | -4.6879 |
| 4400 | 19.7705 | 80167.0 | 108.5727 | 397552.8 | -17098.9 | | | -345555.8 | -5.0870 |
| 4500 | 19.7749 | 82144.2 | 109.0170 | 408432.4 | -15121.6 | | | -345668.2 | -5.4685 |
| 4600 | 19.7791 | 84121.9 | 109.4517 | 419355.9 | -13143.9 | | | -345784.5 | -5.8335 |
| 4700 | 19.7830 | 86100.0 | 109.8771 | 430322.4 | -11165.8 | | | -345904.9 | -6.1831 |
| 4800 | 19.7867 | 88078.5 | 110.2937 | 441331.1 | -9187.3 | | | -346029.1 | -6.5182 |
| 4900 | 19.7901 | 90057.4 | 110.7017 | 452380.9 | -7208.4 | | | -346157.3 | -6.8398 |
| 5000 | 19.7934 | 92036.5 | 111.1015 | 463471.1 | -5229.3 | | | -346289.4 | -7.1486 |
| 5100 | 19.7964 | 94016.0 | 111.4935 | 474600.9 | -3249.8 | | | -346425.3 | -7.4454 |
| 5200 | 19.7993 | 95995.8 | 111.8780 | 485769.6 | -1270.0 | | | -346564.9 | -7.7310 |
| 5300 | 19.8020 | 97975.9 | 112.2551 | 496976.3 | 710.1 | | | -346708.1 | -8.0058 |
| 5400 | 19.8046 | 99956.2 | 112.6253 | 508220.4 | 2690.4 | | | -346855.0 | -8.2706 |
| 5500 | 19.8070 | 101936.8 | 112.9887 | 519501.1 | 4671.0 | | | -347005.4 | -8.5259 |
| 5600 | 19.8094 | 103917.6 | 113.3456 | 530817.9 | 6651.8 | | | -347159.2 | -8.7722 |
| 5700 | 19.8115 | 105898.7 | 113.6963 | 542170.0 | 8632.9 | | | -347316.4 | -9.0099 |
| 5800 | 19.8136 | 107879.9 | 114.0408 | 553556.9 | 10614.1 | | | -347476.8 | -9.2396 |
| 5900 | 19.8156 | 109861.4 | 114.3796 | 564978.0 | 12595.6 | | | -347640.4 | -9.4615 |
| 6000 | 19.8175 | 111843.1 | 114.7126 | 576432.7 | 14577.2 | | | -347807.0 | -9.6762 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(190) SOCl (gas); molecular weight, 83.523

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -27227.6 | -24039.7 | ----- | -177478.1 | ----- |
| 100 | 8.3121 | 801.5 | 55.8107 | 4779.6 | -26426.0 | -24097.7 | 54.7370 | -178200.0 | 379.6602 |
| 200 | 9.8167 | 1708.9 | 62.0388 | 10698.9 | -25518.7 | -24293.6 | 28.3258 | -178886.4 | 184.6413 |
| 298.15 | 10.8672 | 2727.6 | 66.1689 | 17000.7 | -24500.0 | -24500.0 | 19.5550 | -179448.1 | 120.2031 |
| 300 | 10.8633 | 2747.7 | 66.2361 | 17123.2 | -24479.9 | -24503.9 | 19.4441 | -179457.8 | 119.3920 |
| 400 | 11.6179 | 3874.7 | 69.4735 | 23914.6 | -23352.8 | -25245.0 | 14.9528 | -179940.0 | 86.6689 |
| 500 | 12.1508 | 5064.6 | 72.1263 | 30998.6 | -22163.0 | -25785.6 | 12.1682 | -180350.9 | 66.9856 |
| 600 | 12.5286 | 6300.1 | 74.3778 | 38326.6 | -20927.5 | -26218.9 | 10.2744 | -180704.8 | 53.8352 |
| 700 | 12.8221 | 7568.8 | 76.3330 | 45864.3 | -19658.7 | -26578.3 | 8.9010 | -181013.6 | 44.4248 |
| 800 | 13.0318 | 8862.1 | 78.0596 | 53585.6 | -18365.5 | -26896.9 | 7.8578 | -181287.0 | 37.3556 |
| 900 | 13.1894 | 10173.5 | 79.6040 | 61470.1 | -17054.1 | -27207.1 | 7.0369 | -181532.6 | 31.8494 |
| 1000 | 13.3098 | 11498.7 | 81.0002 | 69501.5 | -15728.8 | -27512.3 | 6.3726 | -181756.1 | 27.4387 |
| 1100 | 13.4035 | 12834.6 | 82.2733 | 77666.1 | -14393.0 | -27814.2 | 5.8231 | -181961.8 | 23.8257 |
| 1200 | 13.4775 | 14178.7 | 83.4429 | 85952.7 | -13048.8 | -28113.9 | 5.3602 | -182153.4 | 20.8116 |
| 1300 | 13.5268 | 15529.6 | 84.5241 | 94351.7 | -11698.0 | -28412.2 | 4.9644 | -182333.4 | 18.2586 |
| 1400 | 13.5849 | 16885.7 | 85.5291 | 102855.0 | -10341.8 | -28710.0 | 4.6215 | -182504.0 | 16.0682 |
| 1500 | 13.6245 | 18246.3 | 86.4677 | 111455.3 | -8981.3 | -29007.8 | 4.3212 | -182667.0 | 14.1681 |
| 1600 | 13.6574 | 19610.4 | 87.3481 | 120146.6 | -7617.1 | -29305.9 | 4.0557 | -182823.9 | 12.5041 |
| 1700 | 13.6851 | 20977.6 | 88.1765 | 128923.2 | -6250.0 | -29604.9 | 3.8191 | -182975.7 | 11.0346 |
| 1800 | 13.7085 | 22347.3 | 88.9598 | 137780.4 | -4880.3 | -29905.1 | 3.6066 | -183123.7 | 9.7273 |
| 1900 | 13.7284 | 23719.2 | 89.7016 | 146713.8 | -3508.4 | -30206.8 | 3.4145 | -183268.6 | 8.5566 |
| 2000 | 13.7456 | 25092.9 | 90.4062 | 155719.5 | -2134.7 | -30510.2 | 3.2400 | -183411.4 | 7.5022 |
| 2100 | 13.7605 | 26468.2 | 91.0772 | 164793.9 | -759.3 | -30815.6 | 3.0804 | -183552.5 | 6.5475 |
| 2200 | 13.7735 | 27844.9 | 91.7177 | 173933.9 | 617.4 | -31123.0 | 2.9339 | -183692.6 | 5.6790 |
| 2300 | 13.7849 | 29222.9 | 92.3302 | 183136.5 | 1995.3 | -31432.7 | 2.7989 | -183832.3 | 4.8853 |
| 2400 | 13.7949 | 30601.9 | 92.9171 | 192399.1 | 3374.3 | -31744.7 | 2.6738 | -183971.9 | 4.1572 |
| 2500 | 13.8038 | 31981.8 | 93.4804 | 201719.2 | 4754.3 | -32059.2 | 2.5576 | -184111.7 | 3.4869 |
| 2600 | 13.8117 | 33362.6 | 94.0219 | 211094.5 | 6135.0 | -184252.2 | | -184252.2 | 2.8676 |
| 2700 | 13.8188 | 34744.1 | 94.5433 | 220522.9 | 7516.6 | -184393.6 | | -184393.6 | 2.2938 |
| 2800 | 13.8252 | 36126.3 | 95.0460 | 230002.5 | 8898.8 | -184536.1 | | -184536.1 | 1.7606 |
| 2900 | 13.8309 | 37509.1 | 95.5313 | 239531.5 | 10281.6 | -184679.9 | | -184679.9 | 1.2638 |
| 3000 | 13.8360 | 38892.5 | 96.0002 | 249108.2 | 11664.9 | -184825.2 | | -184825.2 | 0.7997 |
| 3100 | 13.8407 | 40276.3 | 96.4540 | 258731.0 | 13048.8 | -184972.1 | | -184972.1 | 0.3652 |
| 3200 | 13.8450 | 41660.6 | 96.8935 | 268398.5 | 14433.1 | -185120.7 | | -185120.7 | -0.0425 |
| 3300 | 13.8489 | 43045.3 | 97.3196 | 278109.3 | 15817.8 | -185271.1 | | -185271.1 | -0.4257 |
| 3400 | 13.8524 | 44430.4 | 97.7331 | 287862.0 | 17202.8 | -185423.3 | | -185423.3 | -0.7868 |
| 3500 | 13.8557 | 45815.8 | 98.1347 | 297655.5 | 18588.2 | -185577.5 | | -185577.5 | -1.1274 |
| 3600 | 13.8587 | 47201.5 | 98.5250 | 307488.6 | 19973.9 | -185733.5 | | -185733.5 | -1.4494 |
| 3700 | 13.8614 | 48587.5 | 98.9048 | 317360.2 | 21360.0 | -185891.6 | | -185891.6 | -1.7543 |
| 3800 | 13.8639 | 49973.8 | 99.2745 | 327269.2 | 22746.2 | -186051.6 | | -186051.6 | -2.0433 |
| 3900 | 13.8663 | 51360.3 | 99.6346 | 337214.7 | 24132.7 | -186213.6 | | -186213.6 | -2.3178 |
| 4000 | 13.8685 | 52747.0 | 99.9857 | 347195.8 | 25519.5 | -186377.5 | | -186377.5 | -2.5788 |
| 4100 | 13.8705 | 54134.0 | 100.3282 | 357211.6 | 26906.4 | -186543.3 | | -186543.3 | -2.8273 |
| 4200 | 13.8724 | 55521.1 | 100.6625 | 367261.2 | 28293.6 | -186711.1 | | -186711.1 | -3.0641 |
| 4300 | 13.8741 | 56908.5 | 100.9889 | 377343.8 | 29680.9 | -186880.7 | | -186880.7 | -3.2901 |
| 4400 | 13.8758 | 58296.0 | 101.3079 | 387458.7 | 31068.4 | -187052.2 | | -187052.2 | -3.5061 |
| 4500 | 13.8773 | 59683.6 | 101.6197 | 397605.2 | 32456.1 | -187225.4 | | -187225.4 | -3.7127 |
| 4600 | 13.8787 | 61071.4 | 101.9248 | 407782.4 | 33843.9 | -187400.4 | | -187400.4 | -3.9104 |
| 4700 | 13.8801 | 62459.4 | 102.2232 | 417989.9 | 35231.8 | -187577.2 | | -187577.2 | -4.0999 |
| 4800 | 13.8813 | 63847.4 | 102.5155 | 428226.9 | 36619.9 | -187755.5 | | -187755.5 | -4.2817 |
| 4900 | 13.8825 | 65235.6 | 102.8017 | 438492.8 | 38008.1 | -187935.5 | | -187935.5 | -4.4563 |
| 5000 | 13.8836 | 66623.9 | 103.0822 | 448787.0 | 39396.4 | -188117.1 | | -188117.1 | -4.6240 |
| 5100 | 13.8847 | 68012.3 | 103.3571 | 459109.0 | 40784.8 | -188300.1 | | -188300.1 | -4.7853 |
| 5200 | 13.8857 | 69400.9 | 103.6266 | 469458.3 | 42173.3 | -188484.6 | | -188484.6 | -4.9405 |
| 5300 | 13.8866 | 70789.5 | 103.8913 | 479834.2 | 43561.9 | -188670.4 | | -188670.4 | -5.0901 |
| 5400 | 13.8875 | 72178.2 | 104.1508 | 490236.4 | 44950.6 | -188857.7 | | -188857.7 | -5.2342 |
| 5500 | 13.8883 | 73567.0 | 104.4057 | 500664.2 | 46339.4 | -189046.2 | | -189046.2 | -5.3732 |
| 5600 | 13.8891 | 74955.8 | 104.6559 | 511117.4 | 47728.3 | -189235.9 | | -189235.9 | -5.5074 |
| 5700 | 13.8899 | 76344.8 | 104.9018 | 521595.3 | 49117.2 | -189426.8 | | -189426.8 | -5.6371 |
| 5800 | 13.8906 | 77733.8 | 105.1433 | 532097.6 | 50506.3 | -189618.9 | | -189618.9 | -5.7623 |
| 5900 | 13.8913 | 79122.9 | 105.3808 | 542623.8 | 51895.4 | -189812.0 | | -189812.0 | -5.8835 |
| 6000 | 13.8919 | 80512.1 | 105.6143 | 553173.6 | 53284.5 | -190006.2 | | -190006.2 | -6.0007 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (191) SOCl_2 (gas); molecular weight, 118.980

| T, °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -53928.1 | -49643.5 | ----- | -231630.3 | ----- |
| 100 | 10.1750 | 855.4 | 59.2947 | 5074.1 | -53072.7 | -49995.6 | 107.1618 | -232795.1 | 492.3128 |
| 200 | 13.9792 | 2080.8 | 67.6345 | 11446.1 | -51847.3 | -50236.3 | 52.4155 | -233662.5 | 237.5418 |
| 298.15 | 15.9184 | 3558.1 | 73.6185 | 18391.3 | -50370.0 | -50370.0 | 34.3223 | -234268.7 | 153.3911 |
| 300 | 15.9449 | 3587.5 | 73.7170 | 18527.6 | -50340.5 | -50372.0 | 34.0945 | -234278.7 | 152.3322 |
| 400 | 17.0662 | 5242.5 | 78.4705 | 26145.6 | -48685.5 | -50999.9 | 24.9012 | -234763.3 | 109.6248 |
| 500 | 17.7899 | 6987.8 | 82.3619 | 34193.2 | -46940.3 | -51412.0 | 19.3087 | -235159.8 | 83.9515 |
| 600 | 18.2820 | 8792.9 | 85.6516 | 42598.1 | -45135.2 | -51710.2 | 15.5527 | -235488.4 | 66.8094 |
| 700 | 18.6273 | 10639.3 | 88.4972 | 51308.7 | -43288.7 | -51931.1 | 12.8564 | -235763.2 | 54.5492 |
| 800 | 18.8763 | 12515.2 | 91.0017 | 60286.2 | -41412.9 | -52109.8 | 10.8264 | -235994.7 | 45.3441 |
| 900 | 19.0601 | 14412.4 | 93.2361 | 69500.1 | -39515.6 | -52279.4 | 9.2422 | -236191.5 | 38.1781 |
| 1000 | 19.1589 | 16325.7 | 95.2518 | 78926.1 | -37602.4 | -52443.8 | 7.9708 | -236360.2 | 32.4408 |
| 1100 | 19.3059 | 18251.1 | 97.0869 | 88544.4 | -35676.9 | -52604.9 | 6.9274 | -236506.0 | 27.7435 |
| 1200 | 19.3898 | 20186.1 | 98.7704 | 98338.4 | -33742.0 | -52764.0 | 6.0552 | -236633.2 | 23.8269 |
| 1300 | 19.4568 | 22128.5 | 100.3252 | 108294.2 | -31799.5 | -52922.2 | 5.3149 | -236745.0 | 20.5111 |
| 1400 | 19.5109 | 24077.0 | 101.7691 | 118399.8 | -29851.1 | -53080.2 | 4.6785 | -236844.2 | 17.6678 |
| 1500 | 19.5553 | 26030.4 | 103.1168 | 128644.3 | -27897.7 | -53238.6 | 4.1253 | -236932.9 | 15.2026 |
| 1600 | 19.5921 | 27987.8 | 104.3801 | 139020.4 | -25940.2 | -53398.0 | 3.6398 | -237013.0 | 13.0448 |
| 1700 | 19.6229 | 29948.6 | 105.5688 | 149518.4 | -23979.5 | -53558.7 | 3.2102 | -237086.0 | 11.1402 |
| 1800 | 19.6490 | 31912.2 | 106.6912 | 160131.9 | -22015.8 | -53721.1 | 2.8271 | -237153.3 | 9.4467 |
| 1900 | 19.6712 | 33878.3 | 107.7542 | 170854.6 | -20049.8 | -53885.6 | 2.4833 | -237216.0 | 7.9311 |
| 2000 | 19.6903 | 35846.4 | 108.7637 | 181681.0 | -18081.7 | -54052.4 | 2.1729 | -237274.9 | 6.5667 |
| 2100 | 19.7068 | 37816.2 | 109.7248 | 192605.3 | -16111.8 | -54221.6 | 1.8912 | -237331.1 | 5.3319 |
| 2200 | 19.7212 | 39787.7 | 110.6419 | 203624.4 | -14140.4 | -54393.6 | 1.6344 | -237385.1 | 4.2092 |
| 2300 | 19.7338 | 41760.4 | 111.5188 | 214732.8 | -12167.6 | -54568.3 | 1.3991 | -237437.3 | 3.1838 |
| 2400 | 19.7449 | 43734.4 | 112.3589 | 225927.0 | -10193.7 | -54746.0 | 1.1827 | -237489.2 | 2.2437 |
| 2500 | 19.7547 | 45709.4 | 113.1651 | 237203.4 | -8218.7 | -54926.8 | 0.9830 | -237540.3 | 1.3786 |
| 2600 | 19.7635 | 47685.3 | 113.9401 | 248559.0 | -6242.8 | ----- | ----- | -237591.3 | 0.5798 |
| 2700 | 19.7713 | 49662.0 | 114.6861 | 259990.5 | -4266.0 | ----- | ----- | -237642.5 | -0.1599 |
| 2800 | 19.7783 | 51639.5 | 115.4053 | 271495.3 | -2288.5 | ----- | ----- | -237694.3 | -0.8469 |
| 2900 | 19.7846 | 53617.7 | 116.0995 | 283070.7 | -310.4 | ----- | ----- | -237746.8 | -1.4867 |
| 3000 | 19.7903 | 55596.4 | 116.7703 | 294714.4 | 1668.4 | ----- | ----- | -237800.3 | -2.0840 |
| 3100 | 19.7955 | 57575.7 | 117.4193 | 306424.1 | 3647.7 | ----- | ----- | -237855.0 | -2.6429 |
| 3200 | 19.8002 | 59555.5 | 118.0478 | 318197.6 | 5627.4 | ----- | ----- | -237911.0 | -3.1669 |
| 3300 | 19.8044 | 61535.7 | 118.6572 | 330033.0 | 7607.7 | ----- | ----- | -237968.4 | -3.6593 |
| 3400 | 19.8084 | 63516.4 | 119.2485 | 341928.4 | 9588.3 | ----- | ----- | -238027.3 | -4.1229 |
| 3500 | 19.8119 | 65497.4 | 119.8227 | 353882.1 | 11569.3 | ----- | ----- | -238087.8 | -4.5601 |
| 3600 | 19.8152 | 67478.8 | 120.3809 | 365892.4 | 13550.7 | ----- | ----- | -238149.9 | -4.9731 |
| 3700 | 19.8183 | 69460.4 | 120.9238 | 377957.8 | 15532.4 | ----- | ----- | -238213.7 | -5.3639 |
| 3800 | 19.8211 | 71442.4 | 121.4524 | 390076.7 | 17514.3 | ----- | ----- | -238279.3 | -5.7342 |
| 3900 | 19.8237 | 73424.6 | 121.9673 | 402247.8 | 19496.6 | ----- | ----- | -238346.5 | -6.0856 |
| 4000 | 19.8261 | 75407.1 | 122.4692 | 414469.7 | 21479.1 | ----- | ----- | -238415.5 | -6.4195 |
| 4100 | 19.8283 | 77389.9 | 122.9588 | 426741.2 | 23461.8 | ----- | ----- | -238486.3 | -6.7373 |
| 4200 | 19.8304 | 79372.8 | 123.4366 | 439061.1 | 25444.7 | ----- | ----- | -238558.7 | -7.0400 |
| 4300 | 19.8323 | 81355.9 | 123.9033 | 451428.2 | 27427.9 | ----- | ----- | -238632.8 | -7.3287 |
| 4400 | 19.8341 | 83339.2 | 124.3592 | 463841.4 | 29411.2 | ----- | ----- | -238708.7 | -7.6044 |
| 4500 | 19.8358 | 85322.7 | 124.8050 | 476299.7 | 31394.7 | ----- | ----- | -238786.1 | -7.8679 |
| 4600 | 19.8373 | 87306.4 | 125.2410 | 488802.1 | 33378.3 | ----- | ----- | -238865.2 | -8.1201 |
| 4700 | 19.8388 | 89290.2 | 125.6676 | 501347.6 | 35362.1 | ----- | ----- | -238945.8 | -8.3615 |
| 4800 | 19.8402 | 91274.1 | 126.0853 | 513935.3 | 37346.1 | ----- | ----- | -239027.9 | -8.5930 |
| 4900 | 19.8415 | 93258.2 | 126.4944 | 526564.3 | 39330.2 | ----- | ----- | -239111.6 | -8.8152 |
| 5000 | 19.8427 | 95242.5 | 126.8953 | 539233.9 | 41314.4 | ----- | ----- | -239196.6 | -9.0285 |
| 5100 | 19.8439 | 97226.8 | 127.2882 | 551943.1 | 43298.7 | ----- | ----- | -239283.1 | -9.2335 |
| 5200 | 19.8450 | 99211.2 | 127.6736 | 564691.3 | 45283.2 | ----- | ----- | -239370.9 | -9.4308 |
| 5300 | 19.8460 | 101195.8 | 128.0516 | 577477.6 | 47267.7 | ----- | ----- | -239460.0 | -9.6206 |
| 5400 | 19.8470 | 103180.4 | 128.4226 | 590301.4 | 49252.4 | ----- | ----- | -239550.4 | -9.8035 |
| 5500 | 19.8479 | 105165.2 | 128.7867 | 603161.9 | 51237.1 | ----- | ----- | -239642.0 | -9.9798 |
| 5600 | 19.8488 | 107150.0 | 129.1444 | 616058.5 | 53221.9 | ----- | ----- | -239734.7 | -10.1499 |
| 5700 | 19.8496 | 109134.9 | 129.4957 | 628990.6 | 55206.9 | ----- | ----- | -239828.5 | -10.3140 |
| 5800 | 19.8504 | 111119.9 | 129.8405 | 641957.4 | 57191.9 | ----- | ----- | -239923.4 | -10.4726 |
| 5900 | 19.8511 | 113105.0 | 130.1803 | 654958.6 | 59176.9 | ----- | ----- | -240019.3 | -10.6258 |
| 6000 | 19.8518 | 115090.1 | 130.5135 | 667993.3 | 61162.1 | ----- | ----- | -240116.1 | -10.7740 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 386.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(192) SOF (gas); molecular weight, 67.066

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| C | ----- | 0 | ----- | 0 | -32454.7 | -29308.9 | ----- | -172553.8 | ----- |
| 100 | 8.0081 | 795.7 | 53.3722 | 4541.6 | -31659.1 | -29372.0 | 66.2175 | -173283.3 | 368.7843 |
| 200 | 8.8449 | 1631.7 | 59.1335 | 10195.1 | -30823.0 | -29626.6 | 34.0225 | -174067.8 | 179.1051 |
| 298.15 | 9.9522 | 2554.7 | 62.8741 | 16191.2 | -29900.0 | -29900.0 | 23.3225 | -174755.6 | 116.3800 |
| 300 | 9.9719 | 2573.2 | 62.9357 | 16307.5 | -29881.6 | -29905.0 | 23.1872 | -174767.4 | 115.5900 |
| 400 | 10.9182 | 3619.7 | 65.9398 | 22756.2 | -28835.1 | -30697.0 | 17.7077 | -175340.0 | 83.7131 |
| 500 | 11.6273 | 4748.8 | 68.4565 | 29479.4 | -27705.9 | -31274.1 | 14.3254 | -175802.8 | 64.5294 |
| 600 | 12.1415 | 5938.7 | 70.6244 | 36436.0 | -26516.1 | -31734.4 | 12.0309 | -176182.8 | 51.7094 |
| 700 | 12.5139 | 7172.4 | 72.5255 | 43595.4 | -25282.3 | -32114.7 | 10.3700 | -176502.3 | 42.5339 |
| 800 | 12.7872 | 8438.2 | 74.2152 | 50934.0 | -24016.6 | -32450.1 | 9.1104 | -176777.5 | 35.6407 |
| 900 | 12.9912 | 9727.6 | 75.7337 | 58432.8 | -22727.2 | -32774.6 | 8.1207 | -177019.8 | 30.2714 |
| 1000 | 13.1464 | 11034.8 | 77.1108 | 66076.1 | -21420.0 | -33092.1 | 7.3211 | -177237.4 | 25.9704 |
| 1100 | 13.2666 | 12355.7 | 78.3697 | 73851.0 | -20099.1 | -33405.0 | 6.6606 | -177435.9 | 22.4473 |
| 1200 | 13.3612 | 13687.2 | 79.5283 | 81746.7 | -18767.5 | -33714.9 | 6.1051 | -177619.5 | 19.5081 |
| 1300 | 13.4369 | 15027.3 | 80.6008 | 89753.8 | -17427.5 | -34022.8 | 5.6307 | -177791.5 | 17.0187 |
| 1400 | 13.4983 | 16374.1 | 81.5985 | 97864.4 | -16080.6 | -34329.7 | 5.2203 | -177954.3 | 14.8829 |
| 1500 | 13.5487 | 17726.6 | 82.5320 | 106071.4 | -14728.2 | -34636.3 | 4.8615 | -178109.6 | 13.0302 |
| 1600 | 13.5905 | 19083.6 | 83.4078 | 114368.8 | -13371.2 | -34943.1 | 4.5448 | -178259.1 | 11.4077 |
| 1700 | 13.6255 | 20444.4 | 84.2328 | 122751.3 | -12013.3 | -35250.8 | 4.2628 | -178404.1 | 9.9749 |
| 1800 | 13.6552 | 21808.5 | 85.0124 | 131213.9 | -10646.2 | -35559.6 | 4.0100 | -178545.5 | 8.7003 |
| 1900 | 13.6805 | 23175.3 | 85.7514 | 139752.4 | -9279.4 | -35869.9 | 3.7818 | -178684.3 | 7.5589 |
| 2000 | 13.7023 | 24544.5 | 86.4537 | 148362.9 | -7910.2 | -36182.0 | 3.5746 | -178821.3 | 6.5309 |
| 2100 | 13.7212 | 25915.7 | 87.1227 | 157042.0 | -6539.1 | -36496.2 | 3.3855 | -178957.0 | 5.6001 |
| 2200 | 13.7376 | 27288.7 | 87.7614 | 165786.5 | -5166.1 | -36812.7 | 3.2122 | -179092.0 | 4.7533 |
| 2300 | 13.7520 | 28663.1 | 88.3724 | 174593.4 | -3791.6 | -37131.5 | 3.0525 | -179226.8 | 3.9795 |
| 2400 | 13.7647 | 30039.0 | 88.9580 | 183460.1 | -2415.8 | -37453.0 | 2.9049 | -179361.9 | 3.2696 |
| 2500 | 13.7759 | 31416.0 | 89.5201 | 192384.2 | -1038.7 | -37777.0 | 2.7679 | -179497.5 | 2.6161 |
| 2600 | 13.7859 | 32794.1 | 90.0606 | 201363.4 | 339.4 | -38102.0 | 2.6385 | -179634.0 | 2.0124 |
| 2700 | 13.7948 | 34173.2 | 90.5811 | 210395.7 | 1718.4 | -38427.0 | 2.5222 | -179771.6 | 1.4530 |
| 2800 | 13.8028 | 35553.1 | 91.0829 | 219479.0 | 3098.3 | -38752.0 | 2.4100 | -179910.5 | 0.9331 |
| 2900 | 13.8101 | 36933.7 | 91.5674 | 228611.7 | 4479.0 | -39077.0 | 2.3025 | -180050.9 | 0.4487 |
| 3000 | 13.8166 | 38315.1 | 92.0357 | 237791.9 | 5860.3 | -39402.0 | 2.2000 | -180193.0 | -0.0038 |
| 3100 | 13.8225 | 39697.0 | 92.4888 | 247018.3 | 7242.3 | -39727.0 | 2.1025 | -180336.8 | -0.4274 |
| 3200 | 13.8278 | 41079.5 | 92.9277 | 256289.2 | 8624.8 | -40052.0 | 2.0100 | -180482.5 | -0.8248 |
| 3300 | 13.8327 | 42462.6 | 93.3533 | 265603.4 | 10007.8 | -40377.0 | 1.9225 | -180630.2 | -1.1985 |
| 3400 | 13.8372 | 43846.1 | 93.7663 | 274959.5 | 11391.3 | -40702.0 | 1.8400 | -180779.8 | -1.5504 |
| 3500 | 13.8413 | 45230.0 | 94.1675 | 284356.3 | 12775.2 | -41027.0 | 1.7625 | -180931.5 | -1.8826 |
| 3600 | 13.8451 | 46614.3 | 94.5575 | 293792.6 | 14159.6 | -41352.0 | 1.6900 | -181085.2 | -2.1965 |
| 3700 | 13.8486 | 47999.0 | 94.9369 | 303267.4 | 15544.3 | -41677.0 | 1.6225 | -181241.0 | -2.4937 |
| 3800 | 13.8518 | 49384.0 | 95.3062 | 312779.6 | 16929.3 | -42002.0 | 1.5600 | -181398.8 | -2.7756 |
| 3900 | 13.8547 | 50769.4 | 95.6661 | 322328.3 | 18314.6 | -42327.0 | 1.5025 | -181558.7 | -3.0432 |
| 4000 | 13.8575 | 52155.0 | 96.0169 | 331912.6 | 19700.2 | -42652.0 | 1.4500 | -181720.7 | -3.2976 |
| 4100 | 13.8600 | 53540.8 | 96.3591 | 341531.4 | 21086.1 | -42977.0 | 1.4025 | -181884.6 | -3.5399 |
| 4200 | 13.8624 | 54927.0 | 96.6931 | 351184.1 | 22472.2 | -43302.0 | 1.3600 | -182050.5 | -3.7708 |
| 4300 | 13.8646 | 56313.3 | 97.0193 | 360869.8 | 23858.6 | -43627.0 | 1.3225 | -182218.4 | -3.9912 |
| 4400 | 13.8667 | 57699.9 | 97.3381 | 370587.7 | 25245.1 | -43952.0 | 1.2900 | -182388.2 | -4.2018 |
| 4500 | 13.8686 | 59086.7 | 97.6497 | 380337.2 | 26631.9 | -44277.0 | 1.2625 | -182559.9 | -4.4032 |
| 4600 | 13.8704 | 60473.6 | 97.9546 | 390117.4 | 28018.9 | -44602.0 | 1.2400 | -182733.4 | -4.5960 |
| 4700 | 13.8721 | 61860.7 | 98.2529 | 399927.9 | 29406.0 | -44927.0 | 1.2225 | -182908.6 | -4.7808 |
| 4800 | 13.8737 | 63248.0 | 98.5450 | 409767.8 | 30793.3 | -45252.0 | 1.2100 | -183085.5 | -4.9581 |
| 4900 | 13.8752 | 64635.5 | 98.8310 | 419636.7 | 32180.7 | -45577.0 | 1.2025 | -183264.1 | -5.1283 |
| 5000 | 13.8766 | 66023.1 | 99.1114 | 429533.8 | 33568.3 | -45902.0 | 1.1900 | -183444.3 | -5.2919 |
| 5100 | 13.8779 | 67410.8 | 99.3862 | 439458.7 | 34956.0 | -46227.0 | 1.1825 | -183626.1 | -5.4491 |
| 5200 | 13.8792 | 68798.6 | 99.6557 | 449410.9 | 36343.9 | -46552.0 | 1.1750 | -183809.3 | -5.6005 |
| 5300 | 13.8803 | 70186.6 | 99.9201 | 459389.7 | 37731.9 | -46877.0 | 1.1725 | -183994.0 | -5.7464 |
| 5400 | 13.8815 | 71574.7 | 100.1795 | 469394.7 | 39120.0 | -47202.0 | 1.1700 | -184180.1 | -5.8869 |
| 5500 | 13.8825 | 72962.9 | 100.4342 | 479425.5 | 40508.2 | -47527.0 | 1.1675 | -184367.5 | -6.0225 |
| 5600 | 13.8835 | 74351.2 | 100.6844 | 489481.4 | 41896.5 | -47852.0 | 1.1650 | -184556.1 | -6.1534 |
| 5700 | 13.8845 | 75739.6 | 100.9301 | 499562.2 | 43284.9 | -48177.0 | 1.1625 | -184746.0 | -6.2798 |
| 5800 | 13.8853 | 77128.1 | 101.1716 | 509667.3 | 44673.3 | -48502.0 | 1.1600 | -184937.1 | -6.4020 |
| 5900 | 13.8862 | 78516.7 | 101.4090 | 519796.4 | 46061.9 | -48827.0 | 1.1575 | -185129.2 | -6.5202 |
| 6000 | 13.8870 | 79905.3 | 101.6424 | 529949.0 | 47450.6 | -49152.0 | 1.1550 | -185322.4 | -6.6345 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (193) SOF₂ (gas); molecular weight, 86.066

| T, °K | C _p ^o , cal/mole °K | H _f ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| C | ----- | 0 | ----- | 0 | -100109.1 | -95908.4 | ----- | -257508.3 | ----- |
| 100 | 8.4239 | 803.0 | 54.998C | 4696.8 | -99306.1 | -96311.6 | 208.4153 | -258729.0 | 548.8535 |
| 200 | 11.1777 | 1777.7 | 61.6426 | 10550.9 | -98331.4 | -96777.6 | 102.9699 | -259900.8 | 265.6307 |
| 298.15 | 13.5833 | 2999.1 | 66.5794 | 16851.6 | -97110.0 | -97110.0 | 68.1024 | -260823.8 | 171.9900 |
| 300 | 13.6213 | 3024.3 | 66.6636 | 16974.8 | -97084.8 | -97115.2 | 67.6633 | -260838.9 | 170.8110 |
| 400 | 15.3185 | 4476.7 | 70.8302 | 23855.4 | -95632.4 | -97886.4 | 49.9447 | -261545.7 | 123.2468 |
| 500 | 16.4745 | 6070.0 | 74.3808 | 31120.4 | -94039.1 | -98402.0 | 39.2235 | -262076.4 | 94.6396 |
| 600 | 17.2724 | 7759.7 | 77.4593 | 38715.9 | -92349.4 | -98778.1 | 32.0417 | -262481.4 | 75.5337 |
| 700 | 17.8351 | 9516.7 | 80.1666 | 46599.9 | -90592.4 | -99060.3 | 26.8947 | -262797.0 | 61.8679 |
| 800 | 18.2414 | 11321.6 | 82.5761 | 54739.3 | -88787.5 | -99288.7 | 23.0245 | -263048.1 | 51.6074 |
| 900 | 18.5418 | 13161.4 | 84.7428 | 63107.1 | -86947.7 | -99500.0 | 20.0077 | -263251.7 | 43.6201 |
| 1000 | 18.7688 | 15027.5 | 86.7086 | 71681.2 | -85081.6 | -99700.3 | 17.5893 | -263419.8 | 37.2258 |
| 1100 | 18.9438 | 16913.5 | 88.5060 | 80443.2 | -83195.6 | -99893.1 | 15.6066 | -263560.6 | 31.9909 |
| 1200 | 19.0813 | 18815.0 | 90.1605 | 89377.6 | -81294.1 | -100080.7 | 13.9513 | -263680.2 | 27.6264 |
| 1300 | 19.1909 | 20728.8 | 91.6923 | 98471.2 | -79380.3 | -100265.1 | 12.5480 | -263783.0 | 23.9318 |
| 1400 | 19.2796 | 22652.5 | 93.1179 | 107712.5 | -77456.6 | -100447.5 | 11.3430 | -263872.6 | 20.7639 |
| 1500 | 19.3523 | 24584.2 | 94.4506 | 117091.7 | -75524.9 | -100629.1 | 10.2967 | -263951.5 | 18.0175 |
| 1600 | 19.4126 | 26522.5 | 95.7015 | 126599.9 | -73586.6 | -100810.7 | 9.3796 | -264021.8 | 15.6136 |
| 1700 | 19.4631 | 28466.4 | 96.8800 | 136229.6 | -71642.7 | -100992.9 | 8.5689 | -264085.4 | 13.4921 |
| 1800 | 19.5058 | 30414.9 | 97.9937 | 145973.7 | -69694.2 | -101176.4 | 7.8470 | -264143.5 | 11.6058 |
| 1900 | 19.5422 | 32367.3 | 99.0493 | 155826.4 | -67741.8 | -101361.7 | 7.1999 | -264197.3 | 9.9178 |
| 2000 | 19.5735 | 34323.2 | 100.0525 | 165781.9 | -65785.9 | -101549.1 | 6.6165 | -264247.9 | 8.3982 |
| 2100 | 19.6006 | 36281.9 | 101.0082 | 175835.3 | -63827.2 | -101738.9 | 6.0876 | -264296.0 | 7.0231 |
| 2200 | 19.6242 | 38243.2 | 101.9206 | 185982.1 | -61865.9 | -101931.5 | 5.6059 | -264342.5 | 5.7728 |
| 2300 | 19.6449 | 40206.6 | 102.7934 | 196218.1 | -59902.4 | -102127.1 | 5.1652 | -264387.8 | 4.6311 |
| 2400 | 19.6631 | 42172.1 | 103.6298 | 206539.5 | -57937.0 | -102325.8 | 4.7605 | -264432.6 | 3.5842 |
| 2500 | 19.6792 | 44139.2 | 104.4329 | 216942.9 | -55969.9 | -102527.7 | 4.3875 | -264477.2 | 2.6210 |
| 2600 | 19.6936 | 46107.9 | 105.2050 | 227425.1 | -54001.2 | -102730.2 | - | -264522.0 | 1.7317 |
| 2700 | 19.7064 | 48077.9 | 105.9485 | 237983.0 | -52031.2 | -102933.4 | - | -264567.4 | 0.9082 |
| 2800 | 19.7179 | 50049.1 | 106.6653 | 248613.9 | -50060.0 | -103136.9 | - | -264613.6 | 0.1433 |
| 2900 | 19.7282 | 52021.4 | 107.3575 | 259315.2 | -48087.7 | -103340.4 | - | -264660.9 | -0.5689 |
| 3000 | 19.7376 | 53994.7 | 108.0264 | 270084.6 | -46114.4 | -103543.9 | - | -264709.4 | -1.2338 |
| 3100 | 19.7460 | 55968.9 | 108.6738 | 280919.8 | -44140.2 | -103747.4 | - | -264759.3 | -1.8559 |
| 3200 | 19.7537 | 57943.9 | 109.3008 | 291818.7 | -42165.2 | -103950.9 | - | -264810.8 | -2.4392 |
| 3300 | 19.7608 | 59919.6 | 109.9088 | 302779.3 | -40189.5 | -104154.4 | - | -264863.8 | -2.9873 |
| 3400 | 19.7672 | 61896.0 | 110.4988 | 313799.8 | -38213.1 | -104357.9 | - | -264918.6 | -3.5032 |
| 3500 | 19.7731 | 63873.0 | 111.0719 | 324878.5 | -36236.1 | -104561.4 | - | -264975.2 | -3.9898 |
| 3600 | 19.7785 | 65850.6 | 111.6290 | 336013.7 | -34258.5 | -104764.9 | - | -265033.6 | -4.4494 |
| 3700 | 19.7834 | 67828.7 | 112.1709 | 347203.8 | -32280.4 | -104968.4 | - | -265093.8 | -4.8843 |
| 3800 | 19.7880 | 69807.3 | 112.6986 | 358447.4 | -30301.8 | -105171.9 | - | -265155.9 | -5.2964 |
| 3900 | 19.7923 | 71786.3 | 113.2127 | 369743.0 | -28322.8 | -105375.4 | - | -265219.9 | -5.6875 |
| 4000 | 19.7962 | 73765.7 | 113.7138 | 381089.5 | -26343.3 | -105578.9 | - | -265285.8 | -6.0590 |
| 4100 | 19.7999 | 75745.6 | 114.2027 | 392485.4 | -24363.5 | -105782.4 | - | -265353.5 | -6.4126 |
| 4200 | 19.8033 | 77725.7 | 114.6798 | 403929.6 | -22383.4 | -105985.9 | - | -265423.0 | -6.7494 |
| 4300 | 19.8064 | 79706.2 | 115.1459 | 415421.0 | -20402.9 | -106189.4 | - | -265494.4 | -7.0706 |
| 4400 | 19.8094 | 81687.0 | 115.6012 | 426958.4 | -18422.1 | -106392.9 | - | -265567.5 | -7.3773 |
| 4500 | 19.8122 | 83668.1 | 116.0464 | 438540.9 | -16441.0 | -106596.4 | - | -265642.4 | -7.6705 |
| 4600 | 19.8147 | 85649.4 | 116.4819 | 450167.4 | -14459.7 | -106800.0 | - | -265719.0 | -7.9510 |
| 4700 | 19.8172 | 87631.0 | 116.9081 | 461837.0 | -12478.1 | -107003.5 | - | -265797.2 | -8.2196 |
| 4800 | 19.8194 | 89612.9 | 117.3253 | 473548.7 | -10496.2 | -107207.0 | - | -265877.1 | -8.4771 |
| 4900 | 19.8216 | 91594.9 | 117.7340 | 485301.7 | -8514.2 | -107410.5 | - | -265958.5 | -8.7242 |
| 5000 | 19.8236 | 93577.2 | 118.1345 | 497095.2 | -6531.9 | -107614.0 | - | -266041.4 | -8.9615 |
| 5100 | 19.8255 | 95559.6 | 118.5271 | 508928.4 | -4549.5 | -107817.5 | - | -266125.8 | -9.1895 |
| 5200 | 19.8273 | 97542.3 | 118.9120 | 520800.4 | -2566.8 | -108021.0 | - | -266211.6 | -9.4089 |
| 5300 | 19.8290 | 99525.1 | 119.2897 | 532710.5 | -584.0 | -108224.5 | - | -266298.8 | -9.6200 |
| 5400 | 19.8306 | 101508.0 | 119.6604 | 544658.1 | 1399.0 | -108428.0 | - | -266387.3 | -9.8234 |
| 5500 | 19.8321 | 103491.2 | 120.0243 | 556642.4 | 3382.1 | -108631.5 | - | -266477.1 | -10.0194 |
| 5600 | 19.8335 | 105474.5 | 120.3816 | 568662.7 | 5365.4 | -108835.0 | - | -266568.0 | -10.2085 |
| 5700 | 19.8348 | 107457.9 | 120.7327 | 580718.5 | 7348.8 | -109038.5 | - | -266660.1 | -10.3911 |
| 5800 | 19.8361 | 109441.4 | 121.0777 | 592809.1 | 9332.3 | -109242.0 | - | -266753.4 | -10.5674 |
| 5900 | 19.8374 | 111425.1 | 121.4168 | 604933.9 | 11316.0 | -109445.5 | - | -266847.7 | -10.7377 |
| 6000 | 19.8385 | 113408.9 | 121.7502 | 617092.2 | 13299.8 | -109649.0 | - | -266942.9 | -10.9025 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(194) SO_2F_2 (gas); molecular weight, 102.066

| T, °K | C_p^0 , cal/mole °K | $H_f^0 - H_o^0$, cal/mole | S_f^0 , cal/mole °K | $-(F_f^0 - H_o^0)$, cal/mole | H_f^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | -208224.0 | -202985.9 | ----- | -423572.4 | ----- |
| 100 | 8.5651 | 805.1 | 55.1429 | 4709.1 | -207418.8 | -203733.7 | 438.6832 | -425318.4 | 905.8534 |
| 200 | 12.3222 | 1839.5 | 62.1606 | 10592.6 | -206384.4 | -204487.9 | 215.7274 | -426987.8 | 440.3776 |
| 298.15 | 15.7245 | 3224.0 | 67.7473 | 16974.9 | -205000.0 | -205000.0 | 142.0844 | -428270.4 | 286.5741 |
| 300 | 15.7792 | 3253.1 | 67.8447 | 17100.3 | -204970.9 | -205007.7 | 141.1576 | -428291.2 | 284.6383 |
| 400 | 18.2222 | 4963.2 | 72.7471 | 24135.6 | -203260.8 | -205876.3 | 103.7809 | -429258.3 | 206.5554 |
| 500 | 20.0674 | 6885.7 | 77.0296 | 31629.1 | -201338.3 | -206428.3 | 81.2574 | -429970.4 | 159.6125 |
| 600 | 21.3470 | 8959.9 | 80.8078 | 39524.8 | -199264.1 | -206797.6 | 66.2063 | -430497.3 | 128.2717 |
| 700 | 22.2752 | 11143.4 | 84.1719 | 47776.9 | -197080.5 | -207042.2 | 55.4394 | -430890.1 | 105.8614 |
| 800 | 22.9595 | 13466.8 | 87.1932 | 56347.7 | -194817.1 | -207210.9 | 47.3563 | -431184.8 | 89.0402 |
| 900 | 23.4734 | 15729.7 | 89.9286 | 65206.0 | -192494.3 | -207346.3 | 41.0649 | -431406.6 | 75.9492 |
| 1000 | 23.8663 | 18097.5 | 92.4230 | 74325.4 | -190126.5 | -207458.6 | 36.0287 | -431573.0 | 65.4717 |
| 1100 | 24.1719 | 20500.0 | 94.7126 | 83683.8 | -187723.9 | -207554.3 | 31.9062 | -431696.9 | 56.8963 |
| 1200 | 24.4136 | 22929.8 | 96.8266 | 93262.1 | -185294.2 | -207637.9 | 28.4692 | -431787.5 | 49.7483 |
| 1300 | 24.6074 | 25381.2 | 98.7886 | 103044.0 | -182842.8 | -207713.1 | 25.5599 | -431851.6 | 43.6990 |
| 1400 | 24.7649 | 27850.0 | 100.6182 | 113015.4 | -180373.9 | -207782.3 | 23.0653 | -431894.5 | 38.5132 |
| 1500 | 24.8945 | 30333.2 | 102.3313 | 123163.8 | -177890.7 | -207847.8 | 20.9027 | -431920.2 | 34.0185 |
| 1600 | 25.0023 | 32828.2 | 103.9415 | 133478.3 | -175395.7 | -207911.2 | 19.0098 | -431932.1 | 30.0854 |
| 1700 | 25.0928 | 35333.1 | 105.4601 | 143949.1 | -172890.9 | -207973.8 | 17.3391 | -431932.6 | 26.6150 |
| 1800 | 25.1695 | 37846.3 | 106.8966 | 154567.5 | -170377.6 | -208037.0 | 15.8535 | -431923.8 | 23.5303 |
| 1900 | 25.2351 | 40366.6 | 108.2592 | 165325.9 | -167857.3 | -208101.5 | 14.5240 | -431907.6 | 20.7703 |
| 2000 | 25.2915 | 42893.0 | 109.5551 | 176217.2 | -165330.9 | -208168.4 | 13.3270 | -431885.4 | 18.2865 |
| 2100 | 25.3404 | 45424.7 | 110.7903 | 187234.9 | -162799.3 | -208238.1 | 12.2436 | -431858.5 | 16.0393 |
| 2200 | 25.3830 | 47960.9 | 111.9701 | 198373.4 | -160263.1 | -208311.3 | 11.2585 | -431827.8 | 13.9966 |
| 2300 | 25.4204 | 50501.1 | 113.0993 | 209627.2 | -157722.9 | -208388.4 | 10.3586 | -431794.3 | 12.1316 |
| 2400 | 25.4533 | 53044.8 | 114.1819 | 220991.7 | -155179.1 | -208469.8 | 9.5334 | -431758.8 | 10.4222 |
| 2500 | 25.4825 | 55591.6 | 115.2215 | 232462.2 | -152632.3 | -208555.8 | 8.7740 | -431722.0 | 8.8496 |
| 2600 | 25.5085 | 58141.2 | 116.2215 | 244034.7 | -150082.7 | | | -431684.4 | 7.3982 |
| 2700 | 25.5318 | 60693.3 | 117.1846 | 255705.3 | -147530.7 | | | -431646.6 | 6.0544 |
| 2800 | 25.5526 | 63247.5 | 118.1136 | 267470.4 | -144976.5 | | | -431608.9 | 4.8066 |
| 2900 | 25.5714 | 65803.7 | 119.0106 | 279326.9 | -142420.3 | | | -431572.0 | 3.6451 |
| 3000 | 25.5883 | 68361.7 | 119.8778 | 291271.6 | -139862.3 | | | -431535.9 | 2.5610 |
| 3100 | 25.6037 | 70921.3 | 120.7170 | 303301.5 | -137302.6 | | | -431501.1 | 1.5470 |
| 3200 | 25.6177 | 73482.4 | 121.5302 | 315414.1 | -134741.6 | | | -431467.9 | 0.5964 |
| 3300 | 25.6305 | 76044.8 | 122.3187 | 327606.7 | -132179.1 | | | -431436.3 | -0.2965 |
| 3400 | 25.6422 | 78608.5 | 123.0840 | 339877.1 | -129615.5 | | | -431406.8 | -1.1368 |
| 3500 | 25.6529 | 81173.2 | 123.8274 | 352222.8 | -127050.7 | | | -431379.3 | -1.9290 |
| 3600 | 25.6627 | 83739.0 | 124.5502 | 364641.9 | -124484.9 | | | -431354.0 | -2.6772 |
| 3700 | 25.6718 | 86305.7 | 125.2535 | 377132.2 | -121918.2 | | | -431331.2 | -3.3849 |
| 3800 | 25.6801 | 88873.3 | 125.9382 | 389691.9 | -119350.6 | | | -431310.8 | -4.0553 |
| 3900 | 25.6879 | 91441.7 | 126.6054 | 402319.3 | -116782.2 | | | -431292.9 | -4.6913 |
| 4000 | 25.6950 | 94010.9 | 127.2558 | 415012.5 | -114213.1 | | | -431277.6 | -5.2955 |
| 4100 | 25.7017 | 96580.7 | 127.8904 | 427769.9 | -111643.2 | | | -431265.0 | -5.8702 |
| 4200 | 25.7079 | 99151.2 | 128.5098 | 440590.0 | -109072.7 | | | -431255.1 | -6.4175 |
| 4300 | 25.7136 | 101722.3 | 129.1148 | 453471.4 | -106501.7 | | | -431247.8 | -6.9393 |
| 4400 | 25.7190 | 104293.9 | 129.7060 | 466412.5 | -103930.0 | | | -431243.3 | -7.4375 |
| 4500 | 25.7241 | 106866.1 | 130.2841 | 479412.2 | -101357.9 | | | -431241.4 | -7.9134 |
| 4600 | 25.7288 | 109438.7 | 130.8495 | 492468.9 | -98785.2 | | | -431242.3 | -8.3687 |
| 4700 | 25.7332 | 112011.8 | 131.4029 | 505581.6 | -96212.1 | | | -431245.8 | -8.8046 |
| 4800 | 25.7373 | 114585.4 | 131.9447 | 518749.1 | -93638.6 | | | -431251.9 | -9.2224 |
| 4900 | 25.7412 | 117159.3 | 132.4754 | 531970.2 | -91064.7 | | | -431260.7 | -9.6231 |
| 5000 | 25.7449 | 119733.6 | 132.9955 | 545243.8 | -88490.4 | | | -431272.0 | -10.0078 |
| 5100 | 25.7484 | 122308.3 | 133.5053 | 558569.0 | -85915.7 | | | -431285.8 | -10.3774 |
| 5200 | 25.7516 | 124883.3 | 134.0054 | 571944.6 | -83340.7 | | | -431302.1 | -10.7328 |
| 5300 | 25.7547 | 127458.6 | 134.4959 | 585369.7 | -80765.4 | | | -431320.8 | -11.0748 |
| 5400 | 25.7576 | 130034.2 | 134.9773 | 598843.5 | -78189.8 | | | -431341.8 | -11.4042 |
| 5500 | 25.7604 | 132610.1 | 135.4500 | 612364.9 | -75613.8 | | | -431365.1 | -11.7216 |
| 5600 | 25.7630 | 135186.3 | 135.9142 | 625933.2 | -73037.7 | | | -431390.7 | -12.0276 |
| 5700 | 25.7654 | 137762.7 | 136.3702 | 639547.5 | -70461.3 | | | -431418.4 | -12.3230 |
| 5800 | 25.7678 | 140339.4 | 136.8183 | 653207.0 | -67884.6 | | | -431448.2 | -12.6082 |
| 5900 | 25.7700 | 142916.3 | 137.2588 | 666910.9 | -65307.7 | | | -431480.1 | -12.8837 |
| 6000 | 25.7721 | 145493.4 | 137.6920 | 680658.5 | -62730.6 | | | -431513.9 | -13.1501 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357°K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(195) Si (gas); molecular weight, 28.09

| T , °K | C_p° , cal/mole °K | $H_T^\circ - H_0^\circ$, cal/mole | S_T° , cal/mole °K | $-(F_T^\circ - H_0^\circ)$, cal/mole | H_T° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|---------------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_T^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_T° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 110195.3 | 110964.3 | ----- | 0 | ----- |
| 100 | 6.6982 | 655.1 | 33.6463 | 2709.6 | 110850.3 | 111553.6 | -236.6400 | 0 | 0 |
| 200 | 5.6883 | 1267.5 | 37.9329 | 6319.1 | 111462.8 | 111886.4 | -114.5773 | 0 | 0 |
| 298.15 ^a | 5.3188 | 1804.7 | 40.1231 | 10158.0 | 112000.0 | 112000.0 | -74.3086 | 0 | 0 |
| 300 | 5.3147 | 1814.6 | 40.1560 | 10232.2 | 112009.8 | 112000.0 | -73.8024 | 0 | 0 |
| 400 | 5.1661 | 2337.6 | 41.6617 | 14327.1 | 112532.9 | 112015.4 | -53.4031 | 0 | 0 |
| 500 | 5.0950 | 2850.3 | 42.8060 | 18552.7 | 113045.5 | 111979.1 | -41.1646 | 0 | 0 |
| 600 | 5.0560 | 3357.6 | 43.7312 | 22881.1 | 113552.9 | 111913.5 | -33.0094 | 0 | 0 |
| 700 | 5.0330 | 3862.0 | 44.5087 | 27294.1 | 114057.3 | 111827.4 | -27.1882 | 0 | 0 |
| 800 | 5.0193 | 4364.6 | 45.1798 | 31779.3 | 114559.8 | 111725.2 | -22.8262 | 0 | 0 |
| 900 | 5.0124 | 4866.1 | 45.7705 | 36327.4 | 115061.4 | 111609.7 | -19.4365 | 0 | 0 |
| 1000 | 5.0117 | 5367.2 | 46.2985 | 40931.3 | 115562.5 | 111482.3 | -16.7278 | 0 | 0 |
| 1100 | 5.0167 | 5868.6 | 46.7764 | 45585.4 | 116063.9 | 111344.7 | -14.5143 | 0 | 0 |
| 1200 | 5.0272 | 6370.8 | 47.2133 | 50285.2 | 116566.0 | 111197.5 | -12.6721 | 0 | 0 |
| 1300 | 5.0429 | 6874.2 | 47.6163 | 55026.9 | 117069.5 | 111041.5 | -11.1154 | 0 | 0 |
| 1400 | 5.0630 | 7379.5 | 47.9907 | 59807.5 | 117574.8 | 110878.0 | -9.7831 | 0 | 0 |
| 1500 | 5.0868 | 7887.0 | 48.3408 | 64624.2 | 118082.2 | 110707.2 | -8.6299 | 0 | 0 |
| 1600 | 5.1134 | 8396.9 | 48.6699 | 69474.9 | 118592.2 | 110529.7 | -7.6227 | 0 | 0 |
| 1700 | 5.1420 | 8909.7 | 48.9808 | 74357.6 | 119105.0 | 98327.1 | -6.7490 | 0 | 0 |
| 1800 | 5.1717 | 9425.4 | 49.2755 | 79270.6 | 119620.7 | 98228.5 | -6.0471 | 0 | 0 |
| 1900 | 5.2018 | 9944.1 | 49.5560 | 84212.2 | 120139.3 | 98132.8 | -5.4197 | 0 | 0 |
| 2000 | 5.2318 | 10465.7 | 49.8235 | 89181.3 | 120661.0 | 98040.2 | -4.8556 | 0 | 0 |
| 2100 | 5.2610 | 10990.4 | 50.0799 | 94176.6 | 121185.7 | 97950.6 | -4.3457 | 0 | 0 |
| 2200 | 5.2892 | 11517.9 | 50.3249 | 99196.9 | 121713.2 | 97863.8 | -3.8826 | 0 | 0 |
| 2300 | 5.3160 | 12048.2 | 50.5606 | 104241.2 | 122243.5 | 97779.8 | -3.4601 | 0 | 0 |
| 2400 | 5.3411 | 12581.1 | 50.7874 | 109308.7 | 122776.3 | 97698.3 | -3.0731 | 0 | 0 |
| 2500 | 5.3645 | 13116.4 | 51.0059 | 114398.4 | 123311.6 | 97619.3 | -2.7174 | 0 | 0 |
| 2600 | 5.3861 | 13653.9 | 51.2167 | 119509.6 | 123849.2 | 97542.6 | -2.3893 | 0 | 0 |
| 2700 | 5.4058 | 14193.5 | 51.4204 | 124641.5 | 124388.8 | 97467.9 | -2.0858 | 0 | 0 |
| 2800 | 5.4237 | 14735.0 | 51.6173 | 129793.5 | 124930.3 | 97395.1 | -1.8041 | 0 | 0 |
| 2900 | 5.4397 | 15278.2 | 51.8079 | 134964.8 | 125473.5 | 97324.0 | -1.5421 | 0 | 0 |
| 3000 | 5.4541 | 15822.9 | 51.9920 | 140154.9 | 126018.2 | 97254.4 | -1.2977 | 0 | 0 |
| 3100 | 5.4667 | 16368.9 | 52.1716 | 145363.1 | 126564.2 | 97186.1 | -1.0693 | 0 | 0 |
| 3200 | 5.4778 | 16916.2 | 52.3454 | 150589.0 | 127111.5 | 97119.1 | -0.8552 | 0 | 0 |
| 3300 | 5.4874 | 17464.5 | 52.5141 | 155832.0 | 127659.7 | 97053.0 | -0.6543 | 0 | 0 |
| 3400 | 5.4956 | 18013.6 | 52.6780 | 161091.7 | 128208.9 | 96987.9 | -0.4653 | 0 | 0 |
| 3500 | 5.5025 | 18563.5 | 52.8374 | 166367.5 | 128758.8 | 96923.5 | -0.2873 | 0 | 0 |
| 3600 | 5.5083 | 19114.1 | 52.9925 | 171659.0 | 129309.3 | 96859.7 | -0.1192 | 0 | 0 |
| 3700 | 5.5130 | 19665.1 | 53.1435 | 176965.8 | 129860.4 | 96796.5 | 0.0396 | 0 | 0 |
| 3800 | 5.5167 | 20216.6 | 53.2906 | 182287.6 | 130411.9 | 96733.7 | 0.1901 | 0 | 0 |
| 3900 | 5.5196 | 20768.5 | 53.4339 | 187623.8 | 130963.7 | 96671.2 | 0.3327 | 0 | 0 |
| 4000 | 5.5217 | 21320.5 | 53.5737 | 192974.3 | 131515.8 | 96609.0 | 0.4680 | 0 | 0 |
| 4100 | 5.5231 | 21872.8 | 53.7101 | 198338.5 | 132068.1 | 96547.0 | 0.5967 | 0 | 0 |
| 4200 | 5.5240 | 22425.1 | 53.8432 | 203716.2 | 132620.4 | 96485.0 | 0.7192 | 0 | 0 |
| 4300 | 5.5243 | 22977.6 | 53.9732 | 209107.0 | 133172.8 | 96423.1 | 0.8359 | 0 | 0 |
| 4400 | 5.5242 | 23530.0 | 54.1002 | 214510.7 | 133725.3 | 96361.3 | 0.9473 | 0 | 0 |
| 4500 | 5.5237 | 24082.4 | 54.2243 | 219926.9 | 134277.7 | 96299.4 | 1.0536 | 0 | 0 |
| 4600 | 5.5230 | 24634.7 | 54.3457 | 225355.5 | 134830.0 | 96237.4 | 1.1552 | 0 | 0 |
| 4700 | 5.5222 | 25187.0 | 54.4645 | 230796.0 | 135382.3 | 96175.4 | 1.2525 | 0 | 0 |
| 4800 | 5.5212 | 25739.2 | 54.5807 | 236248.3 | 135934.4 | 96113.2 | 1.3456 | 0 | 0 |
| 4900 | 5.5202 | 26291.2 | 54.6945 | 241712.0 | 136486.5 | 96051.0 | 1.4349 | 0 | 0 |
| 5000 | 5.5193 | 26843.2 | 54.8061 | 247187.1 | 137038.5 | 95988.7 | 1.5205 | 0 | 0 |
| 5100 | 5.5186 | 27395.1 | 54.9153 | 252673.2 | 137590.4 | 95926.3 | 1.6028 | 0 | 0 |
| 5200 | 5.5180 | 27946.9 | 55.0225 | 258170.1 | 138142.2 | 95863.8 | 1.6818 | 0 | 0 |
| 5300 | 5.5178 | 28498.7 | 55.1276 | 263677.6 | 138694.0 | 95801.3 | 1.7578 | 0 | 0 |
| 5400 | 5.5179 | 29050.5 | 55.2307 | 269195.6 | 139245.8 | 95738.8 | 1.8309 | 0 | 0 |
| 5500 | 5.5185 | 29602.3 | 55.3320 | 274723.7 | 139797.6 | 95676.3 | 1.9013 | 0 | 0 |
| 5600 | 5.5197 | 30154.2 | 55.4314 | 280261.9 | 140349.5 | 95613.9 | 1.9692 | 0 | 0 |
| 5700 | 5.5199 | 30705.6 | 55.5290 | 285809.9 | 140900.9 | 95551.0 | 2.0347 | 0 | 0 |
| 5800 | 5.5220 | 31257.7 | 55.6251 | 291367.6 | 141453.0 | 95488.8 | 2.0978 | 0 | 0 |
| 5900 | 5.5249 | 31810.1 | 55.7195 | 296934.8 | 142005.3 | 95426.8 | 2.1588 | 0 | 0 |
| 6000 | 5.5283 | 32362.6 | 55.8123 | 302511.4 | 142557.9 | 95365.1 | 2.2176 | 0 | 0 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Si, 1685° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (196) Si (crystal, liquid); molecular weight, 28.09

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H _O ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H _O ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | 0 | 0 | -769.0 | 0 | ----- | -110964.3 | ----- |
| 100 | 1.739 | 63.7 | 0.916 | 27.9 | -705.3 | 0 | 0 | -111555.6 | 236.6400 |
| 200 | 3.735 | 345.4 | 2.788 | 212.2 | -423.6 | 0 | 0 | -111886.4 | 114.5773 |
| 298.15 | 4.782 | 769.0 | 4.497 | 571.8 | 0 | 0 | 0 | -112000.0 | 74.3086 |
| 300 | 4.796 | 777.9 | 4.527 | 580.2 | 8.9 | 0 | 0 | -112000.9 | 73.8024 |
| 400 | 5.335 | 1286.5 | 5.987 | 1108.3 | 517.5 | 0 | 0 | -112015.4 | 53.4031 |
| 500 | 5.627 | 1835.4 | 7.210 | 1769.6 | 1066.4 | 0 | 0 | -111979.1 | 41.1646 |
| 600 | 5.826 | 2408.4 | 8.254 | 2544.0 | 1639.4 | 0 | 0 | -111913.5 | 33.0094 |
| 700 | 5.981 | 2998.9 | 9.164 | 3415.9 | 2229.9 | 0 | 0 | -111827.4 | 27.1882 |
| 800 | 6.111 | 3603.6 | 9.972 | 4374.0 | 2834.6 | 0 | 0 | -111725.2 | 22.8262 |
| 900 | 6.229 | 4220.7 | 10.698 | 5407.5 | 3451.7 | 0 | 0 | -111609.7 | 19.4365 |
| 1000 | 6.339 | 4849.2 | 11.360 | 6510.8 | 4080.2 | 0 | 0 | -111482.3 | 16.7278 |
| 1100 | 6.442 | 5488.2 | 11.969 | 7677.7 | 4719.2 | 0 | 0 | -111344.7 | 14.5143 |
| 1200 | 6.542 | 6137.5 | 12.534 | 8903.3 | 5368.5 | 0 | 0 | -111197.5 | 12.6721 |
| 1300 | 6.639 | 6797.0 | 13.062 | 10183.6 | 6028.0 | 0 | 0 | -111041.5 | 11.1154 |
| 1400 | 6.735 | 7465.8 | 13.558 | 11515.4 | 6696.8 | 0 | 0 | -110878.0 | 9.7831 |
| 1500 | 6.829 | 8144.0 | 14.025 | 12893.5 | 7375.0 | 0 | 0 | -110707.2 | 8.6299 |
| 1600 | 6.922 | 8831.5 | 14.469 | 14318.9 | 8062.5 | 0 | 0 | -110529.7 | 7.6227 |
| ^b 1685 | 6.999 | 9423.2 | 14.829 | 15563.7 | 8654.2 | 0 | 0 | -110329.4 | 6.8614 |
| 1685 | 6.143 | 21454.8 | 21.969 | 15563.7 | 20685.8 | 0 | 0 | -98341.1 | 6.8614 |
| 1700 | 6.143 | 21546.9 | 22.0234 | 15892.9 | 20777.9 | 0 | 0 | -98327.1 | 6.7490 |
| 1800 | 6.143 | 22161.2 | 22.3746 | 18113.0 | 21392.2 | 0 | 0 | -98228.5 | 6.0471 |
| 1900 | 6.143 | 22775.5 | 22.7067 | 20367.2 | 22006.5 | 0 | 0 | -98132.8 | 5.4197 |
| 2000 | 6.143 | 23389.8 | 23.0218 | 22653.8 | 22620.8 | 0 | 0 | -98040.2 | 4.8556 |
| 2100 | 6.143 | 24004.1 | 23.3215 | 24971.1 | 23235.1 | 0 | 0 | -97950.6 | 4.3457 |
| 2200 | 6.143 | 24618.4 | 23.6073 | 27317.6 | 23849.4 | 0 | 0 | -97853.8 | 3.8826 |
| 2300 | 6.143 | 25232.7 | 23.8804 | 29692.1 | 24463.7 | 0 | 0 | -97779.8 | 3.4601 |
| 2400 | 6.143 | 25847.0 | 24.1418 | 32093.3 | 25078.0 | 0 | 0 | -97698.3 | 3.0731 |
| 2500 | 6.143 | 26461.3 | 24.3926 | 34520.1 | 25692.3 | 0 | 0 | -97619.3 | 2.7174 |
| 2600 | 6.143 | 27075.6 | 24.6335 | 36971.5 | 26306.6 | 0 | 0 | -97542.6 | 2.3893 |
| 2700 | 6.143 | 27689.9 | 24.8653 | 39446.5 | 26920.9 | 0 | 0 | -97467.9 | 2.0858 |
| 2800 | 6.143 | 28304.2 | 25.0887 | 41944.3 | 27535.2 | 0 | 0 | -97395.1 | 1.8041 |
| 2900 | 6.143 | 28918.5 | 25.3043 | 44444.0 | 28149.5 | 0 | 0 | -97324.0 | 1.5421 |
| 3000 | 6.143 | 29532.8 | 25.5126 | 47004.9 | 28763.8 | 0 | 0 | -97254.4 | 1.2977 |
| 3100 | 6.143 | 30147.1 | 25.7140 | 49566.3 | 29378.1 | 0 | 0 | -97186.1 | 1.0693 |
| 3200 | 6.143 | 30761.4 | 25.9090 | 52147.5 | 29992.4 | 0 | 0 | -97119.1 | 0.8552 |
| 3300 | 6.143 | 31375.7 | 26.0981 | 54747.9 | 30606.7 | 0 | 0 | -97053.0 | 0.6543 |
| 3400 | 6.143 | 31990.0 | 26.2814 | 57366.9 | 31221.0 | 0 | 0 | -96987.9 | 0.4653 |
| 3500 | 6.143 | 32604.3 | 26.4595 | 60004.0 | 31835.3 | 0 | 0 | -96923.5 | 0.2873 |
| 3600 | 6.143 | 33218.6 | 26.6326 | 62658.6 | 32449.6 | 0 | 0 | -96859.7 | 0.1192 |
| 3700 | 6.143 | 33832.9 | 26.8009 | 65330.4 | 33063.9 | 0 | 0 | -96796.5 | -0.0396 |
| 3800 | 6.143 | 34447.2 | 26.9647 | 68018.7 | 33678.2 | 0 | 0 | -96733.7 | -0.1901 |
| 3900 | 6.143 | 35061.5 | 27.1243 | 70723.2 | 34292.5 | 0 | 0 | -96671.2 | -0.3327 |
| 4000 | 6.143 | 35675.8 | 27.2798 | 73443.4 | 34906.8 | 0 | 0 | -96609.0 | -0.4680 |
| 4100 | 6.143 | 36290.1 | 27.4315 | 76179.0 | 35521.1 | 0 | 0 | -96547.0 | -0.5967 |
| 4200 | 6.143 | 36904.4 | 27.5795 | 78929.6 | 36135.4 | 0 | 0 | -96485.0 | -0.7192 |
| 4300 | 6.143 | 37518.7 | 27.7241 | 81694.8 | 36749.7 | 0 | 0 | -96423.1 | -0.8359 |
| 4400 | 6.143 | 38133.0 | 27.8653 | 84474.3 | 37364.0 | 0 | 0 | -96361.3 | -0.9473 |
| 4500 | 6.143 | 38747.3 | 28.0033 | 87267.7 | 37978.3 | 0 | 0 | -96299.4 | -1.0536 |
| 4600 | 6.143 | 39361.6 | 28.1384 | 90074.8 | 38592.6 | 0 | 0 | -96237.4 | -1.1552 |
| 4700 | 6.143 | 39975.9 | 28.2705 | 92895.3 | 39206.9 | 0 | 0 | -96175.4 | -1.2525 |
| 4800 | 6.143 | 40590.2 | 28.3998 | 95728.8 | 39821.2 | 0 | 0 | -96113.2 | -1.3456 |
| 4900 | 6.143 | 41204.5 | 28.5265 | 98575.2 | 40435.5 | 0 | 0 | -96051.0 | -1.4349 |
| 5000 | 6.143 | 41818.8 | 28.6506 | 101434.0 | 41049.8 | 0 | 0 | -95988.7 | -1.5205 |
| 5100 | 6.143 | 42433.1 | 28.7722 | 104305.2 | 41664.1 | 0 | 0 | -95926.3 | -1.6028 |
| 5200 | 6.143 | 43047.4 | 28.8915 | 107188.4 | 42278.4 | 0 | 0 | -95863.8 | -1.6818 |
| 5300 | 6.143 | 43661.7 | 29.0085 | 110083.4 | 42892.7 | 0 | 0 | -95801.3 | -1.7578 |
| 5400 | 6.143 | 44276.0 | 29.1233 | 112990.0 | 43507.0 | 0 | 0 | -95738.8 | -1.8309 |
| 5500 | 6.143 | 44890.3 | 29.2361 | 115908.0 | 44121.3 | 0 | 0 | -95676.3 | -1.9013 |
| 5600 | 6.143 | 45504.6 | 29.3467 | 118837.2 | 44735.6 | 0 | 0 | -95613.9 | -1.9692 |
| 5700 | 6.143 | 46118.9 | 29.4555 | 121777.3 | 45349.9 | 0 | 0 | -95551.0 | -2.0347 |
| 5800 | 6.143 | 46733.2 | 29.5623 | 124728.2 | 45964.2 | 0 | 0 | -95488.8 | -2.0978 |
| 5900 | 6.143 | 47347.5 | 29.6673 | 127689.7 | 46578.5 | 0 | 0 | -95426.8 | -2.1588 |
| 6000 | 6.143 | 47961.8 | 29.7706 | 130661.6 | 47192.8 | 0 | 0 | -95365.1 | -2.2176 |

^aH_T^o refers to crystal state.^bMelting point.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(197) Si₂ (gas); molecular weight, 56.18

| T, °K | C _p , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 145390.5 | 146928.5 | ----- | -75000.0 | ----- |
| 100 | 7.0338 | 696.5 | 46.6775 | 3971.3 | 146087.0 | 147497.6 | -312.5398 | -75613.7 | 160.7403 |
| 200 | 7.7057 | 1431.4 | 51.7443 | 8917.4 | 146822.0 | 147609.2 | -151.2680 | -76103.6 | 77.8867 |
| 298.15 | 8.2227 | 2215.5 | 54.9272 | 14161.0 | 147606.1 | 147606.1 | -98.1548 | -76393.9 | 50.4624 |
| 300 | 8.2296 | 2230.8 | 54.9781 | 14262.7 | 147621.3 | 147603.5 | -97.4877 | -76398.4 | 50.1170 |
| 400 | 8.5137 | 3069.4 | 57.3887 | 19886.1 | 148459.9 | 147424.9 | -70.6205 | -76605.7 | 36.1857 |
| 500 | 8.6743 | 3929.5 | 59.3072 | 25724.2 | 149320.0 | 147187.2 | -54.5228 | -76771.1 | 27.8064 |
| 600 | 8.7734 | 4802.2 | 60.8982 | 31736.7 | 150192.7 | 146913.9 | -43.8098 | -76913.1 | 22.2089 |
| 700 | 8.8397 | 5683.1 | 62.2559 | 37896.1 | 151073.6 | 146613.8 | -36.1727 | -77040.9 | 18.2037 |
| 800 | 8.8873 | 6569.5 | 63.4395 | 44182.1 | 151960.1 | 146290.9 | -30.4574 | -77159.6 | 15.1949 |
| 900 | 8.9235 | 7460.1 | 64.4885 | 50579.5 | 152850.7 | 145947.3 | -26.0217 | -77272.0 | 12.8513 |
| 1000 | 8.9523 | 8354.0 | 65.4302 | 57076.2 | 153744.5 | 145584.1 | -22.4820 | -77380.5 | 10.9737 |
| 1100 | 8.9763 | 9250.5 | 66.2846 | 63662.6 | 154641.0 | 145202.6 | -19.5933 | -77486.8 | 9.4353 |
| 1200 | 8.9969 | 10149.1 | 67.0666 | 70330.7 | 155539.7 | 144802.7 | -17.1926 | -77592.4 | 8.1516 |
| 1300 | 9.0151 | 11049.8 | 67.7874 | 77073.9 | 156440.3 | 144384.3 | -15.1669 | -77698.7 | 7.0639 |
| 1400 | 9.0315 | 11952.1 | 68.4561 | 83886.5 | 157342.6 | 143949.0 | -13.4359 | -77806.9 | 6.1303 |
| 1500 | 9.0467 | 12856.0 | 69.0796 | 90763.6 | 158246.6 | 143496.6 | -11.9398 | -77917.9 | 5.3200 |
| 1600 | 9.0608 | 13761.4 | 69.6641 | 97701.1 | 159151.9 | 143026.9 | -10.6354 | -78032.5 | 4.6100 |
| 1700 | 9.0741 | 14668.1 | 70.2138 | 104695.3 | 160058.7 | 142502.9 | -9.5153 | -78151.3 | 3.9826 |
| 1800 | 9.0868 | 15576.2 | 70.7328 | 111742.9 | 160966.7 | 14182.3 | -8.6701 | -78274.6 | 3.4240 |
| 1900 | 9.0990 | 16485.5 | 71.2244 | 118841.0 | 161876.0 | 141863.0 | -7.9160 | -78402.6 | 2.9234 |
| 2000 | 9.1109 | 17396.0 | 71.6915 | 125986.9 | 162786.5 | 141544.9 | -7.2390 | -78535.5 | 2.4721 |
| 2100 | 9.1224 | 18307.7 | 72.1363 | 133178.5 | 163698.2 | 141228.0 | -6.6282 | -78673.1 | 2.0632 |
| 2200 | 9.1336 | 19220.5 | 72.5609 | 140413.5 | 164611.0 | 140912.2 | -6.0744 | -78815.4 | 1.6907 |
| 2300 | 9.1446 | 20134.4 | 72.9672 | 147690.1 | 165524.9 | 140597.5 | -5.5702 | -78962.0 | 1.3500 |
| 2400 | 9.1555 | 21049.4 | 73.3566 | 155006.4 | 166439.9 | 140283.9 | -5.1092 | -79112.7 | 1.0371 |
| 2500 | 9.1662 | 21965.5 | 73.7305 | 162360.9 | 167356.0 | 139971.4 | -4.6862 | -79267.2 | 0.7486 |
| 2600 | 9.1767 | 22882.6 | 74.0902 | 169752.0 | 168273.1 | 139660.0 | -4.2968 | -79425.2 | 0.4819 |
| 2700 | 9.1871 | 23800.8 | 74.4368 | 177178.5 | 169191.3 | 139349.5 | -3.9372 | -79586.2 | 0.2344 |
| 2800 | 9.1975 | 24720.0 | 74.7711 | 184639.0 | 170110.6 | 139040.2 | -3.6042 | -79750.0 | 0.0041 |
| 2900 | 9.2077 | 25640.3 | 75.0940 | 192132.3 | 171030.8 | 138731.8 | -3.2950 | -79916.1 | -0.2108 |
| 3000 | 9.2179 | 26561.6 | 75.4063 | 199657.4 | 171952.1 | 138424.5 | -3.0072 | -80084.2 | -0.4118 |
| 3100 | 9.2280 | 27483.9 | 75.7088 | 207213.3 | 172874.4 | 138118.2 | -2.7386 | -80254.0 | -0.6001 |
| 3200 | 9.2381 | 28407.2 | 76.0019 | 214798.9 | 173797.7 | 137812.9 | -2.4876 | -80425.2 | -0.7771 |
| 3300 | 9.2481 | 29331.5 | 76.2853 | 222413.3 | 174722.0 | 137508.6 | -2.2523 | -80597.4 | -0.9437 |
| 3400 | 9.2581 | 30256.8 | 76.5625 | 230055.9 | 175647.3 | 137205.3 | -2.0315 | -80770.4 | -1.1009 |
| 3500 | 9.2680 | 31183.1 | 76.8311 | 237725.6 | 176573.6 | 136903.0 | -1.8239 | -80943.9 | -1.2494 |
| 3600 | 9.2779 | 32110.4 | 77.0923 | 245421.8 | 177500.9 | 136601.7 | -1.6284 | -81117.8 | -1.3899 |
| 3700 | 9.2877 | 33038.7 | 77.3466 | 253143.8 | 178429.2 | 136301.4 | -1.4439 | -81291.6 | -1.5232 |
| 3800 | 9.2976 | 33967.9 | 77.5944 | 260890.9 | 179358.5 | 136002.1 | -1.2695 | -81465.3 | -1.6496 |
| 3900 | 9.3074 | 34898.2 | 77.8361 | 268662.5 | 180288.7 | 135703.7 | -1.1046 | -81638.7 | -1.7699 |
| 4000 | 9.3171 | 35829.4 | 78.0718 | 276457.9 | 181219.9 | 135406.3 | -0.9483 | -81811.7 | -1.8844 |
| 4100 | 9.3269 | 36761.6 | 78.3020 | 284276.7 | 182152.1 | 135110.0 | -0.8001 | -81984.0 | -1.9935 |
| 4200 | 9.3366 | 37694.8 | 78.5269 | 292118.2 | 183085.3 | 134814.5 | -0.6592 | -82155.5 | -2.0977 |
| 4300 | 9.3464 | 38628.9 | 78.7467 | 299981.9 | 184019.5 | 134520.1 | -0.5253 | -82326.2 | -2.1972 |
| 4400 | 9.3561 | 39564.1 | 78.9617 | 307867.4 | 184954.6 | 134226.6 | -0.3978 | -82495.9 | -2.2924 |
| 4500 | 9.3658 | 40500.2 | 79.1721 | 315774.1 | 185890.7 | 133934.1 | -0.2763 | -82664.6 | -2.3835 |
| 4600 | 9.3755 | 41437.2 | 79.3780 | 323701.6 | 186827.8 | 133642.6 | -0.1604 | -82832.2 | -2.4709 |
| 4700 | 9.3851 | 42375.2 | 79.5797 | 331649.5 | 187765.8 | 133352.0 | -0.0497 | -82998.7 | -2.5547 |
| 4800 | 9.3948 | 43314.2 | 79.7774 | 339617.4 | 188704.8 | 133062.4 | 0.0561 | -83164.1 | -2.6352 |
| 4900 | 9.4044 | 44254.2 | 79.9712 | 347604.9 | 189644.7 | 132773.7 | 0.1573 | -83328.2 | -2.7125 |
| 5000 | 9.4141 | 45195.1 | 80.1613 | 355611.6 | 190585.7 | 132486.1 | 0.2542 | -83491.3 | -2.7869 |
| 5100 | 9.4237 | 46137.0 | 80.3479 | 363637.0 | 191527.6 | 132199.4 | 0.3470 | -83653.2 | -2.8586 |
| 5200 | 9.4334 | 47079.9 | 80.5309 | 371681.0 | 192470.4 | 131913.6 | 0.4361 | -83814.0 | -2.9276 |
| 5300 | 9.4430 | 48023.7 | 80.7107 | 379743.1 | 193414.2 | 131628.8 | 0.5215 | -83973.7 | -2.9941 |
| 5400 | 9.4526 | 48968.5 | 80.8873 | 387823.1 | 194359.0 | 131345.0 | 0.6036 | -84132.5 | -3.0583 |
| 5500 | 9.4622 | 49914.2 | 81.0609 | 395920.5 | 195304.7 | 131062.2 | 0.6825 | -84290.4 | -3.1202 |
| 5600 | 9.4718 | 50860.9 | 81.2314 | 404035.1 | 196251.4 | 130780.2 | 0.7583 | -84447.5 | -3.1801 |
| 5700 | 9.4814 | 51808.6 | 81.3992 | 412166.7 | 197199.1 | 130499.3 | 0.8314 | -84602.7 | -3.2380 |
| 5800 | 9.4910 | 52757.2 | 81.5641 | 420314.9 | 198147.7 | 130219.3 | 0.9017 | -84758.2 | -3.2939 |
| 5900 | 9.5006 | 53706.8 | 81.7265 | 428479.4 | 199097.3 | 129940.3 | 0.9694 | -84913.4 | -3.3481 |
| 6000 | 9.5101 | 54657.3 | 81.8862 | 436660.1 | 200047.8 | 129662.2 | 1.0347 | -85067.9 | -3.4006 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Si, 1685° K.

c-4

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(198) Si₃ (gas); molecular weight, 84.27

| T, °K | C _p ^o , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 155585.8 | 157892.8 | ----- | -175000.0 | ----- |
| 100 | 8.4665 | 730.4 | 48.8660 | 4156.2 | 156316.2 | 158432.1 | -336.158C | -176234.8 | 373.7622 |
| 200 | 11.4570 | 1741.5 | 55.7531 | 9409.1 | 157327.3 | 158598.1 | -162.9432 | -177061.1 | 180.7888 |
| 298.15 | 12.9216 | 2946.4 | 60.6356 | 15132.0 | 158532.3 | 158532.3 | -105.8587 | -177467.7 | 117.0269 |
| 300 | 12.9404 | 2970.4 | 60.7155 | 15244.3 | 158556.2 | 158529.5 | -105.1823 | -177473.3 | 116.2247 |
| 400 | 13.6762 | 4305.2 | 64.5505 | 21515.0 | 159891.0 | 158338.5 | -76.3263 | -177707.6 | 83.8829 |
| 500 | 14.0752 | 5694.6 | 67.6493 | 28130.0 | 16128C.4 | 158081.2 | -59.0365 | -177856.2 | 64.4568 |
| 600 | 14.3108 | 7114.9 | 70.2381 | 35028.0 | 16270C.7 | 157782.5 | -47.5311 | -177958.0 | 51.4969 |
| 700 | 14.4600 | 8554.0 | 72.4562 | 42165.4 | 164139.8 | 157450.1 | -39.3293 | -178032.0 | 42.2353 |
| 800 | 14.5600 | 10005.3 | 74.3940 | 49509.9 | 165591.1 | 157087.3 | -33.192C | -178088.4 | 35.2865 |
| 900 | 14.6299 | 11465.0 | 76.1132 | 57036.9 | 16705C.8 | 156695.7 | -28.4252 | -178133.3 | 29.8804 |
| 1000 | 14.6807 | 12930.6 | 77.6573 | 64726.7 | 168516.4 | 156275.8 | -24.6291 | -178171.1 | 25.5544 |
| 1100 | 14.7187 | 14400.7 | 79.0584 | 72563.6 | 169986.5 | 155828.9 | -21.5286 | -178205.2 | 22.0143 |
| 1200 | 14.7478 | 15874.1 | 80.3404 | 80534.4 | 171459.9 | 155354.4 | -18.9525 | -178238.2 | 19.0637 |
| 1300 | 14.7706 | 17350.0 | 81.5218 | 88628.3 | 172935.8 | 154851.8 | -16.7797 | -178272.7 | 16.5666 |
| 1400 | 14.7888 | 18828.0 | 82.6171 | 96835.9 | 174413.8 | 154323.4 | -14.9236 | -178310.4 | 14.4257 |
| 1500 | 14.8035 | 20307.7 | 83.6379 | 105149.3 | 175893.5 | 153768.5 | -13.3158 | -178353.2 | 12.5699 |
| 1600 | 14.8156 | 21788.6 | 84.5937 | 113561.3 | 177374.4 | 153186.9 | -11.9224 | -178402.2 | 10.9456 |
| 1700 | 14.8257 | 23270.7 | 85.4922 | 122066.1 | 178856.5 | 116522.8 | -10.7349 | -178458.4 | 9.5120 |
| 1800 | 14.8341 | 24753.7 | 86.3399 | 130658.1 | 180335.5 | 116162.9 | -9.9035 | -178522.4 | 8.2373 |
| 1900 | 14.8413 | 26237.5 | 87.1421 | 139322.6 | 181823.3 | 115803.8 | -9.1628 | -178594.7 | 7.0963 |
| 2000 | 14.8474 | 27721.9 | 87.9036 | 148085.2 | 183307.7 | 115445.3 | -8.4978 | -178675.3 | 6.0690 |
| 2100 | 14.8526 | 29206.9 | 88.6281 | 156912.0 | 184792.7 | 115087.4 | -7.898C | -178764.2 | 5.1390 |
| 2200 | 14.8572 | 30692.4 | 89.3191 | 165809.7 | 186278.2 | 114730.0 | -7.3544 | -178861.3 | 4.2932 |
| 2300 | 14.8612 | 32178.4 | 89.9797 | 174774.9 | 187764.2 | 114373.1 | -6.8557 | -178966.2 | 3.5205 |
| 2400 | 14.8647 | 33664.7 | 90.6122 | 183804.7 | 189250.5 | 114016.5 | -6.4076 | -179078.5 | 2.8117 |
| 2500 | 14.8678 | 35151.3 | 91.2191 | 192896.4 | 190737.1 | 113660.2 | -5.9929 | -179197.8 | 2.1593 |
| 2600 | 14.8706 | 36638.2 | 91.8023 | 202047.7 | 192224.0 | 113304.2 | -5.6114 | -179323.5 | 1.5566 |
| 2700 | 14.8730 | 38125.4 | 92.3635 | 211256.2 | 193711.2 | 112948.5 | -5.2552 | -179455.1 | 0.9981 |
| 2800 | 14.8752 | 39612.8 | 92.9045 | 220519.7 | 195198.6 | 112593.0 | -4.9332 | -179592.2 | 0.4792 |
| 2900 | 14.8772 | 41100.4 | 93.4265 | 229836.4 | 196686.2 | 112237.8 | -4.6307 | -179734.1 | -0.0044 |
| 3000 | 14.8790 | 42588.3 | 93.9309 | 239204.4 | 198174.1 | 111882.7 | -4.3452 | -179880.4 | -0.4560 |
| 3100 | 14.8806 | 44076.2 | 94.4188 | 248622.1 | 199662.0 | 111527.7 | -4.0867 | -180030.6 | -0.8789 |
| 3200 | 14.8821 | 45564.4 | 94.8913 | 258087.7 | 201150.2 | 111173.0 | -3.8413 | -180184.2 | -1.2757 |
| 3300 | 14.8834 | 47052.6 | 95.3492 | 267599.8 | 202638.4 | 110818.4 | -3.6116 | -180340.7 | -1.6487 |
| 3400 | 14.8846 | 48541.0 | 95.7936 | 277157.1 | 204126.9 | 110463.9 | -3.3961 | -180499.8 | -2.0001 |
| 3500 | 14.8857 | 50029.6 | 96.2251 | 286758.1 | 205615.4 | 110109.5 | -3.1936 | -180661.0 | -2.3318 |
| 3600 | 14.8868 | 51518.2 | 96.6444 | 296401.7 | 207104.0 | 109755.2 | -3.0029 | -180824.0 | -2.6453 |
| 3700 | 14.8877 | 53006.9 | 97.0523 | 306086.6 | 208592.7 | 109401.0 | -2.8231 | -180988.5 | -2.9421 |
| 3800 | 14.8886 | 54495.7 | 97.4493 | 315811.8 | 210081.5 | 109046.9 | -2.6534 | -181154.2 | -3.2235 |
| 3900 | 14.8894 | 55984.6 | 97.8361 | 325576.1 | 211570.4 | 108692.9 | -2.4928 | -181320.8 | -3.4908 |
| 4000 | 14.8901 | 57473.6 | 98.2131 | 335378.7 | 213059.4 | 108339.0 | -2.3408 | -181488.0 | -3.7449 |
| 4100 | 14.8908 | 58962.6 | 98.5808 | 345218.4 | 214548.4 | 107985.2 | -2.1967 | -181655.7 | -3.9868 |
| 4200 | 14.8914 | 60451.8 | 98.9396 | 355094.5 | 216037.6 | 107631.4 | -2.0598 | -181823.7 | -4.2175 |
| 4300 | 14.8920 | 61940.9 | 99.2900 | 365006.1 | 217526.7 | 107277.6 | -1.9298 | -181991.7 | -4.4376 |
| 4400 | 14.8926 | 63430.2 | 99.6324 | 374952.3 | 219016.0 | 106924.0 | -1.8061 | -182159.8 | -4.6479 |
| 4500 | 14.8931 | 64919.4 | 99.9671 | 384932.3 | 220505.3 | 106570.4 | -1.6883 | -182327.7 | -4.8491 |
| 4600 | 14.8936 | 66408.8 | 100.2944 | 394945.4 | 221994.6 | 106216.8 | -1.5759 | -182495.4 | -5.0417 |
| 4700 | 14.8941 | 67898.2 | 100.6147 | 404990.9 | 223484.0 | 105863.3 | -1.4688 | -182662.8 | -5.2262 |
| 4800 | 14.8945 | 69387.6 | 100.9283 | 415068.1 | 224973.4 | 105509.8 | -1.3664 | -182829.9 | -5.4032 |
| 4900 | 14.8949 | 70877.1 | 101.2354 | 425176.4 | 226462.9 | 105156.4 | -1.2685 | -182996.6 | -5.5732 |
| 5000 | 14.8953 | 72366.6 | 101.5363 | 435315.0 | 227952.4 | 104803.0 | -1.1749 | -183163.0 | -5.7365 |
| 5100 | 14.8956 | 73856.1 | 101.8313 | 445483.4 | 229441.9 | 104449.6 | -1.0852 | -183329.2 | -5.8935 |
| 5200 | 14.8960 | 75345.7 | 102.1205 | 455681.1 | 230931.5 | 104096.3 | -0.9993 | -183495.1 | -6.0447 |
| 5300 | 14.8963 | 76835.3 | 102.4043 | 465907.4 | 232421.1 | 103743.0 | -0.9169 | -183660.8 | -6.1902 |
| 5400 | 14.8966 | 78324.9 | 102.6827 | 476161.8 | 233910.7 | 103389.8 | -0.8378 | -183826.5 | -6.3306 |
| 5500 | 14.8969 | 79814.6 | 102.9561 | 486443.7 | 235400.4 | 103036.5 | -0.7618 | -183992.3 | -6.4659 |
| 5600 | 14.8971 | 81304.3 | 103.2245 | 496752.8 | 236890.1 | 102683.3 | -0.6888 | -184158.3 | -6.5965 |
| 5700 | 14.8974 | 82794.0 | 103.4882 | 507088.5 | 238379.8 | 102330.2 | -0.6187 | -184322.8 | -6.7226 |
| 5800 | 14.8976 | 84283.8 | 103.7473 | 517450.3 | 239869.6 | 101977.0 | -0.5511 | -184489.3 | -6.8445 |
| 5900 | 14.8979 | 85773.6 | 104.0019 | 527837.8 | 241359.4 | 101623.9 | -0.4861 | -184656.6 | -6.9624 |
| 6000 | 14.8981 | 87263.4 | 104.2523 | 538250.5 | 242849.2 | 101270.8 | -0.4235 | -184824.4 | -7.0764 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Si, 1685° K.

TABLE III. - Continued THERMODYNAMIC PROPERTIES
(199) SiCl (gas); molecular weight, 63.547

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | 45346.9 | 47212.7 | ----- | -92300.0 | ----- |
| 100 | 7.8246 | 724.6 | 47.7627 | 4051.7 | 46071.5 | 47525.6 | -98.5579 | -92727.3 | 198.3100 |
| 200 | 8.2997 | 1534.7 | 53.3600 | 9137.3 | 46881.7 | 47691.2 | -46.5408 | -93028.6 | 96.8475 |
| 298.15 | 8.5542 | 2362.8 | 56.7253 | 14549.8 | 47709.8 | 47709.8 | -29.3796 | -93240.9 | 63.3496 |
| 300 | 8.5579 | 2378.7 | 56.7783 | 14654.8 | 47725.6 | 47709.2 | -29.1640 | -93244.5 | 62.9281 |
| 400 | 8.7118 | 3242.8 | 59.2632 | 20462.5 | 48589.8 | 47650.1 | -20.4796 | -93433.7 | 45.9310 |
| 500 | 8.8048 | 4119.0 | 61.2180 | 26490.0 | 49466.0 | 47550.4 | -15.2775 | -93611.1 | 35.7125 |
| 600 | 8.8651 | 5002.7 | 62.8290 | 32694.7 | 50349.6 | 47426.7 | -11.8177 | -93779.2 | 28.8874 |
| 700 | 8.9073 | 5891.4 | 64.1989 | 39047.8 | 51238.4 | 47285.7 | -9.3534 | -93938.4 | 24.0058 |
| 800 | 8.9389 | 6783.8 | 65.3905 | 45282.6 | 52130.8 | 47130.7 | -7.5111 | -94089.3 | 20.3551 |
| 900 | 8.9639 | 7679.0 | 66.4448 | 52121.3 | 53025.9 | 46963.5 | -6.0828 | -94232.7 | 17.4771 |
| 1000 | 8.9847 | 8576.5 | 67.3904 | 58813.9 | 53923.4 | 46785.3 | -4.9494 | -94369.7 | 15.1873 |
| 1100 | 9.0026 | 9475.9 | 68.2476 | 65596.5 | 54822.8 | 46596.8 | -4.0168 | -94501.3 | 13.3112 |
| 1200 | 9.0186 | 10376.9 | 69.0316 | 72461.0 | 55723.9 | 46398.4 | -3.2469 | -94628.8 | 11.7456 |
| 1300 | 9.0331 | 11279.5 | 69.7541 | 79400.8 | 56626.5 | 46190.0 | -2.5984 | -94753.1 | 10.4191 |
| 1400 | 9.0465 | 12183.5 | 70.4240 | 86410.1 | 57530.4 | 45972.7 | -2.0451 | -94875.2 | 9.2806 |
| 1500 | 9.0592 | 13088.8 | 71.0486 | 93484.0 | 58435.7 | 45746.2 | -1.5676 | -94996.0 | 8.2926 |
| 1600 | 9.0713 | 13995.3 | 71.6336 | 100618.5 | 59342.3 | 45510.8 | -1.1522 | -95116.0 | 7.4271 |
| 1700 | 9.0829 | 14903.0 | 72.1839 | 107809.6 | 60250.0 | 45247.8 | -0.8011 | -95235.8 | 6.6624 |
| 1800 | 9.0941 | 15811.9 | 72.7034 | 115054.2 | 61158.8 | 45006.2 | -0.5642 | -95355.9 | 5.9818 |
| 1900 | 9.1051 | 16721.9 | 73.1954 | 122349.4 | 62068.8 | 44724.9 | -0.3533 | -95476.5 | 5.3721 |
| 2000 | 9.1158 | 17632.9 | 73.6627 | 129692.5 | 62979.8 | 44423.9 | -0.1644 | -95597.7 | 4.8227 |
| 2100 | 9.1263 | 18545.0 | 74.1077 | 137081.2 | 63892.0 | 44103.3 | 0.0057 | -95719.8 | 4.3250 |
| 2200 | 9.1367 | 19458.2 | 74.5325 | 144513.3 | 64805.1 | 43742.9 | 0.1595 | -95842.8 | 3.8719 |
| 2300 | 9.1469 | 20372.4 | 74.9389 | 151987.1 | 65719.3 | 43382.9 | 0.2993 | -95966.6 | 3.4877 |
| 2400 | 9.1570 | 21287.6 | 75.3284 | 159500.6 | 66634.5 | 43023.2 | 0.4268 | -96091.2 | 3.0775 |
| 2500 | 9.1671 | 22203.8 | 75.7024 | 167052.2 | 67550.7 | 42663.7 | 0.5435 | -96216.6 | 2.7273 |
| 2600 | 9.1770 | 23121.0 | 76.0621 | 174640.6 | 68467.9 | 42304.7 | 0.6507 | -96342.5 | 2.4036 |
| 2700 | 9.1869 | 24039.2 | 76.4087 | 182264.2 | 69386.1 | 41945.9 | 0.7495 | -96469.0 | 2.1035 |
| 2800 | 9.1967 | 24958.3 | 76.7429 | 189921.9 | 70305.3 | 41587.4 | 0.8408 | -96595.9 | 1.8244 |
| 2900 | 9.2065 | 25878.5 | 77.0658 | 197612.4 | 71225.4 | 41229.3 | 0.9253 | -96723.0 | 1.5643 |
| 3000 | 9.2162 | 26799.6 | 77.3781 | 205334.7 | 72146.6 | 40871.4 | 1.0038 | -96850.2 | 1.3211 |
| 3100 | 9.2259 | 27721.7 | 77.6805 | 213087.7 | 73068.7 | 40513.9 | 1.0769 | -96977.3 | 1.0934 |
| 3200 | 9.2356 | 28644.8 | 77.9735 | 220870.5 | 73991.8 | 40156.7 | 1.1450 | -97104.4 | 0.8796 |
| 3300 | 9.2452 | 29568.9 | 78.2579 | 228682.1 | 74915.8 | 39799.9 | 1.2087 | -97231.1 | 0.6785 |
| 3400 | 9.2548 | 30493.9 | 78.5340 | 236521.8 | 75840.8 | 39453.3 | 1.2684 | -97357.5 | 0.4890 |
| 3500 | 9.2644 | 31419.8 | 78.8024 | 244388.7 | 76766.8 | 39107.1 | 1.3243 | -97483.5 | 0.3101 |
| 3600 | 9.2740 | 32346.7 | 79.0635 | 252282.0 | 77693.7 | 38761.1 | 1.3769 | -97608.8 | 0.1409 |
| 3700 | 9.2836 | 33274.6 | 79.3178 | 260201.1 | 78621.6 | 38415.5 | 1.4263 | -97733.4 | -0.0193 |
| 3800 | 9.2932 | 34203.5 | 79.5655 | 268145.4 | 79550.4 | 38070.2 | 1.4730 | -97857.3 | -0.1713 |
| 3900 | 9.3028 | 35133.3 | 79.8070 | 276114.0 | 80480.2 | 37725.3 | 1.5170 | -97980.4 | -0.3157 |
| 4000 | 9.3124 | 36064.0 | 80.0426 | 284106.6 | 81411.0 | 37380.7 | 1.5586 | -98102.5 | -0.4530 |
| 4100 | 9.3220 | 36995.8 | 80.2727 | 292122.4 | 82342.7 | 37037.4 | 1.5979 | -98223.7 | -0.5839 |
| 4200 | 9.3317 | 37928.4 | 80.4975 | 300160.9 | 83275.4 | 36702.4 | 1.6352 | -98343.8 | -0.7086 |
| 4300 | 9.3413 | 38862.1 | 80.7172 | 308221.7 | 84209.0 | 36368.8 | 1.6706 | -98462.9 | -0.8277 |
| 4400 | 9.3510 | 39796.7 | 80.9320 | 316304.2 | 85143.6 | 36035.5 | 1.7042 | -98580.9 | -0.9415 |
| 4500 | 9.3608 | 40732.3 | 81.1423 | 324407.9 | 86079.2 | 35702.5 | 1.7361 | -98697.7 | -1.0503 |
| 4600 | 9.3706 | 41668.9 | 81.3481 | 332532.5 | 87015.8 | 35370.9 | 1.7665 | -98813.4 | -1.1546 |
| 4700 | 9.3804 | 42606.4 | 81.5498 | 340677.4 | 87953.3 | 35037.7 | 1.7954 | -98927.9 | -1.2544 |
| 4800 | 9.3903 | 43544.9 | 81.7473 | 348842.3 | 88891.9 | 34704.5 | 1.8229 | -99041.1 | -1.3504 |
| 4900 | 9.4003 | 44484.5 | 81.9411 | 357026.8 | 89831.4 | 34371.3 | 1.8493 | -99153.2 | -1.4425 |
| 5000 | 9.4104 | 45425.0 | 82.1311 | 365230.4 | 90771.9 | 34038.2 | 1.8744 | -99264.1 | -1.5310 |
| 5100 | 9.4205 | 46366.6 | 82.3175 | 373452.9 | 91715.5 | 33705.4 | 1.8984 | -99373.8 | -1.6161 |
| 5200 | 9.4307 | 47309.1 | 82.5006 | 381693.8 | 92666.0 | 33372.0 | 1.9213 | -99482.3 | -1.6980 |
| 5300 | 9.4410 | 48252.7 | 82.6803 | 389952.9 | 93599.6 | 33038.1 | 1.9433 | -99589.7 | -1.7770 |
| 5400 | 9.4514 | 49197.3 | 82.8569 | 398229.8 | 94544.2 | 32703.6 | 1.9643 | -99696.0 | -1.8531 |
| 5500 | 9.4619 | 50143.0 | 83.0304 | 406524.1 | 95489.9 | 32369.5 | 1.9845 | -99801.1 | -1.9265 |
| 5600 | 9.4725 | 51089.7 | 83.2010 | 414835.7 | 96436.6 | 32035.8 | 2.0039 | -99905.2 | -1.9973 |
| 5700 | 9.4832 | 52037.5 | 83.3687 | 423164.2 | 97384.4 | 31702.5 | 2.0224 | -100007.7 | -2.0657 |
| 5800 | 9.4941 | 52986.3 | 83.5337 | 431509.4 | 98333.3 | 31369.7 | 2.0402 | -100109.8 | -2.1319 |
| 5900 | 9.5051 | 53936.3 | 83.6961 | 439870.9 | 99283.2 | 31037.4 | 2.0574 | -100210.9 | -2.1958 |
| 6000 | 9.5162 | 54887.4 | 83.8560 | 448248.5 | 100234.3 | 30705.6 | 2.0738 | -100311.0 | -2.2577 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Si, 1685° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (200) SiCl₂ (gas); molecular weight, 99.004

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| G | ----- | C | ----- | 0 | -40187.4 | -37224.9 | ----- | -205286.0 | ----- |
| 100 | 8.9803 | 821.1 | 55.4607 | 4725.0 | -39366.3 | -37163.5 | 83.2696 | -206113.6 | 440.3653 |
| 200 | 11.1115 | 1832.1 | 62.3822 | 10644.4 | -38355.3 | -37155.8 | 42.6666 | -206713.0 | 214.8659 |
| 298.15 | 12.2947 | 2987.4 | 67.0662 | 17008.4 | -37200.0 | -37200.0 | 29.2948 | -207101.3 | 140.4447 |
| 300 | 12.3101 | 3010.1 | 67.1423 | 17132.6 | -37177.2 | -37201.2 | 29.1266 | -207107.7 | 139.5085 |
| 400 | 12.9129 | 4274.5 | 70.7757 | 24035.7 | -35912.8 | -37274.7 | 22.3459 | -207426.9 | 101.7639 |
| 500 | 13.2389 | 5583.7 | 73.6955 | 31264.1 | -34603.7 | -37368.4 | 18.2664 | -207712.3 | 79.0838 |
| 600 | 13.4307 | 6917.9 | 76.1277 | 38758.7 | -33269.4 | -37475.9 | 15.5427 | -207974.2 | 63.9436 |
| 700 | 13.5519 | 8267.5 | 78.2078 | 46478.0 | -31919.9 | -37595.4 | 13.5898 | -208216.2 | 53.1160 |
| 800 | 13.6328 | 9627.0 | 80.0230 | 54391.4 | -30560.4 | -37726.0 | 12.1201 | -208440.7 | 44.9861 |
| 900 | 13.6894 | 10993.2 | 81.6322 | 62475.7 | -29194.1 | -37867.3 | 10.9731 | -208650.1 | 38.6563 |
| 1000 | 13.7304 | 12364.3 | 83.0767 | 70712.4 | -27823.0 | -38019.1 | 10.0519 | -208846.7 | 33.5875 |
| 1100 | 13.7611 | 13739.0 | 84.3869 | 79086.6 | -26448.4 | -38181.1 | 9.2950 | -209032.7 | 29.4365 |
| 1200 | 13.7846 | 15116.3 | 85.5853 | 87586.1 | -25071.0 | -38353.5 | 8.6615 | -209210.3 | 25.9743 |
| 1300 | 13.8030 | 16495.7 | 86.6894 | 96200.5 | -23691.6 | -38536.5 | 8.1229 | -209381.2 | 23.0423 |
| 1400 | 13.8177 | 17876.8 | 87.7129 | 104921.2 | -22310.6 | -38729.3 | 7.6589 | -209547.1 | 20.5272 |
| 1500 | 13.8295 | 19259.2 | 88.6666 | 113740.8 | -20928.2 | -38932.2 | 7.2551 | -209709.3 | 18.3457 |
| 1600 | 13.8393 | 20642.6 | 89.5595 | 122652.5 | -19544.7 | -39145.1 | 6.8995 | -209869.0 | 16.4354 |
| 1700 | 13.8474 | 22027.0 | 90.3987 | 131650.9 | -18160.4 | -39366.8 | 6.5706 | -210027.0 | 14.7486 |
| 1800 | 13.8542 | 23412.1 | 91.1904 | 140730.7 | -16775.3 | -39528.4 | 6.2031 | -210184.1 | 13.2480 |
| 1900 | 13.8600 | 24797.8 | 91.9397 | 149887.6 | -15389.6 | -39670.9 | 5.8734 | -210340.7 | 11.9045 |
| 2000 | 13.8649 | 26184.0 | 92.6507 | 159117.4 | -14003.3 | -39814.4 | 5.5758 | -210497.5 | 10.6943 |
| 2100 | 13.8691 | 27570.7 | 93.3273 | 168416.5 | -12616.6 | -39958.9 | 5.3058 | -210654.5 | 9.5986 |
| 2200 | 13.8728 | 28957.8 | 93.9726 | 177781.8 | -11229.5 | -40104.5 | 5.0597 | -210812.1 | 8.6018 |
| 2300 | 13.8760 | 30345.3 | 94.5893 | 187210.1 | -9842.1 | -40251.2 | 4.8343 | -210970.4 | 7.6910 |
| 2400 | 13.8789 | 31733.0 | 95.1799 | 196698.8 | -8454.3 | -40399.0 | 4.6272 | -211129.4 | 6.8554 |
| 2500 | 13.8814 | 33121.0 | 95.7465 | 206245.3 | -7066.3 | -40547.9 | 4.4361 | -211289.2 | 6.0862 |
| 2600 | 13.8836 | 34509.3 | 96.2910 | 215847.3 | -5678.1 | -40697.5 | 4.2551 | -211449.8 | 5.3755 |
| 2700 | 13.8855 | 35897.8 | 96.8150 | 225502.8 | -4289.6 | -40849.1 | 4.0949 | -211611.0 | 4.7170 |
| 2800 | 13.8873 | 37286.4 | 97.3200 | 235209.7 | -2901.0 | -40991.5 | 3.9419 | -211773.0 | 4.1051 |
| 2900 | 13.8889 | 38675.2 | 97.8074 | 244966.2 | -1512.1 | -41135.0 | 3.7956 | -211935.5 | 3.5340 |
| 3000 | 13.8903 | 40064.2 | 98.2783 | 254770.6 | -123.2 | -41280.6 | 3.6653 | -212098.5 | 3.0023 |
| 3100 | 13.8916 | 41453.3 | 98.7338 | 264621.4 | 1265.9 | -41427.5 | 3.5399 | -212261.9 | 2.5037 |
| 3200 | 13.8928 | 42842.5 | 99.1748 | 274516.9 | 2655.1 | -41576.5 | 3.4219 | -212425.7 | 2.0359 |
| 3300 | 13.8939 | 44231.8 | 99.6023 | 284455.9 | 4044.5 | -41727.7 | 3.3108 | -212589.7 | 1.5961 |
| 3400 | 13.8949 | 45621.3 | 100.0171 | 294436.9 | 5433.9 | -41880.1 | 3.2059 | -212753.9 | 1.1819 |
| 3500 | 13.8958 | 47010.8 | 100.4199 | 304458.9 | 6823.4 | -42033.7 | 3.1067 | -212918.2 | 0.7910 |
| 3600 | 13.8966 | 48400.4 | 100.8114 | 314520.6 | 8213.1 | -42188.4 | 3.0127 | -213082.5 | 0.4216 |
| 3700 | 13.8973 | 49790.1 | 101.1921 | 324620.8 | 9602.8 | -42345.4 | 2.9235 | -213246.8 | 0.0719 |
| 3800 | 13.8980 | 51179.9 | 101.5628 | 334758.6 | 10992.5 | -42504.6 | 2.8388 | -213411.0 | -0.2597 |
| 3900 | 13.8987 | 52569.7 | 101.9238 | 344933.1 | 12382.4 | -42665.0 | 2.7582 | -213575.0 | -0.5745 |
| 4000 | 13.8993 | 53959.6 | 102.2757 | 355143.1 | 13772.3 | -42827.5 | 2.6814 | -213738.8 | -0.8739 |
| 4100 | 13.8998 | 55349.6 | 102.6189 | 365387.9 | 15162.2 | -42992.3 | 2.6081 | -213902.4 | -1.1588 |
| 4200 | 13.9004 | 56739.6 | 102.9539 | 375666.6 | 16552.2 | -43159.3 | 2.5380 | -214065.7 | -1.4303 |
| 4300 | 13.9008 | 58129.6 | 103.2809 | 385978.4 | 17942.3 | -43328.5 | 2.4711 | -214228.7 | -1.6895 |
| 4400 | 13.9013 | 59519.8 | 103.6005 | 396322.5 | 19332.4 | -43500.9 | 2.4069 | -214391.4 | -1.9370 |
| 4500 | 13.9017 | 60909.9 | 103.9129 | 406698.3 | 20722.5 | -43675.6 | 2.3455 | -214553.7 | -2.1737 |
| 4600 | 13.9021 | 62300.1 | 104.2185 | 417104.9 | 22112.7 | -43852.4 | 2.2865 | -214715.6 | -2.4003 |
| 4700 | 13.9025 | 63690.3 | 104.5175 | 427541.7 | 23503.0 | -44031.5 | 2.2299 | -214877.2 | -2.6175 |
| 4800 | 13.9028 | 65080.6 | 104.8102 | 438008.2 | 24893.2 | -44212.9 | 2.1754 | -215038.4 | -2.8257 |
| 4900 | 13.9031 | 66470.9 | 105.0968 | 448503.6 | 26283.5 | -44395.6 | 2.1230 | -215199.3 | -3.0256 |
| 5000 | 13.9034 | 67861.2 | 105.3777 | 459027.4 | 27673.9 | -44580.5 | 2.0726 | -215359.8 | -3.2176 |
| 5100 | 13.9037 | 69251.6 | 105.6530 | 469578.9 | 29064.2 | -44767.6 | 2.0235 | -215520.1 | -3.4022 |
| 5200 | 13.9040 | 70642.0 | 105.9230 | 480157.8 | 30454.6 | -44956.9 | 1.9777 | -215680.0 | -3.5799 |
| 5300 | 13.9042 | 72032.4 | 106.1879 | 490763.4 | 31845.0 | -45148.4 | 1.9318 | -215839.7 | -3.7510 |
| 5400 | 13.9045 | 73422.8 | 106.4478 | 501395.2 | 33235.4 | -45342.0 | 1.8880 | -215999.2 | -3.9159 |
| 5500 | 13.9047 | 74813.3 | 106.7029 | 512052.8 | 34625.9 | -45537.7 | 1.8457 | -216158.6 | -4.0749 |
| 5600 | 13.9049 | 76203.7 | 106.9535 | 522735.6 | 36016.4 | -45734.5 | 1.8048 | -216317.9 | -4.2283 |
| 5700 | 13.9051 | 77594.2 | 107.1996 | 533443.3 | 37406.9 | -45933.4 | 1.7652 | -216476.5 | -4.3764 |
| 5800 | 13.9053 | 78984.8 | 107.4414 | 544175.4 | 38797.4 | -46134.4 | 1.7268 | -216635.7 | -4.5196 |
| 5900 | 13.9055 | 80375.3 | 107.6791 | 554931.5 | 40188.0 | -46337.5 | 1.6897 | -216795.0 | -4.6580 |
| 6000 | 13.9057 | 81765.9 | 107.9128 | 565711.1 | 41578.5 | -46542.8 | 1.6536 | -216954.3 | -4.7919 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Si, 1685° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(201) SiCl4 (gas); molecular weight, 169.918

| T , °K | C_p^0 , cal/mole °K | $H_T^0 - H_0^0$, cal/mole | S_T^0 , cal/mole °K | $-(F_T^0 - H_0^0)$, cal/mole | H_T^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_f^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f^0 , cal/mole | $\log_{10} K$ |
| 0 | ----- | C | ----- | 0 | -156445.3 | -151285.4 | ----- | -376447.2 | ----- |
| 100 | 13.6518 | 992.8 | 59.7222 | 4979.4 | -155452.5 | -151752.2 | 324.7550 | -378096.8 | 802.3063 |
| 200 | 18.8482 | 2644.0 | 70.9604 | 11548.1 | -153801.3 | -151833.9 | 158.8835 | -379054.1 | 388.7050 |
| 298.15 | 21.6446 | 4645.3 | 79.0646 | 18927.8 | -151800.0 | -151800.0 | 104.2709 | -375602.5 | 252.2621 |
| 300 | 21.6E23 | 46E5.4 | 79.1986 | 19074.2 | -151759.9 | -151758.8 | 103.5847 | -375610.9 | 252.5462 |
| 400 | 23.1907 | 6936.7 | 85.6649 | 27329.3 | -149508.6 | -151714.8 | 75.9459 | -380003.9 | 181.3790 |
| 500 | 24.0336 | 9301.7 | 90.9388 | 36127.7 | -147143.6 | -151606.5 | 59.3736 | -380315.2 | 139.8398 |
| 600 | 24.5389 | 11732.3 | 95.3689 | 45489.0 | -144713.0 | -151486.6 | 48.3337 | -380569.6 | 112.1261 |
| 700 | 24.8616 | 14203.5 | 99.1776 | 55220.8 | -142241.8 | -151363.0 | 40.4544 | -380777.2 | 92.3186 |
| 800 | 25.0788 | 16701.2 | 102.5125 | 65308.8 | -139744.1 | -151240.7 | 34.5496 | -380945.0 | 77.4555 |
| 900 | 25.2314 | 19217.1 | 105.4756 | 75711.0 | -137228.2 | -151122.8 | 29.9609 | -381078.8 | 65.8908 |
| 1000 | 25.3424 | 21746.1 | 108.1401 | 86394.0 | -134699.2 | -151011.2 | 26.2927 | -381184.0 | 56.6361 |
| 1100 | 25.4256 | 24284.7 | 110.5595 | 97330.8 | -132160.6 | -150906.9 | 23.2935 | -381265.4 | 49.0622 |
| 1200 | 25.4895 | 26830.6 | 112.7747 | 108499.1 | -129614.7 | -150811.2 | 20.7558 | -381327.2 | 42.7495 |
| 1300 | 25.5396 | 29382.1 | 114.8170 | 119880.0 | -127063.2 | -150725.0 | 18.6887 | -381372.9 | 37.4072 |
| 1400 | 25.5796 | 31938.1 | 116.7112 | 131457.6 | -124507.2 | -150647.9 | 16.8742 | -381405.5 | 32.8276 |
| 1500 | 25.6119 | 34497.8 | 118.4772 | 143218.0 | -121947.5 | -150580.6 | 15.3070 | -381427.6 | 28.8583 |
| 1600 | 25.6386 | 37060.3 | 120.1310 | 155149.3 | -119385.0 | -150523.3 | 13.9361 | -381441.3 | 25.3850 |
| 1700 | 25.6607 | 39625.3 | 121.6860 | 167240.9 | -116820.0 | -150495.0 | 12.7132 | -381448.2 | 22.3203 |
| 1800 | 25.6793 | 42192.4 | 123.1533 | 179483.6 | -114252.9 | -150466.9 | 11.5532 | -381449.8 | 19.5960 |
| 1900 | 25.6950 | 44761.1 | 124.5421 | 191869.0 | -111684.2 | -150440.3 | 10.5161 | -381447.2 | 17.1586 |
| 2000 | 25.7085 | 47331.3 | 125.8605 | 204389.6 | -109114.0 | -150415.3 | 9.5834 | -381441.3 | 14.9649 |
| 2100 | 25.7201 | 49902.7 | 127.1151 | 217038.9 | -106542.6 | -151952.1 | 8.7401 | -381432.7 | 12.9801 |
| 2200 | 25.7302 | 52475.3 | 128.3118 | 229810.7 | -103970.0 | -161870.6 | 7.9742 | -381422.1 | 11.1759 |
| 2300 | 25.7390 | 55048.7 | 129.4558 | 242699.5 | -101396.6 | -161751.1 | 7.2753 | -381409.8 | 9.5285 |
| 2400 | 25.7468 | 57623.0 | 130.5514 | 255700.3 | -98822.2 | -161633.6 | 6.6351 | -381396.2 | 8.0186 |
| 2500 | 25.7536 | 60198.0 | 131.6025 | 268808.3 | -96247.3 | -161518.1 | 6.0466 | -381381.5 | 6.6294 |
| 2600 | 25.7597 | 62773.7 | 132.6127 | 282019.4 | -93671.6 | -161404.8 | 5.5038 | -381365.9 | 5.3472 |
| 2700 | 25.7651 | 65350.0 | 133.5850 | 295329.6 | -91095.3 | -161293.5 | 5.0015 | -381349.5 | 4.1600 |
| 2800 | 25.7699 | 67926.7 | 134.5221 | 308735.2 | -88518.6 | -161184.4 | 4.5354 | -381332.3 | 3.0576 |
| 2900 | 25.7743 | 70503.9 | 135.4265 | 322232.9 | -85941.4 | -161077.5 | 4.1017 | -381314.6 | 2.0313 |
| 3000 | 25.7782 | 73081.5 | 136.3004 | 335819.5 | -83363.8 | -160972.9 | 3.6972 | -381296.2 | 1.0735 |
| 3100 | 25.7817 | 75659.5 | 137.1457 | 349492.1 | -80785.8 | -160870.4 | 3.3191 | -381277.2 | 0.1775 |
| 3200 | 25.7850 | 78237.9 | 137.9643 | 363247.8 | -78207.4 | -160770.3 | 2.9648 | -381257.6 | -0.6624 |
| 3300 | 25.7879 | 80816.5 | 138.7578 | 377084.1 | -75628.8 | -160672.4 | 2.6322 | -381237.4 | -1.4514 |
| 3400 | 25.7906 | 83395.5 | 139.5276 | 390998.5 | -73049.8 | -160576.8 | 2.3193 | -381216.6 | -2.1939 |
| 3500 | 25.7931 | 85974.6 | 140.2753 | 404988.9 | -70470.6 | -160483.6 | 2.0245 | -381195.1 | -2.8940 |
| 3600 | 25.7953 | 88554.1 | 141.0019 | 419052.9 | -67891.2 | -160392.7 | 1.7462 | -381173.1 | -3.5551 |
| 3700 | 25.7974 | 91133.7 | 141.7087 | 433188.6 | -65311.6 | -160304.1 | 1.4832 | -381150.3 | -4.1805 |
| 3800 | 25.7993 | 93713.5 | 142.3967 | 447394.0 | -62731.8 | -160217.8 | 1.2341 | -381126.9 | -4.7729 |
| 3900 | 25.8011 | 96293.6 | 143.0669 | 461667.3 | -60151.7 | -160133.9 | 0.9975 | -381102.8 | -5.3349 |
| 4000 | 25.8027 | 98873.8 | 143.7201 | 476006.8 | -57571.5 | -160052.4 | 0.7736 | -381077.9 | -5.8688 |
| 4100 | 25.8042 | 101454.1 | 144.3573 | 490410.8 | -54991.2 | -159973.2 | 0.5604 | -381052.4 | -6.3766 |
| 4200 | 25.8057 | 104034.6 | 144.9791 | 504877.8 | -52410.7 | -159896.4 | 0.3574 | -381026.2 | -6.8602 |
| 4300 | 25.8070 | 106615.2 | 145.5864 | 519406.2 | -49830.1 | -159822.0 | 0.1635 | -380999.2 | -7.3212 |
| 4400 | 25.8082 | 109196.0 | 146.1797 | 533994.6 | -47249.3 | -159750.0 | -0.0206 | -380971.6 | -7.7613 |
| 4500 | 25.8094 | 111776.9 | 146.7597 | 548641.7 | -44668.4 | -159680.4 | -0.1969 | -380943.2 | -8.1818 |
| 4600 | 25.8104 | 114357.9 | 147.3269 | 563346.1 | -42087.4 | -159613.1 | -0.3655 | -380914.1 | -8.5839 |
| 4700 | 25.8114 | 116939.0 | 147.8820 | 578106.6 | -39506.3 | -159548.3 | -0.5268 | -380884.4 | -8.9689 |
| 4800 | 25.8124 | 119520.1 | 148.4255 | 592922.1 | -36925.1 | -159485.9 | -0.6813 | -380854.0 | -9.3379 |
| 4900 | 25.8133 | 122101.4 | 148.9577 | 607791.4 | -34343.9 | -159425.9 | -0.8294 | -380823.0 | -9.6918 |
| 5000 | 25.8141 | 124682.8 | 149.4792 | 622713.3 | -31762.5 | -159368.3 | -0.9716 | -380791.4 | -10.0314 |
| 5100 | 25.8149 | 127264.2 | 149.9904 | 637686.9 | -29181.1 | -159313.1 | -1.1082 | -380759.2 | -10.3578 |
| 5200 | 25.8156 | 129845.8 | 150.4917 | 652711.1 | -26595.5 | -159260.3 | -1.2394 | -380726.5 | -10.6715 |
| 5300 | 25.8163 | 132427.4 | 150.9834 | 667784.9 | -24017.9 | -159210.0 | -1.3657 | -380693.4 | -10.9734 |
| 5400 | 25.8170 | 135009.0 | 151.4660 | 682907.4 | -21436.3 | -159162.0 | -1.4873 | -380659.9 | -11.2641 |
| 5500 | 25.8176 | 137590.8 | 151.9397 | 698077.8 | -18854.5 | -159116.5 | -1.6044 | -380626.0 | -11.5442 |
| 5600 | 25.8182 | 140172.6 | 152.4049 | 713295.1 | -16272.7 | -159073.4 | -1.7173 | -380591.8 | -11.8142 |
| 5700 | 25.8188 | 142754.4 | 152.8619 | 728558.5 | -13690.9 | -159032.8 | -1.8261 | -380556.9 | -12.0748 |
| 5800 | 25.8193 | 145336.3 | 153.3110 | 743867.2 | -11109.0 | -158994.6 | -1.9313 | -380522.2 | -12.3263 |
| 5900 | 25.8198 | 147918.3 | 153.7523 | 759220.4 | -8527.0 | -158958.8 | -2.0328 | -380487.6 | -12.5693 |
| 6000 | 25.8203 | 150500.3 | 154.1863 | 774617.4 | -5945.0 | -158925.4 | -2.1309 | -380452.8 | -12.8042 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Si, 1685° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (202) SiF (gas); molecular weight, 47.09

| T_f , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|---------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | | 0 | | 0 | 2495.5 | 4319.3 | | -125000.0 | |
| 100 | 7.8305 | 736.2 | 45.5263 | 3816.5 | 3231.6 | 4644.4 | -4.8474 | -125417.4 | 269.6641 |
| 200 | 7.6162 | 1506.5 | 50.8760 | 8668.7 | 4001.9 | 4782.9 | 0.3063 | -125785.4 | 132.4618 |
| 298.15 | 7.8046 | 2261.1 | 53.9432 | 13822.1 | 4756.5 | 4756.5 | 2.0258 | -126101.6 | 87.1644 |
| 300 | 7.8100 | 2275.5 | 53.9915 | 13921.9 | 4771.0 | 4755.2 | 2.0472 | -126107.1 | 86.5944 |
| 400 | 8.0979 | 3071.2 | 56.2784 | 19440.2 | 5566.6 | 4657.1 | 2.9057 | -126374.6 | 63.6055 |
| 500 | 8.3282 | 3893.0 | 58.1114 | 25162.7 | 6388.5 | 4527.4 | 3.4083 | -126597.5 | 49.7849 |
| 600 | 8.4947 | 4734.6 | 59.6454 | 31052.6 | 7230.1 | 4380.3 | 3.7332 | -126788.1 | 40.5561 |
| 700 | 8.6145 | 5590.4 | 60.9643 | 37084.6 | 8085.9 | 4220.4 | 3.9573 | -126956.0 | 33.9547 |
| 800 | 8.7026 | 6456.5 | 62.1207 | 43240.0 | 8952.0 | 4049.7 | 4.1186 | -127107.5 | 28.9974 |
| 900 | 8.7695 | 7330.2 | 63.1497 | 49504.5 | 9825.7 | 3869.0 | 4.2391 | -127247.1 | 25.1372 |
| 1000 | 8.8217 | 8209.9 | 64.0765 | 55866.6 | 10705.4 | 3678.6 | 4.3309 | -127377.9 | 22.0459 |
| 1100 | 8.8637 | 9094.3 | 64.9193 | 62317.0 | 11589.7 | 3479.0 | 4.4020 | -127502.3 | 19.5140 |
| 1200 | 8.8984 | 9982.4 | 65.6921 | 68848.1 | 12477.9 | 3270.1 | 4.4579 | -127622.2 | 17.4021 |
| 1300 | 8.9276 | 10873.7 | 66.4055 | 75455.4 | 13369.2 | 3051.7 | 4.5022 | -127739.0 | 15.6135 |
| 1400 | 8.9528 | 11767.8 | 67.0681 | 82127.5 | 14263.3 | 2824.6 | 4.5375 | -127853.8 | 14.0789 |
| 1500 | 8.9750 | 12664.2 | 67.6865 | 88865.6 | 15159.7 | 2588.5 | 4.5659 | -127967.7 | 12.7478 |
| 1600 | 8.9948 | 13562.7 | 68.2664 | 95663.5 | 16058.2 | 2343.5 | 4.5883 | -128081.3 | 11.5821 |
| 1700 | 9.0128 | 14463.1 | 68.8123 | 102517.7 | 16958.6 | -9929.1 | 4.5925 | -128195.3 | 10.5526 |
| 1800 | 9.0293 | 15365.2 | 69.3279 | 109425.0 | 17860.7 | -10100.4 | 4.5210 | -128309.9 | 9.6366 |
| 1900 | 9.0446 | 16268.9 | 69.8165 | 116382.4 | 18764.4 | -10271.6 | 4.4559 | -128425.5 | 8.8163 |
| 2000 | 9.0590 | 17174.1 | 70.2808 | 123387.5 | 19669.6 | -10442.6 | 4.3964 | -128542.3 | 8.0774 |
| 2100 | 9.0726 | 18080.7 | 70.7231 | 130437.8 | 20576.2 | -10613.5 | 4.3416 | -128660.4 | 7.4083 |
| 2200 | 9.0856 | 18988.6 | 71.1455 | 137531.4 | 21484.1 | -10784.3 | 4.2910 | -128779.7 | 6.7994 |
| 2300 | 9.0980 | 19897.8 | 71.5496 | 144666.3 | 22393.3 | -10955.1 | 4.2440 | -128900.3 | 6.2430 |
| 2400 | 9.1101 | 20808.2 | 71.9371 | 151840.8 | 23303.7 | -11125.8 | 4.2003 | -129022.0 | 5.7324 |
| 2500 | 9.1218 | 21719.8 | 72.3092 | 159053.2 | 24215.3 | -11296.5 | 4.1595 | -129144.8 | 5.2622 |
| 2600 | 9.1332 | 22632.6 | 72.6672 | 166302.2 | 25128.0 | -11467.2 | 4.1212 | -129268.5 | 4.8278 |
| 2700 | 9.1445 | 23546.5 | 73.0121 | 173586.2 | 26041.9 | -11637.9 | 4.0853 | -129393.0 | 4.4252 |
| 2800 | 9.1556 | 24461.5 | 73.3449 | 180904.2 | 26956.9 | -11808.5 | 4.0514 | -129518.1 | 4.0510 |
| 2900 | 9.1667 | 25377.6 | 73.6664 | 188254.8 | 27873.1 | -11979.1 | 4.0194 | -129643.7 | 3.7022 |
| 3000 | 9.1777 | 26294.8 | 73.9773 | 195637.1 | 28790.3 | -12149.6 | 3.9891 | -129769.6 | 3.3764 |
| 3100 | 9.1888 | 27213.1 | 74.2784 | 203050.0 | 29708.6 | -12320.1 | 3.9603 | -129895.6 | 3.0713 |
| 3200 | 9.2000 | 28132.6 | 74.5703 | 210492.5 | 30628.0 | -12490.6 | 3.9350 | -130021.7 | 2.7850 |
| 3300 | 9.2113 | 29053.1 | 74.8536 | 217963.8 | 31548.6 | -12660.9 | 3.9070 | -130147.5 | 2.5158 |
| 3400 | 9.2228 | 29974.8 | 75.1288 | 225462.9 | 32470.3 | -12831.1 | 3.8822 | -130273.0 | 2.2622 |
| 3500 | 9.2345 | 30897.7 | 75.3963 | 232989.3 | 33393.2 | -13001.2 | 3.8584 | -130398.1 | 2.0229 |
| 3600 | 9.2464 | 31821.7 | 75.6566 | 240542.0 | 34317.2 | -13171.2 | 3.8357 | -130522.5 | 1.7966 |
| 3700 | 9.2587 | 32747.0 | 75.9101 | 248120.3 | 35242.5 | -13340.9 | 3.8140 | -130646.2 | 1.5823 |
| 3800 | 9.2712 | 33673.5 | 76.1572 | 255723.8 | 36169.0 | -13510.4 | 3.7931 | -130769.0 | 1.3792 |
| 3900 | 9.2841 | 34601.3 | 76.3982 | 263351.6 | 37096.7 | -13679.6 | 3.7731 | -130890.8 | 1.1862 |
| 4000 | 9.2974 | 35530.3 | 76.6334 | 271003.2 | 38025.8 | -13848.5 | 3.7536 | -131011.6 | 1.0028 |
| 4100 | 9.3111 | 36460.8 | 76.8631 | 278678.1 | 38956.2 | -14017.1 | 3.7352 | -131131.1 | 0.8281 |
| 4200 | 9.3252 | 37392.6 | 77.0877 | 286375.6 | 39888.0 | -14185.3 | 3.7173 | -131249.3 | 0.6616 |
| 4300 | 9.3398 | 38325.8 | 77.3073 | 294095.4 | 40821.5 | -14353.0 | 3.7001 | -131366.0 | 0.5028 |
| 4400 | 9.3548 | 39260.6 | 77.5222 | 301836.9 | 41756.0 | -14520.2 | 3.6834 | -131481.3 | 0.3510 |
| 4500 | 9.3703 | 40196.8 | 77.7326 | 309599.7 | 42692.3 | -14686.9 | 3.6673 | -131595.0 | 0.2058 |
| 4600 | 9.3863 | 41134.6 | 77.9387 | 317383.3 | 43630.1 | -14853.0 | 3.6517 | -131707.0 | 0.0668 |
| 4700 | 9.4027 | 42074.1 | 78.1407 | 325187.3 | 44569.5 | -15018.4 | 3.6366 | -131817.3 | -0.0664 |
| 4800 | 9.4197 | 43015.2 | 78.3389 | 333011.3 | 45510.7 | -15183.1 | 3.6220 | -131925.8 | -0.1942 |
| 4900 | 9.4371 | 43958.0 | 78.5335 | 340855.0 | 46453.5 | -15347.2 | 3.6078 | -132032.4 | -0.3168 |
| 5000 | 9.4551 | 44902.6 | 78.7241 | 348717.9 | 47398.1 | -15510.4 | 3.5940 | -132137.2 | -0.4346 |
| 5100 | 9.4735 | 45849.1 | 78.9115 | 356599.7 | 48344.5 | -15672.7 | 3.5807 | -132240.0 | -0.5479 |
| 5200 | 9.4925 | 46797.4 | 79.0957 | 364500.1 | 49292.8 | -15834.2 | 3.5677 | -132340.9 | -0.6569 |
| 5300 | 9.5120 | 47747.6 | 79.2767 | 372418.7 | 50243.0 | -15994.7 | 3.5551 | -132439.8 | -0.7619 |
| 5400 | 9.5319 | 48699.8 | 79.4546 | 380355.3 | 51195.2 | -16154.2 | 3.5428 | -132536.7 | -0.8631 |
| 5500 | 9.5524 | 49654.0 | 79.6297 | 388309.5 | 52149.4 | -16312.6 | 3.5308 | -132631.6 | -0.9606 |
| 5600 | 9.5735 | 50610.3 | 79.8020 | 396281.1 | 53105.7 | -16470.0 | 3.5192 | -132724.5 | -1.0548 |
| 5700 | 9.5947 | 51568.7 | 79.9717 | 404269.8 | 54064.1 | -16626.2 | 3.5079 | -132814.8 | -1.1456 |
| 5800 | 9.6165 | 52529.2 | 80.1387 | 412275.4 | 55024.7 | -16781.2 | 3.4968 | -132903.6 | -1.2335 |
| 5900 | 9.6389 | 53492.0 | 80.3033 | 420297.5 | 55987.4 | -16934.9 | 3.4861 | -132990.4 | -1.3184 |
| 6000 | 9.6616 | 54457.0 | 80.4655 | 428336.0 | 56952.5 | -17087.4 | 3.4756 | -133075.2 | -1.4005 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Si, 1685° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(203) SiF₂ (gas); molecular weight, 66.09

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -128129.9 | -125251.3 | ----- | -272925.5 | ----- |
| 100 | 8.1147 | 797.6 | 50.5367 | 4256.1 | -127332.3 | -125212.2 | 275.5883 | -273780.1 | 587.9712 |
| 200 | 9.2387 | 1660.4 | 56.4724 | 9634.1 | -126469.5 | -125331.2 | 138.7280 | -274581.4 | 288.4617 |
| 298.15 | 10.4872 | 2629.9 | 60.3997 | 15378.3 | -125500.0 | -125500.0 | 93.6191 | -275216.3 | 189.5878 |
| 300 | 10.5084 | 2649.3 | 60.4647 | 15490.1 | -125480.6 | -125503.3 | 53.0518 | -275226.4 | 188.3438 |
| 400 | 11.4805 | 3751.7 | 63.6292 | 21700.0 | -124378.2 | -125679.7 | 70.1809 | -275727.8 | 138.1774 |
| 500 | 12.1418 | 4935.0 | 66.2670 | 28198.5 | -123194.9 | -125850.7 | 56.4354 | -276121.3 | 108.0280 |
| 600 | 12.5856 | 6172.8 | 68.5225 | 34940.7 | -121957.1 | -126017.4 | 47.2659 | -276440.7 | 87.9022 |
| 700 | 12.8893 | 7447.5 | 70.4869 | 41893.3 | -120682.4 | -126183.5 | 40.7047 | -276708.9 | 73.5114 |
| 800 | 13.1032 | 8747.7 | 72.2227 | 49030.5 | -119382.2 | -126352.1 | 35.7771 | -276941.3 | 62.7084 |
| 900 | 13.2582 | 10066.1 | 73.7755 | 56331.8 | -118063.7 | -126525.5 | 31.9397 | -277148.0 | 54.2994 |
| 1000 | 13.3735 | 11398.0 | 75.1786 | 63780.6 | -116731.9 | -126705.2 | 28.8653 | -277335.9 | 47.5674 |
| 1100 | 13.4613 | 12739.9 | 76.4576 | 71363.4 | -115390.0 | -126852.2 | 26.3462 | -277510.2 | 42.0558 |
| 1200 | 13.5295 | 14089.6 | 77.6319 | 79068.7 | -114040.3 | -127087.4 | 24.2438 | -277674.4 | 37.4600 |
| 1300 | 13.5835 | 15445.4 | 78.7170 | 86886.8 | -112684.5 | -127291.5 | 22.4620 | -277831.4 | 33.5690 |
| 1400 | 13.6270 | 16806.0 | 79.7253 | 94809.5 | -111323.9 | -127504.4 | 20.9322 | -277983.4 | 30.2321 |
| 1500 | 13.6624 | 18170.5 | 80.6667 | 102829.6 | -109959.4 | -127726.7 | 19.6044 | -278131.9 | 27.3384 |
| 1600 | 13.6916 | 19538.2 | 81.5495 | 110940.9 | -108591.7 | -127958.5 | 18.4402 | -278278.5 | 24.8052 |
| 1700 | 13.7160 | 20908.6 | 82.3803 | 119137.8 | -107221.2 | -140218.7 | 17.3576 | -278424.0 | 22.5687 |
| 1800 | 13.7366 | 22281.3 | 83.1648 | 127415.4 | -105848.6 | -140378.6 | 16.3556 | -278569.1 | 20.5798 |
| 1900 | 13.7541 | 23655.9 | 83.9080 | 135769.4 | -104474.0 | -140539.5 | 15.4981 | -278714.6 | 18.7993 |
| 2000 | 13.7691 | 25032.0 | 84.6139 | 144195.8 | -103097.9 | -140701.4 | 14.6854 | -278860.7 | 17.1959 |
| 2100 | 13.7820 | 26409.6 | 85.2860 | 152691.0 | -101720.3 | -140864.5 | 13.9569 | -279007.8 | 15.7446 |
| 2200 | 13.7933 | 27788.4 | 85.9274 | 161251.9 | -100341.5 | -141028.9 | 13.2902 | -279156.0 | 14.4244 |
| 2300 | 13.8032 | 29168.2 | 86.5408 | 169875.6 | -98961.7 | -141194.7 | 12.6807 | -279305.4 | 13.2185 |
| 2400 | 13.8118 | 30549.0 | 87.1284 | 178559.2 | -97580.9 | -141362.0 | 12.1214 | -279456.0 | 12.1124 |
| 2500 | 13.8195 | 31930.6 | 87.6924 | 187300.5 | -96199.3 | -141530.7 | 11.6062 | -279607.9 | 11.0942 |
| 2600 | 13.8263 | 33312.9 | 88.2346 | 196097.0 | -94817.0 | -141700.9 | 11.1301 | -279761.0 | 10.1539 |
| 2700 | 13.8324 | 34695.8 | 88.7565 | 204946.7 | -93434.1 | -141872.8 | 10.6887 | -279915.2 | 9.2827 |
| 2800 | 13.8379 | 36079.3 | 89.2596 | 213847.7 | -92050.6 | -142046.2 | 10.2783 | -280070.4 | 8.4734 |
| 2900 | 13.8428 | 37463.3 | 89.7453 | 222798.1 | -90666.5 | -142221.3 | 9.8958 | -280226.6 | 7.7194 |
| 3000 | 13.8472 | 38847.8 | 90.2147 | 231796.2 | -89282.0 | -142398.0 | 9.5383 | -280383.7 | 7.0153 |
| 3100 | 13.8512 | 40232.8 | 90.6688 | 240840.5 | -87897.1 | -142576.5 | 9.2035 | -280541.4 | 6.3562 |
| 3200 | 13.8548 | 41618.1 | 91.1086 | 249929.5 | -86511.8 | -142756.6 | 8.8852 | -280699.8 | 5.7380 |
| 3300 | 13.8582 | 43003.7 | 91.5350 | 259061.8 | -85126.2 | -142938.5 | 8.5936 | -280858.7 | 5.1569 |
| 3400 | 13.8612 | 44389.7 | 91.9487 | 268236.1 | -83740.2 | -143122.1 | 8.3150 | -281018.0 | 4.6097 |
| 3500 | 13.8640 | 45776.0 | 92.3506 | 277451.1 | -82353.9 | -143307.4 | 8.0520 | -281177.6 | 4.0935 |
| 3600 | 13.8665 | 47162.5 | 92.7412 | 286705.8 | -80967.4 | -143494.6 | 7.8033 | -281337.5 | 3.6057 |
| 3700 | 13.8689 | 48549.2 | 93.1211 | 295999.0 | -79580.6 | -143683.5 | 7.5677 | -281497.6 | 3.1440 |
| 3800 | 13.8710 | 49936.2 | 93.4910 | 305329.7 | -78193.6 | -143874.2 | 7.3442 | -281657.7 | 2.7063 |
| 3900 | 13.8730 | 51323.5 | 93.8514 | 314696.9 | -76806.4 | -144066.6 | 7.1319 | -281817.8 | 2.2909 |
| 4000 | 13.8749 | 52710.8 | 94.2026 | 324099.7 | -75419.0 | -144260.9 | 6.9255 | -281978.0 | 1.8959 |
| 4100 | 13.8766 | 54098.4 | 94.5453 | 333537.1 | -74031.5 | -144457.0 | 6.7376 | -282138.0 | 1.5201 |
| 4200 | 13.8782 | 55486.2 | 94.8797 | 343008.4 | -72643.7 | -144654.9 | 6.5541 | -282297.9 | 1.1619 |
| 4300 | 13.8797 | 56874.1 | 95.2062 | 352512.8 | -71255.8 | -144854.6 | 6.3789 | -282457.6 | 0.8202 |
| 4400 | 13.8811 | 58262.1 | 95.5254 | 362049.4 | -69867.8 | -145056.2 | 6.2115 | -282617.1 | 0.4939 |
| 4500 | 13.8824 | 59650.3 | 95.8373 | 371617.6 | -68479.6 | -145259.6 | 6.0513 | -282776.4 | 0.1819 |
| 4600 | 13.8836 | 61038.6 | 96.1424 | 381216.7 | -67091.3 | -145464.8 | 5.8978 | -282935.5 | -0.1168 |
| 4700 | 13.8848 | 62427.0 | 96.4410 | 390845.9 | -65702.9 | -145671.9 | 5.7507 | -283094.2 | -0.4028 |
| 4800 | 13.8858 | 63815.5 | 96.7334 | 400504.7 | -64314.4 | -145880.8 | 5.6055 | -283252.8 | -0.6772 |
| 4900 | 13.8868 | 65204.2 | 97.0197 | 410192.4 | -62925.7 | -146091.5 | 5.4738 | -283411.1 | -0.9404 |
| 5000 | 13.8878 | 66592.9 | 97.3003 | 419908.4 | -61537.0 | -146304.1 | 5.3434 | -283569.1 | -1.1933 |
| 5100 | 13.8887 | 67981.7 | 97.5753 | 429652.2 | -60148.2 | -146518.5 | 5.2180 | -283726.9 | -1.4364 |
| 5200 | 13.8895 | 69370.6 | 97.8450 | 439423.3 | -58759.3 | -146734.8 | 5.0971 | -283884.6 | -1.6702 |
| 5300 | 13.8903 | 70759.6 | 98.1096 | 449221.1 | -57370.2 | -146953.0 | 4.9807 | -284042.0 | -1.8954 |
| 5400 | 13.8911 | 72148.7 | 98.3692 | 459045.1 | -55981.2 | -147173.0 | 4.8684 | -284199.4 | -2.1124 |
| 5500 | 13.8918 | 73537.8 | 98.6241 | 468894.7 | -54592.0 | -147394.9 | 4.7600 | -284356.6 | -2.3215 |
| 5600 | 13.8924 | 74927.1 | 98.8744 | 478769.7 | -53202.8 | -147618.7 | 4.6554 | -284513.9 | -2.5234 |
| 5700 | 13.8931 | 76316.3 | 99.1203 | 488669.5 | -51813.6 | -147844.3 | 4.5542 | -284670.6 | -2.7182 |
| 5800 | 13.8937 | 77705.7 | 99.3620 | 498593.6 | -50424.2 | -148071.7 | 4.4564 | -284827.8 | -2.9064 |
| 5900 | 13.8943 | 79095.1 | 99.5995 | 508541.7 | -49034.8 | -148301.1 | 4.3618 | -284985.2 | -3.0884 |
| 6000 | 13.8948 | 80484.5 | 99.8330 | 518513.4 | -47645.4 | -148532.3 | 4.2701 | -285142.8 | -3.2644 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Si, 1685° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(204) SiF₄ (gas); molecular weight, 104.09

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _T ^o) _f , cal/mole | log ₁₀ K _f | ΔH _T ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -389679.2 | -384691.0 | ----- | -569075.2 | ----- |
| 100 | 9.9417 | 84C.2 | 52.6478 | 4424.6 | -388839.0 | -385304.0 | 835.559C | -570884.3 | 1223.6848 |
| 200 | 14.5035 | 2077.4 | 61.0401 | 10130.6 | -387601.8 | -385748.7 | 414.3305 | -572362.7 | 599.2205 |
| 298.15 | 17.5655 | 3659.2 | 67.4343 | 16446.3 | -386020.0 | -386020.0 | 275.5262 | -573452.7 | 393.1551 |
| 300 | 17.6144 | 3651.8 | 67.5431 | 16571.2 | -385987.4 | -386024.1 | 273.7813 | -573470.2 | 390.5630 |
| 400 | 19.8506 | 5571.5 | 72.9353 | 23602.6 | -384107.7 | -386193.2 | 203.4647 | -574274.0 | 286.0546 |
| 500 | 21.4058 | 7639.1 | 77.5427 | 31132.2 | -382040.1 | -386285.3 | 161.2604 | -574847.4 | 223.2731 |
| 600 | 22.4767 | 9836.6 | 81.5461 | 39091.1 | -379842.7 | -386323.8 | 133.1193 | -575256.9 | 181.3826 |
| 700 | 23.2243 | 12123.8 | 85.0703 | 47425.5 | -377555.4 | -386327.6 | 113.0175 | -575551.2 | 151.4425 |
| 800 | 23.7583 | 14474.3 | 88.2083 | 56092.3 | -375204.9 | -386310.0 | 97.9412 | -575763.3 | 128.9775 |
| 900 | 24.1493 | 16870.7 | 91.0303 | 65056.6 | -372808.5 | -386280.3 | 86.2162 | -575915.7 | 111.4992 |
| 1000 | 24.4424 | 19300.9 | 93.5906 | 74289.6 | -370378.3 | -386244.7 | 76.8369 | -576023.9 | 97.5134 |
| 1100 | 24.6669 | 21756.9 | 95.9312 | 83767.4 | -367922.3 | -386207.5 | 69.1637 | -576098.9 | 86.0686 |
| 1200 | 24.8422 | 24232.7 | 98.0853 | 93469.7 | -365446.5 | -386172.1 | 62.7699 | -576148.7 | 76.5303 |
| 1300 | 24.9814 | 26724.1 | 100.0794 | 103379.1 | -362955.1 | -386141.1 | 57.3602 | -576179.3 | 68.4589 |
| 1400 | 25.0937 | 29228.1 | 101.9350 | 113480.9 | -360451.1 | -386115.3 | 52.7236 | -576195.2 | 61.5402 |
| 1500 | 25.1854 | 31742.2 | 103.6695 | 123762.1 | -357937.0 | -386096.5 | 48.7058 | -576199.9 | 55.5439 |
| 1600 | 25.2613 | 34264.7 | 105.2975 | 134211.3 | -355414.6 | -386085.6 | 45.1900 | -576196.0 | 50.2971 |
| 1700 | 25.3248 | 36794.0 | 106.8309 | 144818.5 | -352885.2 | -386102.2 | 42.0744 | -576185.6 | 45.6677 |
| 1800 | 25.3783 | 39329.3 | 108.2800 | 155574.7 | -350349.9 | -386017.8 | 39.2315 | -576170.4 | 41.5528 |
| 1900 | 25.4239 | 41869.4 | 109.6534 | 166471.9 | -347809.8 | -385934.1 | 36.6884 | -576151.5 | 37.8711 |
| 2000 | 25.4630 | 44413.8 | 110.9585 | 177503.1 | -345265.4 | -385851.6 | 34.4001 | -576130.0 | 34.5777 |
| 2100 | 25.4969 | 46961.9 | 112.2016 | 188661.6 | -342717.3 | -385770.7 | 32.3302 | -576106.6 | 31.5599 |
| 2200 | 25.5263 | 49513.1 | 113.3884 | 199941.5 | -340166.1 | -385691.6 | 30.4488 | -576081.8 | 28.8348 |
| 2300 | 25.5521 | 52067.0 | 114.5237 | 211337.5 | -337612.2 | -385614.6 | 28.7314 | -576056.1 | 26.3468 |
| 2400 | 25.5747 | 54623.4 | 115.6117 | 222844.7 | -335055.8 | -385539.9 | 27.1573 | -576029.7 | 24.0662 |
| 2500 | 25.5948 | 57181.9 | 116.6561 | 234458.4 | -332497.3 | -385467.7 | 25.7095 | -576002.8 | 21.9682 |
| 2600 | 25.6126 | 59742.3 | 117.6603 | 246174.6 | -329937.0 | -385398.2 | 24.3733 | -575975.7 | 20.0316 |
| 2700 | 25.6286 | 62304.3 | 118.6273 | 257989.2 | -327374.9 | -385331.3 | 23.1362 | -575948.3 | 18.2386 |
| 2800 | 25.6428 | 64867.9 | 119.5596 | 269898.9 | -324811.3 | -385267.4 | 21.9878 | -575920.7 | 16.5737 |
| 2900 | 25.6557 | 67432.9 | 120.4596 | 281900.1 | -322246.4 | -385206.4 | 20.9186 | -575893.1 | 15.0238 |
| 3000 | 25.6673 | 69999.0 | 121.3296 | 293989.8 | -319680.2 | -385148.4 | 19.9210 | -575865.2 | 13.5772 |
| 3100 | 25.6778 | 72566.3 | 122.1714 | 306165.1 | -317112.9 | -385093.5 | 18.9878 | -575837.3 | 12.2240 |
| 3200 | 25.6873 | 75134.5 | 122.9868 | 318423.2 | -314544.7 | -385041.9 | 18.1130 | -575809.1 | 10.9555 |
| 3300 | 25.6960 | 77703.7 | 123.7774 | 330761.6 | -311975.5 | -384993.4 | 17.2914 | -575780.8 | 9.7638 |
| 3400 | 25.7040 | 80273.7 | 124.5446 | 343177.9 | -309405.5 | -384948.3 | 16.5182 | -575752.2 | 8.6424 |
| 3500 | 25.7113 | 82844.5 | 125.2898 | 355669.8 | -306834.7 | -384906.4 | 15.7852 | -575723.3 | 7.5851 |
| 3600 | 25.7180 | 85416.0 | 126.0142 | 368235.1 | -304263.3 | -384868.0 | 15.1009 | -575694.1 | 6.5865 |
| 3700 | 25.7241 | 87988.1 | 126.7189 | 380872.0 | -301691.1 | -384832.9 | 14.4498 | -575664.6 | 5.6420 |
| 3800 | 25.7298 | 90560.8 | 127.4050 | 393578.3 | -299118.4 | -384801.3 | 13.8330 | -575634.6 | 4.7473 |
| 3900 | 25.7351 | 93134.0 | 128.0734 | 406352.4 | -296545.2 | -384773.1 | 13.2475 | -575604.3 | 3.8984 |
| 4000 | 25.7400 | 95707.8 | 128.7251 | 419192.4 | -293971.4 | -384748.4 | 12.6920 | -575573.5 | 3.0921 |
| 4100 | 25.7445 | 98282.0 | 129.3607 | 432096.9 | -291397.2 | -384727.2 | 12.1634 | -575542.2 | 2.3251 |
| 4200 | 25.7487 | 100856.7 | 129.9811 | 445064.1 | -288822.6 | -384709.5 | 11.6599 | -575510.5 | 1.5947 |
| 4300 | 25.7526 | 103431.7 | 130.5871 | 458092.6 | -286247.5 | -384695.4 | 11.1799 | -575478.2 | 0.8984 |
| 4400 | 25.7563 | 106007.2 | 131.1791 | 471181.0 | -283672.0 | -384684.8 | 10.7216 | -575445.5 | 0.2337 |
| 4500 | 25.7597 | 108583.0 | 131.7580 | 484328.0 | -281096.2 | -384677.9 | 10.2838 | -575412.2 | -0.4015 |
| 4600 | 25.7629 | 111159.1 | 132.3242 | 497532.2 | -278520.1 | -384674.5 | 9.8650 | -575378.4 | -1.0089 |
| 4700 | 25.7659 | 113735.5 | 132.8783 | 510792.4 | -275943.7 | -384674.7 | 9.4641 | -575344.1 | -1.5905 |
| 4800 | 25.7687 | 116312.3 | 133.4208 | 524107.5 | -273366.9 | -384678.5 | 9.0798 | -575309.4 | -2.1478 |
| 4900 | 25.7713 | 118889.3 | 133.9521 | 537476.2 | -270789.9 | -384686.0 | 8.7112 | -575274.1 | -2.6824 |
| 5000 | 25.7738 | 121466.5 | 134.4728 | 550897.5 | -268212.7 | -384697.1 | 8.3574 | -575238.4 | -3.1955 |
| 5100 | 25.7762 | 124044.0 | 134.9832 | 564370.4 | -265635.2 | -384711.8 | 8.0174 | -575202.3 | -3.6885 |
| 5200 | 25.7784 | 126621.8 | 135.4838 | 577893.9 | -263057.4 | -384730.2 | 7.6905 | -575165.9 | -4.1625 |
| 5300 | 25.7805 | 129199.7 | 135.9748 | 591466.9 | -260479.5 | -384752.3 | 7.3759 | -575129.0 | -4.6185 |
| 5400 | 25.7824 | 131777.9 | 136.4567 | 605088.5 | -257901.3 | -384778.0 | 7.0729 | -575091.9 | -5.0577 |
| 5500 | 25.7843 | 134356.2 | 136.9298 | 618757.9 | -255322.0 | -384807.4 | 6.7809 | -575054.6 | -5.4808 |
| 5600 | 25.7861 | 136934.7 | 137.3945 | 632474.2 | -252744.5 | -384840.5 | 6.4954 | -575017.1 | -5.8889 |
| 5700 | 25.7878 | 139513.4 | 137.8509 | 646236.5 | -250165.8 | -384877.3 | 6.2277 | -574978.9 | -6.2825 |
| 5800 | 25.7893 | 142092.3 | 138.2994 | 660044.1 | -247586.9 | -384917.8 | 5.9653 | -574941.1 | -6.6626 |
| 5900 | 25.7908 | 144671.3 | 138.7402 | 673896.1 | -245007.9 | -384962.0 | 5.7118 | -574903.4 | -7.0298 |
| 6000 | 25.7923 | 147250.4 | 139.1737 | 687791.9 | -242426.8 | -385009.8 | 5.4667 | -574865.7 | -7.3847 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Si, 1685° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (205) SiH (gas); molecular weight, 29.098

| T, °K | C_p^0 , cal/mole °K | $H_T^0 - H_0^0$, cal/mole | S_T^0 , cal/mole °K | $-(F_T^0 - H_0^0)$, cal/mole | H_T^0 , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|--------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|-----------------------------------------------|-----------------|---------------------------------|---------------|
| | | | | | | $(\Delta H_T^0)_f$, cal/mole | $\log_{10} K_f$ | ΔH_T^0 , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 87241.8 | 89022.7 | ----- | -73570.0 | ----- |
| 100 | 7.7296 | 721.0 | 39.1891 | 3197.9 | 87962.7 | 89300.5 | -139.4573 | -74000.9 | 158.1321 |
| 200 | 7.3462 | 1473.8 | 44.4235 | 7410.9 | 88715.6 | 89470.2 | -91.1813 | -74357.3 | 77.1157 |
| 298.15 | 7.1810 | 2185.2 | 47.3195 | 11923.1 | 89426.9 | 89426.9 | -39.6002 | -74670.8 | 50.3189 |
| 300 | 7.1796 | 2198.5 | 47.3664 | 12010.7 | 89440.2 | 89425.0 | -59.1962 | -74676.5 | 49.9814 |
| 400 | 7.1750 | 2915.1 | 49.4256 | 16855.2 | 90156.8 | 89285.7 | -42.9214 | -74979.8 | 36.3564 |
| 500 | 7.2811 | 3637.2 | 51.0364 | 21881.1 | 90878.9 | 89109.6 | -33.1736 | -75257.2 | 28.1487 |
| 600 | 7.4475 | 4373.3 | 52.3781 | 27053.6 | 91615.1 | 88922.7 | -26.6886 | -75535.2 | 22.6565 |
| 700 | 7.6232 | 5127.3 | 53.5400 | 32350.7 | 92369.0 | 88735.1 | -22.0664 | -75782.4 | 18.7199 |
| 800 | 7.8142 | 5899.8 | 54.5712 | 37757.2 | 93141.5 | 88550.1 | -18.6072 | -76009.3 | 15.7582 |
| 900 | 7.9796 | 6689.6 | 55.5013 | 43261.6 | 93931.4 | 88367.3 | -15.9218 | -76217.8 | 13.4481 |
| 1000 | 8.1261 | 7495.1 | 56.3498 | 48854.8 | 94736.8 | 88185.2 | -13.7780 | -76410.3 | 11.5951 |
| 1100 | 8.2539 | 8314.2 | 57.1304 | 54529.3 | 95556.0 | 88002.1 | -12.0280 | -76589.4 | 10.0752 |
| 1200 | 8.3650 | 9145.3 | 57.8535 | 60279.0 | 96387.0 | 87816.0 | -10.5725 | -76757.3 | 8.8059 |
| 1300 | 8.4615 | 9986.7 | 58.5270 | 66098.4 | 97228.4 | 87625.1 | -9.3435 | -76916.2 | 7.7295 |
| 1400 | 8.5457 | 10837.1 | 59.1572 | 71982.9 | 98078.9 | 87428.7 | -8.2928 | -77067.8 | 6.8050 |
| 1500 | 8.6195 | 11695.5 | 59.7494 | 77928.5 | 98937.3 | 87225.3 | -7.3838 | -77213.7 | 6.0023 |
| 1600 | 8.6847 | 12560.8 | 60.3078 | 83931.7 | 99802.5 | 87014.3 | -6.5904 | -77355.2 | 5.2985 |
| 1700 | 8.7426 | 13432.2 | 60.8360 | 89989.1 | 100674.0 | 86776.8 | -5.9057 | -77493.4 | 4.6765 |
| 1800 | 8.7945 | 14309.1 | 61.3373 | 96098.0 | 101550.9 | 86541.3 | -5.3722 | -77629.0 | 4.1225 |
| 1900 | 8.8412 | 15190.9 | 61.8140 | 102255.7 | 102432.7 | 86305.7 | -4.8956 | -77762.7 | 3.6261 |
| 2000 | 8.8836 | 16077.2 | 62.2686 | 108460.0 | 103318.9 | 86070.1 | -4.4676 | -77894.9 | 3.1785 |
| 2100 | 8.9224 | 16967.5 | 62.7030 | 114708.8 | 104209.3 | 85834.3 | -4.0809 | -78026.0 | 2.7728 |
| 2200 | 8.9580 | 17861.5 | 63.1189 | 121000.1 | 105103.3 | 85598.3 | -3.7302 | -78156.3 | 2.4035 |
| 2300 | 8.9909 | 18759.0 | 63.5178 | 127332.0 | 106000.8 | 85361.8 | -3.4103 | -78285.9 | 2.0656 |
| 2400 | 9.0216 | 19659.7 | 63.9011 | 133703.0 | 106901.4 | 85124.9 | -3.1179 | -78415.0 | 1.7554 |
| 2500 | 9.0502 | 20563.3 | 64.2700 | 140111.7 | 107805.0 | 84887.6 | -2.8492 | -78543.5 | 1.4696 |
| 2600 | 9.0771 | 21469.7 | 64.6255 | 146556.6 | 108711.5 | 84649.9 | -2.6017 | -78671.4 | 1.2053 |
| 2700 | 9.1025 | 22378.6 | 64.9685 | 153036.4 | 109620.4 | 84411.5 | -2.3729 | -78798.9 | 0.9602 |
| 2800 | 9.1266 | 23290.1 | 65.3006 | 159549.9 | 110531.9 | 84172.8 | -2.1610 | -78925.7 | 0.7322 |
| 2900 | 9.1495 | 24203.9 | 65.6207 | 166096.1 | 111445.7 | 83933.5 | -1.9639 | -79051.9 | 0.5196 |
| 3000 | 9.1714 | 25120.0 | 65.9312 | 172673.8 | 112361.7 | 83693.6 | -1.7803 | -79177.4 | 0.3209 |
| 3100 | 9.1923 | 26038.1 | 66.2323 | 179282.0 | 113279.9 | 83453.0 | -1.6090 | -79302.1 | 0.1347 |
| 3200 | 9.2124 | 26958.4 | 66.5245 | 185919.9 | 114200.1 | 83211.7 | -1.4486 | -79425.9 | -0.0401 |
| 3300 | 9.2318 | 27880.6 | 66.8082 | 192586.6 | 115122.4 | 82970.4 | -1.2983 | -79548.7 | -0.2046 |
| 3400 | 9.2506 | 28804.8 | 67.0841 | 199281.3 | 116046.5 | 82727.8 | -1.1571 | -79670.6 | -0.3597 |
| 3500 | 9.2688 | 29730.8 | 67.3526 | 206003.2 | 116972.5 | 82484.2 | -1.0242 | -79791.3 | -0.5061 |
| 3600 | 9.2864 | 30658.5 | 67.6139 | 212751.6 | 117900.3 | 82240.8 | -0.8989 | -79910.9 | -0.6446 |
| 3700 | 9.3035 | 31588.0 | 67.8686 | 219525.7 | 118829.7 | 81996.6 | -0.7807 | -80029.3 | -0.7758 |
| 3800 | 9.3202 | 32519.1 | 68.1169 | 226325.1 | 119760.9 | 81750.9 | -0.6689 | -80146.5 | -0.9033 |
| 3900 | 9.3365 | 33452.0 | 68.3592 | 233148.8 | 120693.8 | 81506.0 | -0.5632 | -80262.2 | -1.0186 |
| 4000 | 9.3525 | 34386.6 | 68.5958 | 239996.6 | 121628.4 | 81260.0 | -0.4627 | -80376.5 | -1.1311 |
| 4100 | 9.3681 | 35322.5 | 68.8269 | 246867.8 | 122564.3 | 81013.7 | -0.3676 | -80489.7 | -1.2363 |
| 4200 | 9.3834 | 36260.0 | 69.0529 | 253762.0 | 123501.8 | 80766.3 | -0.2768 | -80601.4 | -1.3405 |
| 4300 | 9.3984 | 37199.1 | 69.2738 | 260678.3 | 124440.9 | 80518.8 | -0.1907 | -80711.5 | -1.4438 |
| 4400 | 9.4131 | 38139.8 | 69.4901 | 267616.5 | 125381.5 | 80270.1 | -0.1086 | -80820.1 | -1.5461 |
| 4500 | 9.4276 | 39081.8 | 69.7018 | 274576.1 | 126323.6 | 80021.7 | -0.0305 | -80927.3 | -1.6206 |
| 4600 | 9.4419 | 40025.2 | 69.9091 | 281556.7 | 127267.0 | 79772.2 | 0.0442 | -81033.0 | -1.7061 |
| 4700 | 9.4560 | 40970.1 | 70.1123 | 288557.8 | 128211.9 | 79522.7 | 0.1156 | -81137.2 | -1.7881 |
| 4800 | 9.4698 | 41916.4 | 70.3115 | 295579.0 | 129153.1 | 79271.2 | 0.1839 | -81239.9 | -1.8667 |
| 4900 | 9.4835 | 42864.1 | 70.5069 | 302619.9 | 130105.8 | 79019.7 | 0.2491 | -81341.1 | -1.9423 |
| 5000 | 9.4970 | 43813.2 | 70.6987 | 309680.3 | 131055.0 | 78768.4 | 0.3116 | -81440.7 | -2.0149 |
| 5100 | 9.5108 | 44763.5 | 70.8869 | 316759.7 | 132005.3 | 78516.0 | 0.3717 | -81539.1 | -2.0847 |
| 5200 | 9.5242 | 45715.3 | 71.0717 | 323857.7 | 132957.1 | 78263.4 | 0.4292 | -81636.0 | -2.1519 |
| 5300 | 9.5375 | 46668.4 | 71.2533 | 330974.0 | 133910.2 | 78009.9 | 0.4843 | -81731.5 | -2.2157 |
| 5400 | 9.5507 | 47622.8 | 71.4317 | 338108.2 | 134864.6 | 77756.2 | 0.5376 | -81825.7 | -2.2792 |
| 5500 | 9.5638 | 48578.5 | 71.6070 | 345260.2 | 135820.3 | 77501.7 | 0.5886 | -81918.6 | -2.3394 |
| 5600 | 9.5768 | 49535.5 | 71.7795 | 352429.6 | 136777.3 | 77247.0 | 0.6377 | -82010.3 | -2.3976 |
| 5700 | 9.5897 | 50493.9 | 71.9491 | 359616.0 | 137735.6 | 76992.2 | 0.6850 | -82100.2 | -2.4537 |
| 5800 | 9.6025 | 51453.5 | 72.1160 | 366819.3 | 138695.2 | 76736.8 | 0.7305 | -82189.5 | -2.5080 |
| 5900 | 9.6152 | 52414.4 | 72.2803 | 374039.1 | 139656.1 | 76480.7 | 0.7745 | -82277.8 | -2.5606 |
| 6000 | 9.6279 | 53376.5 | 72.4420 | 381275.3 | 140618.3 | 76224.5 | 0.8167 | -82365.0 | -2.6114 |

A change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Si, 1685° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(206) SiH₄ (gas); molecular weight, 32.122

| T, °K | C _p , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | C | ----- | 0 | 5281.1 | 10097.7 | ----- | -307380.1 | ----- |
| 100 | 7.9518 | 794.9 | 39.5929 | 3164.4 | 6076.1 | 9311.1 | -22.5553 | -305227.5 | 657.8824 |
| 200 | 8.4905 | 1606.0 | 45.1954 | 7433.1 | 6887.1 | 8634.9 | -12.6336 | -311016.2 | 319.2223 |
| 298.15 | 10.2359 | 2518.9 | 48.8858 | 12056.4 | 7800.0 | 7800.0 | -9.6565 | -312591.0 | 207.0941 |
| 300 | 10.2738 | 2537.8 | 48.9493 | 12146.9 | 7815.0 | 7784.6 | -9.6222 | -312618.6 | 205.6811 |
| 400 | 12.3029 | 3667.6 | 52.1854 | 17206.6 | 8948.7 | 7016.6 | -8.2766 | -313559.2 | 148.6313 |
| 500 | 14.1396 | 4991.7 | 55.1323 | 22574.5 | 10272.8 | 6394.6 | -7.5362 | -315175.0 | 114.2595 |
| 600 | 15.7508 | 6488.0 | 57.8560 | 28225.6 | 11765.1 | 5917.9 | -7.0873 | -316173.3 | 91.2650 |
| 700 | 17.1480 | 8134.7 | 60.3916 | 34139.4 | 13415.8 | 5565.7 | -6.7888 | -317018.3 | 74.7920 |
| 800 | 18.3438 | 9910.9 | 62.7616 | 40298.4 | 15192.0 | 5330.1 | -6.5764 | -317731.9 | 62.4067 |
| 900 | 19.3565 | 11797.3 | 64.9824 | 46686.8 | 17078.5 | 5177.2 | -6.4165 | -318334.2 | 52.7536 |
| 1000 | 20.2085 | 13776.8 | 67.0672 | 53290.4 | 19057.9 | 5051.9 | -6.2912 | -318843.1 | 45.0177 |
| 1100 | 20.9239 | 15834.5 | 69.0278 | 60096.1 | 21115.6 | 5057.7 | -6.1910 | -319274.1 | 38.6789 |
| 1200 | 21.5251 | 17957.8 | 70.8749 | 67092.1 | 23236.9 | 5060.5 | -6.1073 | -319640.2 | 33.3899 |
| 1300 | 22.0318 | 20136.4 | 72.6184 | 74267.6 | 25417.5 | 5088.0 | -6.0360 | -319952.4 | 28.9099 |
| 1400 | 22.4607 | 22361.6 | 74.2673 | 81612.7 | 27642.7 | 5132.2 | -5.9756 | -320219.7 | 25.0665 |
| 1500 | 22.8254 | 24626.4 | 75.8297 | 89118.2 | 29907.5 | 5184.5 | -5.9215 | -320449.6 | 21.7329 |
| 1600 | 23.1373 | 26924.9 | 77.3130 | 96776.0 | 32206.0 | 5240.7 | -5.8737 | -320648.3 | 18.8140 |
| 1700 | 23.4054 | 29252.4 | 78.7240 | 104578.4 | 34533.5 | -6721.5 | -5.8449 | -320820.9 | 16.2370 |
| 1800 | 23.6372 | 31604.8 | 80.0685 | 112518.6 | 36885.9 | -6575.6 | -5.8224 | -320971.4 | 13.9453 |
| 1900 | 23.8385 | 33978.8 | 81.3520 | 120590.1 | 39255.9 | -6428.4 | -5.9337 | -321103.3 | 11.8938 |
| 2000 | 24.0144 | 36371.6 | 82.5794 | 128787.1 | 41652.8 | -6280.2 | -5.9708 | -321219.5 | 10.0468 |
| 2100 | 24.1687 | 38780.9 | 83.7548 | 137104.2 | 44062.1 | -6132.6 | -6.0029 | -321322.0 | 8.3751 |
| 2200 | 24.3047 | 41204.8 | 84.8824 | 145536.5 | 46485.9 | -5985.9 | -6.0319 | -321413.0 | 6.8550 |
| 2300 | 24.4252 | 43641.4 | 85.9655 | 154079.2 | 48922.5 | -5842.4 | -6.0568 | -321493.9 | 5.4666 |
| 2400 | 24.5323 | 46089.3 | 87.0073 | 162728.2 | 51370.5 | -5701.5 | -6.0803 | -321566.1 | 4.1937 |
| 2500 | 24.6275 | 48547.4 | 88.0107 | 171479.4 | 53826.6 | -5564.1 | -6.1005 | -321630.5 | 3.0223 |
| 2600 | 24.7135 | 51014.6 | 88.9784 | 180329.1 | 56295.7 | -5431.0 | -6.1193 | -321688.2 | 1.9408 |
| 2700 | 24.7906 | 53489.9 | 89.9125 | 189273.9 | 58771.0 | -5301.5 | -6.1356 | -321739.8 | 0.9393 |
| 2800 | 24.8600 | 55972.5 | 90.8154 | 198310.6 | 61253.6 | -5177.3 | -6.1512 | -321786.0 | 0.0092 |
| 2900 | 24.9229 | 58461.7 | 91.6889 | 207436.0 | 63742.8 | -5057.4 | -6.1650 | -321827.2 | -0.8569 |
| 3000 | 24.9800 | 60956.8 | 92.5348 | 216647.4 | 66238.0 | -4943.1 | -6.1769 | -321864.0 | -1.6654 |
| 3100 | 25.0319 | 63457.5 | 93.3547 | 225942.1 | 68738.6 | -4834.2 | -6.1887 | -321896.7 | -2.4218 |
| 3200 | 25.0794 | 65963.1 | 94.1502 | 235317.6 | 71244.2 | -4732.5 | -6.1993 | -321925.5 | -3.1309 |
| 3300 | 25.1227 | 68473.2 | 94.9226 | 244771.4 | 73754.3 | -4633.6 | -6.2089 | -321950.9 | -3.7972 |
| 3400 | 25.1625 | 70987.5 | 95.6732 | 254301.4 | 76268.6 | -4543.4 | -6.2175 | -321973.1 | -4.4243 |
| 3500 | 25.1991 | 73505.6 | 96.4031 | 263905.3 | 78786.8 | -4460.6 | -6.2263 | -321992.1 | -5.0156 |
| 3600 | 25.2328 | 76027.2 | 97.1135 | 273581.3 | 81308.4 | -4381.1 | -6.2335 | -322008.3 | -5.5741 |
| 3700 | 25.2640 | 78552.1 | 97.8053 | 283327.4 | 83833.2 | -4307.4 | -6.2410 | -322021.8 | -6.1024 |
| 3800 | 25.2927 | 81080.0 | 98.4794 | 293141.8 | 86361.1 | -4244.1 | -6.2475 | -322032.7 | -6.6030 |
| 3900 | 25.3194 | 83610.6 | 99.1367 | 303022.7 | 88891.7 | -4181.9 | -6.2544 | -322041.2 | -7.0778 |
| 4000 | 25.3442 | 86143.8 | 99.7781 | 312968.6 | 91424.9 | -4128.3 | -6.2595 | -322047.3 | -7.5290 |
| 4100 | 25.3672 | 88679.4 | 100.4042 | 322977.8 | 93960.5 | -4078.6 | -6.2656 | -322051.2 | -7.9581 |
| 4200 | 25.3887 | 91217.2 | 101.0157 | 333049.0 | 96498.3 | -4037.4 | -6.2698 | -322053.0 | -8.3669 |
| 4300 | 25.4087 | 93757.1 | 101.6134 | 343180.5 | 99038.2 | -4001.3 | -6.2748 | -322052.8 | -8.7566 |
| 4400 | 25.4275 | 96298.9 | 102.1977 | 353371.2 | 101580.0 | -3973.6 | -6.2795 | -322050.7 | -9.1286 |
| 4500 | 25.4450 | 98842.5 | 102.7694 | 363619.7 | 104123.6 | -3948.9 | -6.2841 | -322046.7 | -9.4840 |
| 4600 | 25.4614 | 101387.8 | 103.3286 | 373924.7 | 106669.0 | -3924.2 | -6.2884 | -322041.0 | -9.8240 |
| 4700 | 25.4768 | 103934.8 | 103.8766 | 384285.0 | 109215.9 | -3922.2 | -6.2924 | -322033.6 | -10.1495 |
| 4800 | 25.4913 | 106483.2 | 104.4131 | 394699.6 | 111764.3 | -3920.0 | -6.2959 | -322024.6 | -10.4615 |
| 4900 | 25.5049 | 109033.0 | 104.9388 | 405167.3 | 114314.1 | -3923.9 | -6.2998 | -322014.1 | -10.7607 |
| 5000 | 25.5177 | 111584.1 | 105.4542 | 415687.0 | 116865.3 | -3931.7 | -6.3035 | -322002.2 | -11.0479 |
| 5100 | 25.5298 | 114136.5 | 105.9597 | 426257.8 | 119417.6 | -3947.3 | -6.3066 | -321989.0 | -11.3239 |
| 5200 | 25.5413 | 116690.1 | 106.4555 | 436878.6 | 121971.2 | -3968.3 | -6.3100 | -321974.5 | -11.5892 |
| 5300 | 25.5521 | 119244.7 | 106.9421 | 447548.6 | 124525.9 | -3996.9 | -6.3137 | -321958.9 | -11.8445 |
| 5400 | 25.5623 | 121800.5 | 107.4199 | 458266.8 | 127081.6 | -4030.9 | -6.3160 | -321942.2 | -12.0904 |
| 5500 | 25.5719 | 124357.2 | 107.8890 | 469032.3 | 129638.3 | -4072.1 | -6.3194 | -321924.5 | -12.3272 |
| 5600 | 25.5811 | 126914.8 | 108.3498 | 479844.3 | 132196.0 | -4118.3 | -6.3221 | -321906.0 | -12.5557 |
| 5700 | 25.5898 | 129473.4 | 108.8027 | 490702.0 | 134754.5 | -4169.4 | -6.3250 | -321886.2 | -12.7760 |
| 5800 | 25.5981 | 132032.8 | 109.2478 | 501604.6 | 137313.9 | -4227.4 | -6.3281 | -321866.6 | -12.9888 |
| 5900 | 25.6059 | 134593.0 | 109.6855 | 512551.3 | 139874.1 | -4292.3 | -6.3304 | -321845.5 | -13.1944 |
| 6000 | 25.6134 | 137154.0 | 110.1159 | 523541.4 | 142435.1 | -4361.6 | -6.3337 | -321824.4 | -13.3930 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Si, 1685° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(207) SiN (gas); molecular weight, 42.098

| T , °K | C_p° , cal/mole °K | $H_f^\circ - H_0^\circ$, cal/mole | S_f° , cal/mole °K | $-(F_f^\circ - H_0^\circ)$, cal/mole | H_f° , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|-------------|------------------------------|---------------------------------------|------------------------------|------------------------------------------|---------------------------|-----------------------------------------------|-----------------|----------------------------------|---------------|
| | | | | | | $(\Delta H_f^\circ)_f$, cal/mole | $\log_{10} K_f$ | ΔH_f° , cal/mole | $\log_{10} K$ |
| 0 | ----- | 0 | ----- | 0 | 117738.6 | 119543.8 | ----- | -104000.0 | ----- |
| 100 | 6.9567 | 694.9 | 44.1401 | 3719.1 | 118433.5 | 119828.1 | -256.5964 | -104457.0 | 223.7572 |
| 200 | 6.9953 | 1391.5 | 48.9676 | 8402.0 | 119130.2 | 119895.2 | -125.6149 | -104869.6 | 109.4340 |
| 298.15 | 7.2105 | 2087.2 | 51.7947 | 13355.4 | 119825.8 | 119825.8 | -82.4955 | -105198.8 | 71.6581 |
| 300 | 7.2160 | 2100.5 | 51.8393 | 13451.2 | 119839.2 | 119823.8 | -81.9539 | -105204.5 | 71.1825 |
| 400 | 7.5412 | 2838.2 | 53.9592 | 18745.5 | 120576.8 | 119704.3 | -60.1417 | -105486.6 | 51.9992 |
| 500 | 7.8439 | 3607.9 | 55.6755 | 24229.8 | 121546.5 | 119573.8 | -47.0681 | -105726.4 | 40.4662 |
| 600 | 8.0860 | 4404.9 | 57.1279 | 29871.8 | 122143.6 | 119441.3 | -38.3620 | -105933.6 | 32.7512 |
| 700 | 8.2713 | 5223.2 | 58.3890 | 35649.1 | 122961.8 | 119305.4 | -32.1505 | -106116.5 | 27.2345 |
| 800 | 8.4122 | 6057.7 | 59.5031 | 41544.7 | 123796.3 | 119163.6 | -27.4974 | -106281.3 | 23.0902 |
| 900 | 8.5206 | 6904.6 | 60.5004 | 47545.8 | 124643.2 | 119013.8 | -23.8824 | -106432.8 | 19.8620 |
| 1000 | 8.6053 | 7761.1 | 61.4027 | 53641.7 | 125499.7 | 118854.6 | -20.9944 | -106574.3 | 17.2759 |
| 1100 | 8.6727 | 8625.1 | 62.2262 | 59823.7 | 126363.7 | 118685.5 | -18.6347 | -106708.5 | 15.1573 |
| 1200 | 8.7273 | 9495.2 | 62.9832 | 66084.7 | 127233.8 | 118506.1 | -16.6712 | -106837.4 | 13.3896 |
| 1300 | 8.7723 | 10370.2 | 63.6836 | 72418.5 | 128108.8 | 118316.1 | -15.0123 | -106962.6 | 11.8920 |
| 1400 | 8.8100 | 11249.4 | 64.3351 | 78819.8 | 128988.0 | 118116.2 | -13.5929 | -107085.5 | 10.6070 |
| 1500 | 8.8421 | 12132.0 | 64.9441 | 85284.1 | 129870.7 | 117906.2 | -12.3646 | -107207.1 | 9.4919 |
| 1600 | 8.8698 | 13017.7 | 65.5156 | 91807.3 | 130756.3 | 117686.2 | -11.2920 | -107328.3 | 8.5152 |
| 1700 | 8.8939 | 13905.9 | 66.0541 | 98386.1 | 131644.5 | 117457.8 | -10.3609 | -107449.7 | 7.6524 |
| 1800 | 8.9154 | 14796.4 | 66.5631 | 105017.2 | 132535.0 | 117229.9 | -9.6084 | -107571.7 | 6.8846 |
| 1900 | 8.9345 | 15688.9 | 67.0456 | 111697.8 | 133427.5 | 117014.6 | -8.9361 | -107694.7 | 6.1968 |
| 2000 | 8.9518 | 16583.2 | 67.5044 | 118425.5 | 134321.8 | 116805.9 | -8.3318 | -107819.0 | 5.5771 |
| 2100 | 8.9677 | 17479.2 | 67.9415 | 125198.0 | 135217.8 | 116603.9 | -7.7859 | -107944.6 | 5.0157 |
| 2200 | 8.9822 | 18376.7 | 68.3590 | 132013.2 | 136115.3 | 116409.7 | -7.2903 | -108071.6 | 4.5048 |
| 2300 | 8.9958 | 19275.6 | 68.7586 | 138869.2 | 137014.2 | 116225.3 | -6.8385 | -108200.2 | 4.0378 |
| 2400 | 9.0084 | 20175.8 | 69.1417 | 145764.3 | 137914.4 | 116043.8 | -6.4249 | -108330.2 | 3.6092 |
| 2500 | 9.0204 | 21077.3 | 69.5097 | 152697.0 | 138815.9 | 115866.2 | -6.0449 | -108461.6 | 3.2144 |
| 2600 | 9.0318 | 21979.9 | 69.8637 | 159665.8 | 139718.5 | 115696.6 | -5.6946 | -108594.5 | 2.8495 |
| 2700 | 9.0428 | 22885.6 | 70.2048 | 166669.3 | 140622.2 | 115534.7 | -5.3708 | -108728.8 | 2.5112 |
| 2800 | 9.0534 | 23788.4 | 70.5338 | 173706.4 | 141527.0 | 115379.5 | -5.0705 | -108864.5 | 2.1967 |
| 2900 | 9.0637 | 24694.3 | 70.8517 | 180775.7 | 142432.9 | 115230.2 | -4.7914 | -109001.5 | 1.9036 |
| 3000 | 9.0739 | 25601.2 | 71.1592 | 187876.4 | 143339.8 | 115086.0 | -4.5312 | -109139.9 | 1.6296 |
| 3100 | 9.0840 | 26509.1 | 71.4569 | 195007.2 | 144247.7 | 114946.1 | -4.2882 | -109279.6 | 1.3729 |
| 3200 | 9.0941 | 27418.0 | 71.7454 | 202167.4 | 145156.6 | 114811.5 | -4.0606 | -109420.8 | 1.1320 |
| 3300 | 9.1042 | 28327.9 | 72.0254 | 209356.0 | 146066.5 | 114682.1 | -3.8472 | -109563.3 | 0.9055 |
| 3400 | 9.1145 | 29238.8 | 72.2974 | 216572.2 | 146977.4 | 114557.8 | -3.6466 | -109707.3 | 0.6919 |
| 3500 | 9.1250 | 30150.8 | 72.5617 | 223815.3 | 147889.4 | 114438.7 | -3.4578 | -109852.8 | 0.4903 |
| 3600 | 9.1357 | 31063.8 | 72.8189 | 231084.4 | 148802.4 | 114324.7 | -3.2797 | -109999.9 | 0.2996 |
| 3700 | 9.1468 | 31977.9 | 73.0694 | 238378.8 | 149716.6 | 114215.8 | -3.1115 | -110148.7 | 0.1191 |
| 3800 | 9.1583 | 32893.2 | 73.3135 | 245698.0 | 150631.8 | 114112.4 | -2.9523 | -110299.2 | -0.0523 |
| 3900 | 9.1701 | 33809.6 | 73.5515 | 253041.3 | 151548.2 | 114014.5 | -2.8015 | -110451.5 | -0.2150 |
| 4000 | 9.1825 | 34727.2 | 73.7838 | 260408.1 | 152465.8 | 113922.8 | -2.6585 | -110605.7 | -0.3699 |
| 4100 | 9.1953 | 35646.1 | 74.0107 | 267797.9 | 153384.7 | 113836.2 | -2.5226 | -110761.9 | -0.5174 |
| 4200 | 9.2087 | 36566.3 | 74.2325 | 275210.1 | 154304.9 | 113754.5 | -2.3934 | -110920.2 | -0.6580 |
| 4300 | 9.2226 | 37487.9 | 74.4493 | 282644.2 | 155226.5 | 113677.6 | -2.2704 | -111080.6 | -0.7923 |
| 4400 | 9.2371 | 38410.8 | 74.6615 | 290099.8 | 156149.5 | 113605.0 | -2.1531 | -111243.2 | -0.9207 |
| 4500 | 9.2523 | 39335.3 | 74.8693 | 297576.4 | 157073.9 | 113537.5 | -2.0412 | -111408.2 | -1.0436 |
| 4600 | 9.2680 | 40261.3 | 75.0728 | 305073.5 | 157999.9 | 113475.2 | -1.9343 | -111575.6 | -1.1613 |
| 4700 | 9.2844 | 41188.9 | 75.2723 | 312590.8 | 158927.6 | 113417.4 | -1.8321 | -111745.4 | -1.2742 |
| 4800 | 9.3014 | 42118.2 | 75.4679 | 320127.8 | 159856.8 | 113364.8 | -1.7343 | -111917.8 | -1.3825 |
| 4900 | 9.3191 | 43049.2 | 75.6599 | 327684.3 | 160787.9 | 113317.3 | -1.6406 | -112092.7 | -1.4866 |
| 5000 | 9.3374 | 43982.1 | 75.8484 | 335259.7 | 161720.7 | 113274.3 | -1.5508 | -112270.3 | -1.5867 |
| 5100 | 9.3564 | 44916.8 | 76.0334 | 342853.8 | 162655.4 | 113235.8 | -1.4646 | -112450.6 | -1.6830 |
| 5200 | 9.3760 | 45853.4 | 76.2153 | 350466.3 | 163592.0 | 113201.7 | -1.3818 | -112633.7 | -1.7757 |
| 5300 | 9.3962 | 46792.0 | 76.3941 | 358096.8 | 164530.6 | 113171.7 | -1.3022 | -112819.5 | -1.8651 |
| 5400 | 9.4170 | 47732.6 | 76.5699 | 365745.0 | 165471.2 | 113145.3 | -1.2257 | -113008.2 | -1.9513 |
| 5500 | 9.4385 | 48675.4 | 76.7429 | 373410.7 | 166414.0 | 113122.6 | -1.1521 | -113199.7 | -2.0345 |
| 5600 | 9.4603 | 49620.3 | 76.9132 | 381093.5 | 167358.9 | 113103.9 | -1.0812 | -113394.1 | -2.1149 |
| 5700 | 9.4828 | 50567.5 | 77.0808 | 388793.2 | 168306.1 | 113089.7 | -1.0129 | -113590.8 | -2.1926 |
| 5800 | 9.5059 | 51516.9 | 77.2459 | 396509.6 | 169255.5 | 113080.0 | -0.9470 | -113791.0 | -2.2678 |
| 5900 | 9.5294 | 52468.6 | 77.4086 | 404242.3 | 170207.3 | 113074.3 | -0.8834 | -113994.0 | -2.3405 |
| 6000 | 9.5534 | 53422.8 | 77.5690 | 411991.2 | 171161.4 | 113072.7 | -0.8220 | -114199.9 | -2.4109 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Si, 1685° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES

(208) SiO (gas); molecular weight, 44.09

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | | 0 | | 0 | -25494.0 | -21687.6 | | -191638.4 | |
| 100 | 6.9565 | 694.9 | 42.9099 | 3596.1 | -22799.1 | -21405.2 | 51.4285 | -192126.0 | 414.8002 |
| 200 | 6.9802 | 1391.1 | 47.7350 | 8155.9 | -22102.9 | -21336.6 | 28.0867 | -192599.7 | 204.6555 |
| 298.15 | 7.1469 | 2083.0 | 50.5473 | 12987.7 | -21411.0 | -21411.0 | 20.4028 | -192967.6 | 135.3135 |
| 300 | 7.1516 | 2096.2 | 50.5915 | 13081.2 | -21397.8 | -21413.2 | 20.3059 | -192973.9 | 134.4412 |
| 400 | 7.4427 | 2825.5 | 52.6875 | 18249.5 | -20668.5 | -21547.6 | 16.3955 | -193285.6 | 99.2711 |
| 500 | 7.7369 | 3584.8 | 54.3806 | 23605.5 | -19909.2 | -21702.8 | 14.0334 | -193549.5 | 78.1371 |
| 600 | 7.9840 | 4371.3 | 55.8138 | 29117.0 | -19122.7 | -21866.9 | 12.4469 | -193776.8 | 64.0297 |
| 700 | 8.1787 | 5179.8 | 57.0598 | 34762.1 | -18314.2 | -22057.8 | 11.3049 | -193976.4 | 53.9419 |
| 800 | 8.3296 | 6005.5 | 58.1622 | 40524.2 | -17488.4 | -22215.6 | 10.4415 | -194155.4 | 46.3686 |
| 900 | 8.4469 | 6844.6 | 59.1503 | 46390.7 | -16649.4 | -22400.7 | 9.7646 | -194318.9 | 40.4730 |
| 1000 | 8.5391 | 7694.1 | 60.0453 | 52351.2 | -15799.9 | -22593.5 | 9.2185 | -194470.8 | 35.7528 |
| 1100 | 8.6127 | 8551.8 | 60.8627 | 58397.2 | -14942.2 | -22794.3 | 8.7677 | -194614.1 | 31.8878 |
| 1200 | 8.6723 | 9416.1 | 61.6148 | 64521.6 | -14077.8 | -23003.5 | 8.3886 | -194751.1 | 28.6646 |
| 1300 | 8.7213 | 10285.9 | 62.3109 | 70718.3 | -13208.1 | -23221.6 | 8.0648 | -194883.6 | 25.9355 |
| 1400 | 8.7622 | 11160.1 | 62.9588 | 76982.1 | -12335.8 | -23448.1 | 7.7846 | -195013.2 | 23.5946 |
| 1500 | 8.7968 | 12038.1 | 63.5645 | 83308.6 | -11455.9 | -23683.7 | 7.5396 | -195141.0 | 21.5645 |
| 1600 | 8.8264 | 12919.3 | 64.1332 | 89693.8 | -10574.7 | -23928.4 | 7.3227 | -195267.9 | 19.7871 |
| 1700 | 8.8521 | 13803.3 | 64.6691 | 96134.2 | -9690.7 | -26201.3 | 7.1159 | -195394.7 | 18.2177 |
| 1800 | 8.8747 | 14689.7 | 65.1757 | 102626.6 | -8804.3 | -36373.6 | 6.8567 | -195521.9 | 16.8218 |
| 1900 | 8.8947 | 15578.1 | 65.6561 | 109168.4 | -7915.8 | -36546.6 | 6.6238 | -195649.9 | 15.5720 |
| 2000 | 8.9126 | 16468.5 | 66.1128 | 115757.1 | -7025.5 | -36720.5 | 6.4131 | -195779.0 | 14.4464 |
| 2100 | 8.9288 | 17360.6 | 66.5480 | 122390.3 | -6133.4 | -36895.6 | 6.2216 | -195909.4 | 13.4274 |
| 2200 | 8.9435 | 18254.2 | 66.9638 | 129066.0 | -5239.8 | -37071.8 | 6.0466 | -196041.1 | 12.5004 |
| 2300 | 8.9570 | 19149.3 | 67.3616 | 135782.4 | -4344.7 | -37249.3 | 5.8862 | -196174.2 | 11.6534 |
| 2400 | 8.9695 | 20045.6 | 67.7431 | 142537.8 | -3448.4 | -37428.3 | 5.7383 | -196308.8 | 10.8765 |
| 2500 | 8.9811 | 20943.1 | 68.1095 | 149330.6 | -2550.8 | -37608.8 | 5.6017 | -196444.8 | 10.1612 |
| 2600 | 8.9920 | 21841.8 | 68.4619 | 156159.2 | -1652.2 | -37790.8 | 5.4749 | -196582.2 | 9.5005 |
| 2700 | 9.0022 | 22741.5 | 68.8015 | 163022.5 | -752.5 | -37974.3 | 5.3570 | -196720.9 | 8.8883 |
| 2800 | 9.0119 | 23642.2 | 69.1291 | 169919.1 | 148.2 | -38159.3 | 5.2470 | -196860.9 | 8.3194 |
| 2900 | 9.0211 | 24543.9 | 69.4455 | 176847.9 | 1049.9 | -38345.9 | 5.1440 | -197002.1 | 7.7894 |
| 3000 | 9.0299 | 25446.4 | 69.7514 | 183807.9 | 1952.5 | -38534.0 | 5.0475 | -197144.4 | 7.2944 |
| 3100 | 9.0383 | 26349.9 | 70.0477 | 190797.9 | 2855.9 | -38723.6 | 4.9567 | -197287.7 | 6.8309 |
| 3200 | 9.0464 | 27254.1 | 70.3348 | 197817.1 | 3760.1 | -38914.6 | 4.8712 | -197432.1 | 6.3962 |
| 3300 | 9.0542 | 28159.1 | 70.6132 | 204864.6 | 4665.1 | -39107.1 | 4.7905 | -197577.4 | 5.9874 |
| 3400 | 9.0618 | 29064.9 | 70.8837 | 211939.5 | 5570.9 | -39300.8 | 4.7141 | -197723.6 | 5.6025 |
| 3500 | 9.0691 | 29971.5 | 71.1464 | 219041.1 | 6477.5 | -39495.9 | 4.6417 | -197870.7 | 5.2392 |
| 3600 | 9.0763 | 30878.7 | 71.4020 | 226168.5 | 7384.8 | -39692.2 | 4.5731 | -198018.5 | 4.8959 |
| 3700 | 9.0835 | 31786.7 | 71.6508 | 233321.2 | 8292.7 | -39889.7 | 4.5078 | -198167.2 | 4.5709 |
| 3800 | 9.0901 | 32695.4 | 71.8931 | 240498.5 | 9201.4 | -40088.3 | 4.4456 | -198316.5 | 4.2627 |
| 3900 | 9.0968 | 33604.7 | 72.1293 | 247699.7 | 10110.8 | -40287.9 | 4.3864 | -198466.5 | 3.9702 |
| 4000 | 9.1034 | 34514.8 | 72.3597 | 254924.2 | 11020.8 | -40488.5 | 4.3298 | -198617.2 | 3.6921 |
| 4100 | 9.1099 | 35425.4 | 72.5846 | 262171.4 | 11931.4 | -40690.1 | 4.2757 | -198768.5 | 3.4273 |
| 4200 | 9.1164 | 36336.7 | 72.8042 | 269440.9 | 12842.8 | -40892.6 | 4.2239 | -198920.3 | 3.1749 |
| 4300 | 9.1228 | 37248.7 | 73.0188 | 276732.1 | 13754.7 | -41095.9 | 4.1743 | -199072.8 | 2.9341 |
| 4400 | 9.1291 | 38161.3 | 73.2286 | 284044.5 | 14667.3 | -41299.9 | 4.1268 | -199225.8 | 2.7041 |
| 4500 | 9.1355 | 39074.5 | 73.4338 | 291377.6 | 15580.5 | -41504.7 | 4.0811 | -199379.3 | 2.4841 |
| 4600 | 9.1419 | 39988.4 | 73.6347 | 298731.1 | 16494.4 | -41710.1 | 4.0371 | -199533.3 | 2.2736 |
| 4700 | 9.1483 | 40902.9 | 73.8313 | 306104.4 | 17408.9 | -41916.2 | 3.9949 | -199687.9 | 2.0718 |
| 4800 | 9.1547 | 41818.0 | 74.0240 | 313497.2 | 18324.1 | -42122.8 | 3.9542 | -199842.9 | 1.8783 |
| 4900 | 9.1611 | 42733.8 | 74.2128 | 320909.1 | 19239.9 | -42329.9 | 3.9149 | -199998.4 | 1.6925 |
| 5000 | 9.1679 | 43650.3 | 74.3980 | 328339.7 | 20156.3 | -42537.5 | 3.8771 | -200154.3 | 1.5140 |
| 5100 | 9.1746 | 44567.4 | 74.5796 | 335788.6 | 21073.4 | -42745.5 | 3.8405 | -200310.7 | 1.3424 |
| 5200 | 9.1815 | 45485.2 | 74.7578 | 343255.5 | 21991.2 | -42953.8 | 3.8052 | -200467.5 | 1.1773 |
| 5300 | 9.1886 | 46403.7 | 74.9328 | 350740.1 | 22909.7 | -43162.5 | 3.7711 | -200624.8 | 1.0183 |
| 5400 | 9.1958 | 47322.9 | 75.1046 | 358242.0 | 23829.0 | -43371.4 | 3.7380 | -200782.6 | 0.8650 |
| 5500 | 9.2033 | 48242.9 | 75.2734 | 365760.9 | 24748.9 | -43580.6 | 3.7061 | -200940.8 | 0.7172 |
| 5600 | 9.2110 | 49163.6 | 75.4393 | 373296.5 | 25669.6 | -43789.9 | 3.6751 | -201099.5 | 0.5746 |
| 5700 | 9.2190 | 50085.1 | 75.6024 | 380848.6 | 26591.1 | -43999.3 | 3.6450 | -201258.0 | 0.4369 |
| 5800 | 9.2272 | 51007.4 | 75.7628 | 388416.9 | 27513.4 | -44208.8 | 3.6158 | -201417.5 | 0.3038 |
| 5900 | 9.2358 | 51930.6 | 75.9206 | 396001.1 | 28436.6 | -44418.3 | 3.5875 | -201577.4 | 0.1751 |
| 6000 | 9.2447 | 52854.6 | 76.0759 | 403601.0 | 29360.6 | -44627.8 | 3.5601 | -201737.8 | 0.0506 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Si, 1685° K.

TABLE III. - Continued. THERMODYNAMIC PROPERTIES
 (209) SiO₂ (gas); molecular weight, 60.09

| T, °K | C _p ^o , cal/mole °K | H _T ^o - H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o - H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| 0 | ----- | 0 | ----- | 0 | -84532.7 | -81688.9 | ----- | -31626.2 | ----- |
| 100 | 7.4717 | 705.0 | 44.8603 | 3781.0 | -83827.7 | -81741.2 | 179.1934 | -311631.3 | 669.2973 |
| 200 | 9.3303 | 1548.3 | 50.6305 | 8577.8 | -82984.4 | -81875.4 | 89.8196 | -312515.2 | 328.3758 |
| 298.15 | 10.6609 | 2532.7 | 54.6173 | 13751.5 | -82000.0 | -82000.0 | 60.3480 | -313113.3 | 215.8609 |
| 300 | 10.6824 | 2552.4 | 54.6833 | 13852.6 | -81980.3 | -82002.1 | 59.9773 | -313122.8 | 214.4456 |
| 400 | 11.6956 | 3673.7 | 57.9021 | 19487.1 | -80858.9 | -82059.6 | 45.0348 | -313560.3 | 157.3828 |
| 500 | 12.4465 | 4882.8 | 60.5969 | 25415.7 | -79649.9 | -82170.6 | 36.0602 | -313885.0 | 123.1029 |
| 600 | 12.9932 | 6156.2 | 62.9172 | 31594.1 | -78376.4 | -82225.4 | 30.0724 | -314131.6 | 100.2287 |
| 700 | 13.3514 | 7476.5 | 64.9516 | 37989.6 | -77056.2 | -82273.6 | 25.7527 | -314323.4 | 83.8785 |
| 800 | 13.6849 | 8831.0 | 66.7599 | 44576.9 | -75701.6 | -82321.4 | 22.5810 | -314475.7 | 71.6091 |
| 900 | 13.9048 | 10211.0 | 68.3850 | 51335.5 | -74321.6 | -82372.6 | 20.0817 | -314599.3 | 62.0621 |
| 1000 | 14.0725 | 11610.2 | 69.8591 | 58248.8 | -72922.4 | -82425.5 | 18.0809 | -314701.7 | 54.4217 |
| 1100 | 14.2026 | 13024.3 | 71.2067 | 65303.1 | -71508.4 | -82493.4 | 16.4427 | -314788.3 | 48.1686 |
| 1200 | 14.3053 | 14449.9 | 72.4471 | 72486.6 | -70082.8 | -82565.6 | 15.0763 | -314863.2 | 42.9563 |
| 1300 | 14.3875 | 15884.7 | 73.5955 | 79789.4 | -68648.0 | -82647.0 | 13.9191 | -314929.6 | 38.5450 |
| 1400 | 14.4543 | 17326.9 | 74.6642 | 87203.0 | -67205.8 | -82737.6 | 12.9261 | -314989.7 | 34.7630 |
| 1500 | 14.5091 | 18775.1 | 75.6634 | 94720.0 | -65757.6 | -82838.2 | 12.0647 | -315045.6 | 31.4848 |
| 1600 | 14.5546 | 20228.4 | 76.6013 | 102333.7 | -64304.3 | -82949.4 | 11.3059 | -315098.6 | 28.6158 |
| 1700 | 14.5928 | 21685.8 | 77.4848 | 110038.4 | -62846.9 | -83090.3 | 10.6293 | -315149.9 | 26.0839 |
| 1800 | 14.6252 | 23146.7 | 78.3199 | 117829.0 | -61385.9 | -83132.3 | 9.9501 | -315200.5 | 23.8330 |
| 1900 | 14.6528 | 24610.7 | 79.1114 | 125700.9 | -59922.0 | -83177.1 | 9.3420 | -315250.9 | 21.8187 |
| 2000 | 14.6766 | 26077.2 | 79.8636 | 133650.0 | -58455.5 | -83224.9 | 8.7545 | -315301.6 | 20.0055 |
| 2100 | 14.6971 | 27545.9 | 80.5802 | 141672.5 | -56986.8 | -83276.0 | 8.2989 | -315353.1 | 18.3648 |
| 2200 | 14.7151 | 29016.5 | 81.2643 | 149764.9 | -55516.2 | -83330.8 | 7.8481 | -315405.7 | 16.8730 |
| 2300 | 14.7308 | 30488.8 | 81.9188 | 157924.3 | -54043.9 | -83389.4 | 7.4362 | -315459.5 | 15.5106 |
| 2400 | 14.7446 | 31962.6 | 82.5460 | 166147.8 | -52570.1 | -83452.0 | 7.0585 | -315514.7 | 14.2616 |
| 2500 | 14.7569 | 33437.7 | 83.1482 | 174432.7 | -51095.0 | -83518.6 | 6.7107 | -315571.4 | 13.1123 |
| 2600 | 14.7678 | 34913.9 | 83.7272 | 182776.7 | -49618.7 | -83589.3 | 6.3894 | -315629.6 | 12.0512 |
| 2700 | 14.7776 | 36391.2 | 84.2847 | 191177.4 | -48141.5 | -83664.2 | 6.0917 | -315689.6 | 11.0685 |
| 2800 | 14.7863 | 37865.4 | 84.8223 | 199632.9 | -46663.3 | -83743.2 | 5.8151 | -315751.2 | 10.1559 |
| 2900 | 14.7942 | 39348.5 | 85.3413 | 208141.3 | -45184.2 | -83826.4 | 5.5573 | -315814.7 | 9.3060 |
| 3000 | 14.8013 | 40828.2 | 85.8429 | 216700.6 | -43704.4 | -83913.6 | 5.3165 | -315879.9 | 8.5126 |
| 3100 | 14.8078 | 42308.7 | 86.3284 | 225309.3 | -42224.0 | -84004.8 | 5.0910 | -315946.9 | 7.7702 |
| 3200 | 14.8137 | 43789.8 | 86.7986 | 233965.8 | -40742.9 | -84100.0 | 4.8794 | -316015.8 | 7.0741 |
| 3300 | 14.8190 | 45271.4 | 87.2545 | 242668.5 | -39261.3 | -84198.9 | 4.6804 | -316086.6 | 6.4200 |
| 3400 | 14.8239 | 46753.6 | 87.6970 | 251416.2 | -37779.1 | -84301.6 | 4.4929 | -316159.4 | 5.8043 |
| 3500 | 14.8284 | 48236.2 | 88.1268 | 260207.5 | -36296.5 | -84407.9 | 4.3160 | -316234.0 | 5.2236 |
| 3600 | 14.8325 | 49719.2 | 88.5446 | 269041.2 | -34813.4 | -84517.7 | 4.1487 | -316310.7 | 4.6751 |
| 3700 | 14.8363 | 51202.7 | 88.9510 | 277916.1 | -33330.0 | -84630.9 | 3.9902 | -316389.4 | 4.1560 |
| 3800 | 14.8398 | 52686.5 | 89.3467 | 286831.0 | -31846.2 | -84747.3 | 3.8359 | -316470.1 | 3.6642 |
| 3900 | 14.8431 | 54170.6 | 89.7322 | 295785.1 | -30362.0 | -84866.8 | 3.6972 | -316552.8 | 3.1975 |
| 4000 | 14.8461 | 55655.1 | 90.1081 | 304777.2 | -28877.6 | -84989.4 | 3.5614 | -316637.6 | 2.7540 |
| 4100 | 14.8489 | 57139.9 | 90.4747 | 313806.4 | -27392.8 | -85114.9 | 3.4321 | -316724.5 | 2.3320 |
| 4200 | 14.8515 | 58624.9 | 90.8325 | 322871.8 | -25907.8 | -85243.1 | 3.3087 | -316813.6 | 1.9299 |
| 4300 | 14.8539 | 60110.1 | 91.1820 | 331972.6 | -24422.5 | -85374.0 | 3.1910 | -316904.7 | 1.5465 |
| 4400 | 14.8561 | 61595.6 | 91.5235 | 341107.9 | -22937.0 | -85507.5 | 3.0784 | -316997.9 | 1.1804 |
| 4500 | 14.8583 | 63081.4 | 91.8574 | 350277.1 | -21451.3 | -85643.5 | 2.9707 | -317093.3 | 0.8305 |
| 4600 | 14.8602 | 64567.3 | 92.1840 | 359479.2 | -19965.4 | -85781.9 | 2.8676 | -317190.9 | 0.4957 |
| 4700 | 14.8621 | 66053.4 | 92.5036 | 368713.6 | -18479.3 | -85922.6 | 2.7687 | -317290.6 | 0.1750 |
| 4800 | 14.8638 | 67539.7 | 92.8165 | 377979.7 | -16993.0 | -86065.5 | 2.6737 | -317392.4 | -0.1324 |
| 4900 | 14.8655 | 69026.2 | 93.1230 | 387276.7 | -15506.5 | -86210.5 | 2.5826 | -317496.4 | -0.4274 |
| 5000 | 14.8670 | 70512.8 | 93.4234 | 396604.1 | -14019.9 | -86357.7 | 2.4949 | -317602.6 | -0.7106 |
| 5100 | 14.8684 | 71999.6 | 93.7178 | 405961.2 | -12533.1 | -86506.8 | 2.4105 | -317711.0 | -0.9829 |
| 5200 | 14.8698 | 73486.5 | 94.0065 | 415347.5 | -11046.2 | -86657.9 | 2.3293 | -317821.6 | -1.2447 |
| 5300 | 14.8711 | 74973.5 | 94.2898 | 424762.3 | -9559.1 | -86810.9 | 2.2510 | -317934.3 | -1.4968 |
| 5400 | 14.8723 | 76460.7 | 94.5678 | 434205.2 | -8072.0 | -86965.8 | 2.1755 | -318049.3 | -1.7396 |
| 5500 | 14.8735 | 77948.0 | 94.8407 | 443675.7 | -6584.7 | -87122.4 | 2.1026 | -318166.5 | -1.9737 |
| 5600 | 14.8746 | 79435.4 | 95.1087 | 453173.2 | -5097.3 | -87280.7 | 2.0322 | -318286.0 | -2.1995 |
| 5700 | 14.8756 | 80922.9 | 95.3720 | 462697.3 | -3609.8 | -87440.8 | 1.9642 | -318407.1 | -2.4174 |
| 5800 | 14.8766 | 82410.5 | 95.6307 | 472247.4 | -2122.2 | -87602.5 | 1.8984 | -318531.0 | -2.6279 |
| 5900 | 14.8775 | 83898.2 | 95.8850 | 481823.3 | -634.5 | -87765.8 | 1.8348 | -318657.2 | -2.8314 |
| 6000 | 14.8784 | 85386.0 | 96.1351 | 491424.3 | 852.3 | -87930.7 | 1.7731 | -318785.6 | -3.0282 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of Si, 1685° K.

TABLE III. - Concluded. THERMODYNAMIC PROPERTIES

(210) SiS (gas); molecular weight, 60.156

| T, °K | C _p , cal/mole °K | H _T ^o -H ₀ ^o , cal/mole | S _T ^o , cal/mole °K | -(F _T ^o -H ₀ ^o), cal/mole | H _T ^o , cal/mole | Formation from assigned reference elements | | Formation from gaseous atoms | |
|----------|---------------------------------|------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|--------------------------------------------|---------------------|
| | | | | | | (ΔH _f ^o) _f , cal/mole | log ₁₀ K _f | ΔH _f ^o , cal/mole | log ₁₀ K |
| C | ----- | C | ----- | C | 27045.0 | 28867.7 | ----- | -148000.0 | ----- |
| 100 | 6.5618 | 695.4 | 45.5740 | 3862.0 | 27740.4 | 29324.7 | -55.0139 | -148458.9 | 319.5896 |
| 200 | 7.2326 | 1401.3 | 50.4565 | 8690.0 | 28446.3 | 29366.3 | -22.9175 | -148902.8 | 157.1749 |
| 298.15 | 7.7134 | 2134.5 | 53.4346 | 12796.6 | 29179.9 | 29179.9 | -12.3792 | -149260.9 | 103.5546 |
| 300 | 7.7216 | 2149.2 | 53.4823 | 12895.5 | 29194.2 | 29175.3 | -12.2475 | -149266.9 | 102.8199 |
| 400 | 8.1022 | 2941.6 | 59.7593 | 19362.1 | 29986.6 | 28360.7 | -6.9682 | -149558.6 | 75.6710 |
| 500 | 8.3539 | 3765.3 | 57.5963 | 25032.8 | 30810.3 | 27657.6 | -3.9011 | -149796.9 | 59.3164 |
| 600 | 8.5199 | 4609.6 | 59.1351 | 30871.5 | 31654.5 | 27117.0 | -1.9038 | -149998.6 | 48.3971 |
| 700 | 8.6330 | 5467.5 | 60.4575 | 36852.7 | 32512.5 | 26575.6 | -0.5065 | -150175.1 | 40.5878 |
| 800 | 8.7133 | 6335.1 | 61.6158 | 42957.5 | 33380.1 | 26072.1 | 0.5212 | -150333.9 | 34.7242 |
| 900 | 8.7724 | 7209.5 | 62.6456 | 49171.6 | 34254.5 | 25560.1 | 1.3053 | -150479.9 | 30.1590 |
| 1000 | 8.8175 | 8089.1 | 63.5723 | 55483.2 | 35134.1 | 25041.7 | 1.9199 | -150616.7 | 26.5034 |
| 1100 | 8.8531 | 8972.7 | 64.4145 | 61883.2 | 36017.7 | 24516.9 | 2.4123 | -150746.8 | 23.5098 |
| 1200 | 8.8818 | 9859.5 | 65.1860 | 68363.8 | 36904.5 | 23945.0 | 2.8139 | -150872.4 | 21.0130 |
| 1300 | 8.9057 | 10748.9 | 65.8975 | 74918.4 | 37793.9 | 23445.5 | 3.1462 | -150995.0 | 18.8986 |
| 1400 | 8.9259 | 11640.5 | 66.5587 | 81541.7 | 38685.5 | 22958.5 | 3.4245 | -151116.0 | 17.0848 |
| 1500 | 8.9435 | 12534.0 | 67.1751 | 88228.7 | 39579.0 | 22344.8 | 3.6602 | -151236.6 | 15.5116 |
| 1600 | 8.9589 | 13429.1 | 67.7528 | 94975.4 | 40474.1 | 21783.1 | 3.8611 | -151357.8 | 14.1339 |
| 1700 | 8.9727 | 14325.7 | 68.2964 | 101778.1 | 41370.7 | 9154.6 | 4.0202 | -151480.2 | 12.9173 |
| 1800 | 8.9852 | 15223.6 | 68.8096 | 108633.7 | 42268.6 | 8709.1 | 4.0842 | -151604.5 | 11.8351 |
| 1900 | 8.9966 | 16122.7 | 69.2957 | 115539.1 | 43167.7 | 8224.5 | 4.1383 | -151731.2 | 10.8659 |
| 2000 | 9.0072 | 17022.9 | 69.7574 | 122492.0 | 44067.9 | 7741.0 | 4.1843 | -151860.7 | 9.9929 |
| 2100 | 9.0171 | 17924.1 | 70.1972 | 129489.9 | 44969.1 | 7258.5 | 4.2233 | -151993.2 | 9.2024 |
| 2200 | 9.0265 | 18826.3 | 70.6168 | 136530.8 | 45871.3 | 6777.0 | 4.2565 | -152129.0 | 8.4831 |
| 2300 | 9.0354 | 19729.4 | 71.0183 | 143612.7 | 46774.4 | 6296.4 | 4.2848 | -152268.1 | 7.8258 |
| 2400 | 9.0435 | 20633.4 | 71.4030 | 150733.9 | 47678.4 | 5816.6 | 4.3088 | -152410.6 | 7.2227 |
| 2500 | 9.0520 | 21538.2 | 71.7724 | 157892.8 | 48583.2 | 5337.7 | 4.3291 | -152556.4 | 6.6673 |
| 2600 | 9.0599 | 22443.8 | 72.1276 | 165087.9 | 49488.8 | 4858.8 | 4.3455 | -152705.5 | 6.1541 |
| 2700 | 9.0675 | 23350.1 | 72.4696 | 172317.8 | 50395.1 | 4380.0 | 4.3585 | -152857.8 | 5.6785 |
| 2800 | 9.0750 | 24257.3 | 72.7995 | 179581.4 | 51302.3 | 3901.1 | 4.3685 | -153013.2 | 5.2364 |
| 2900 | 9.0822 | 25165.1 | 73.1181 | 186877.4 | 52210.1 | 3422.1 | 4.3755 | -153171.4 | 4.8244 |
| 3000 | 9.0893 | 26073.7 | 73.4261 | 194204.7 | 53118.7 | 2943.1 | 4.3805 | -153332.4 | 4.4394 |
| 3100 | 9.0963 | 26983.0 | 73.7243 | 201562.2 | 54028.0 | 2464.1 | 4.3845 | -153495.9 | 4.0789 |
| 3200 | 9.1032 | 27893.0 | 74.0132 | 208949.2 | 54938.0 | 1985.1 | 4.3875 | -153661.8 | 3.7406 |
| 3300 | 9.1100 | 28803.6 | 74.2934 | 216364.6 | 55848.6 | 1506.1 | 4.3895 | -153829.9 | 3.4224 |
| 3400 | 9.1168 | 29715.0 | 74.5655 | 223807.6 | 56760.0 | 1027.1 | 4.3915 | -153999.9 | 3.1226 |
| 3500 | 9.1236 | 30627.0 | 74.8298 | 231277.4 | 57672.0 | 548.1 | 4.3935 | -154171.7 | 2.8397 |
| 3600 | 9.1304 | 31539.7 | 75.0865 | 238773.3 | 58584.7 | 60.1 | 4.3955 | -154345.1 | 2.5721 |
| 3700 | 9.1372 | 32453.1 | 75.3372 | 246294.6 | 59498.0 | 112.1 | 4.3975 | -154519.9 | 2.3187 |
| 3800 | 9.1441 | 33367.1 | 75.5810 | 253840.6 | 60412.1 | 164.1 | 4.3995 | -154695.8 | 2.0784 |
| 3900 | 9.1511 | 34281.9 | 75.8186 | 261410.6 | 61326.9 | 216.1 | 4.4015 | -154872.8 | 1.8502 |
| 4000 | 9.1582 | 35197.3 | 76.0504 | 269004.1 | 62242.3 | 268.1 | 4.4035 | -155050.7 | 1.6331 |
| 4100 | 9.1655 | 36113.5 | 76.2766 | 276620.5 | 63158.5 | 320.1 | 4.4055 | -155229.2 | 1.4264 |
| 4200 | 9.1730 | 37030.4 | 76.4975 | 284259.2 | 64075.4 | 372.1 | 4.4075 | -155408.2 | 1.2293 |
| 4300 | 9.1808 | 37948.1 | 76.7135 | 291919.8 | 64993.1 | 424.1 | 4.4095 | -155587.6 | 1.0411 |
| 4400 | 9.1886 | 38866.6 | 76.9246 | 299601.7 | 65911.6 | 476.1 | 4.4115 | -155767.2 | 0.8613 |
| 4500 | 9.1972 | 39785.9 | 77.1312 | 307304.6 | 66830.9 | 528.1 | 4.4135 | -155946.8 | 0.6893 |
| 4600 | 9.2060 | 40706.1 | 77.3335 | 315027.8 | 67751.0 | 580.1 | 4.4155 | -156126.3 | 0.5245 |
| 4700 | 9.2152 | 41627.1 | 77.5315 | 322771.1 | 68672.1 | 632.1 | 4.4175 | -156305.6 | 0.3666 |
| 4800 | 9.2248 | 42549.1 | 77.7257 | 330534.0 | 69594.1 | 684.1 | 4.4195 | -156484.6 | 0.2151 |
| 4900 | 9.2350 | 43472.1 | 77.9160 | 338316.1 | 70517.1 | 736.1 | 4.4215 | -156663.1 | 0.0696 |
| 5000 | 9.2457 | 44396.1 | 78.1026 | 346117.1 | 71441.1 | 788.1 | 4.4235 | -156841.0 | -0.0702 |
| 5100 | 9.2570 | 45321.3 | 78.2858 | 353936.5 | 72366.2 | 840.1 | 4.4255 | -157018.3 | -0.2047 |
| 5200 | 9.2689 | 46247.5 | 78.4657 | 361774.2 | 73292.5 | 892.1 | 4.4275 | -157194.7 | -0.3341 |
| 5300 | 9.2816 | 47175.1 | 78.6424 | 369629.6 | 74220.1 | 944.1 | 4.4295 | -157370.3 | -0.4589 |
| 5400 | 9.2949 | 48103.5 | 78.8160 | 377502.5 | 75148.9 | 996.1 | 4.4315 | -157544.9 | -0.5791 |
| 5500 | 9.3089 | 49034.1 | 78.9867 | 385392.7 | 76079.1 | 1048.1 | 4.4335 | -157718.5 | -0.6951 |
| 5600 | 9.3238 | 49965.7 | 79.1545 | 393299.8 | 77010.7 | 1100.1 | 4.4355 | -157891.0 | -0.8071 |
| 5700 | 9.3394 | 50898.9 | 79.3197 | 401223.5 | 77943.8 | 1152.1 | 4.4375 | -158061.7 | -0.9152 |
| 5800 | 9.3559 | 51833.6 | 79.4823 | 409163.6 | 78878.6 | 1204.1 | 4.4395 | -158231.6 | -1.0198 |
| 5900 | 9.3733 | 52770.1 | 79.6424 | 417119.9 | 79815.1 | 1256.1 | 4.4415 | -158400.2 | -1.1209 |
| 6000 | 9.3915 | 53708.3 | 79.8001 | 425092.0 | 80753.3 | 1308.1 | 4.4435 | -158567.3 | -1.2187 |

^aA change in phase of an assigned reference element has occurred between this temperature and the preceding temperature. Melting point of S, 388.357° K and of Si, 1685° K.

TABLE IV. - HEATS OF FORMATION

| Substance | Phase | Formation from assigned reference elements | | Formation from gaseous atoms | | References |
|--------------------------------|-----------|------------------------------------------------|-----------------------------------------|--------------------------------------------|-------------------------------------|-----------------|
| | | $(\Delta H_{298.15}^{\circ})_f$, kcal/mole | $(\Delta H_0^{\circ})_f$, kcal/mole | $\Delta H_{298.15}^{\circ}$, kcal/mole | ΔH_0° , kcal/mole | |
| Al | Gas | ^a 77.42 | 76.8576 | 0 | 0 | 290 |
| Al | Crystal | ^a 0 | 0 | -77.4200 | -76.8576 | --- |
| Al ₂ | Gas | 116.8998 | 116.7152 | -37.9402 | ^a -37 | 159 |
| AlCl | Gas | ^a -11.58 | -11.6208 | -117.9506 | -117.0267 | 291 |
| AlCl ₃ | Gas | ^a -140.42 | -139.9543 | -304.6919 | -302.4571 | 4(6/30/61) |
| AlF | Gas | ^a -61.4 | -61.3791 | -157.6782 | -156.5917 | 292 |
| AlF ₃ | Gas | ^a -283.6 | -282.6165 | -417.5945 | -414.5391 | 293 |
| AlF ₃ | α | ^a -356.3 | -354.8264 | -490.2945 | -486.7490 | 292 |
| AlH | Gas | 61.5547 | 61.5860 | -67.9631 | ^a -66.9 | 32 |
| AlO | Gas | 20.8160 | 20.8441 | -116.1606 | ^a -115 | 44 |
| Al ₂ O | Gas | -32.6738 | -32.0983 | -247.0704 | ^a -244.8 | 44 |
| Al ₂ O ₂ | Gas | -94.6400 | -93.3118 | -368.5933 | ^a -365 | 44 |
| Al ₂ O ₃ | Crystal | ^a -400.4 | -397.4999 | -733.9099 | -728.1746 | 294 |
| AlOCl | Gas | -92.0727 | -91.7751 | ^a -258 | -256.1676 | (b) |
| AlOF | Gas | ^a -139.2 | -138.7509 | -295.0348 | -292.9500 | 295 |
| Ar | Gas | ^a 0 | 0 | 0 | 0 | --- |
| B | Gas | ^a 135 | 133.7807 | 0 | 0 | 296 |
| B | Amorphous | ^a .4 | .3783 | -134.6000 | -133.4024 | 50 |
| B | Crystal | ^a 0 | 0 | -135.0000 | -133.7807 | --- |
| B ₂ | Gas | 205.0716 | 203.5615 | -64.9284 | ^a -64 | 297 |
| BCl | Gas | 45.0587 | 44.3291 | -118.8919 | ^a -118 | 32 |
| BCl ₂ | Gas | -19.5413 | -19.9225 | -212.4426 | ^a -210.8 | (b) |
| BCl ₃ | Gas | ^a -97.11 | -96.8899 | -318.9619 | -316.3158 | 298 |
| BF | Gas | -43.1327 | -43.8643 | -196.9909 | ^a -196 | 32 |
| BF ₂ | Gas | -134.9516 | -135.1093 | -307.6679 | ^a -305.6 | (b) |
| BF ₃ | Gas | ^a -270.1 | -269.4277 | -461.6745 | -458.2734 | 158 |
| BFCl | Gas | -77.2596 | -77.5159 | -260.0684 | ^a -258.2 | (b) |
| BH | Gas | 116.9702 | 116.2091 | -70.1275 | ^a -69.2 | 32 |
| BH ₃ | Gas | ^a 18 | 18.9065 | -273.2932 | -269.7595 | 299 |
| BN | Gas | 154.8084 | 154.0602 | -93.2162 | ^a -92.3 | 32 |
| BN | Crystal | ^a -60.29 | -59.6031 | -308.3146 | -305.9634 | 52 |
| BO | Gas | 5.7441 | ^a 5 | -188.8125 | -187.7673 | 296 |
| BO ₂ | Gas | ^a -84.6 | -84.6478 | -338.7133 | -336.4015 | ^b 54 |
| B ₂ O ₂ | Gas | -111.3981 | ^a -111.7 | -500.5114 | -497.2345 | 300 |
| B ₂ O ₃ | Gas | ^a -202 | -201.6479 | -650.6699 | -646.1690 | 301 |
| B ₂ O ₃ | Glass | ^a -300.98 | ----- | -749.6499 | ----- | --- |
| B ₂ O ₃ | Crystal | ^a -305.34 | -303.8628 | -754.0099 | -748.3838 | 302 |
| BOCl | Gas | -88.0291 | -88.0843 | -311.5364 | ^a -309.4 | (b) |
| (BOCl) ₃ | Gas | ^a -396.7 | -394.9672 | -1067.2218 | -1058.9142 | (b) |

^aValue either assigned, taken directly from the original reference, or derived as discussed in appendix C.

^bSee appendix C.

TABLE IV. - Continued. HEATS OF FORMATION

| Substance | Phase | Formation from assigned reference elements | | Formation from gaseous atoms | | References |
|-------------------------------|----------|-------------------------------------------------|---------------------------------------------------|--------------------------------------------|----------------------------------------------|---------------------|
| | | $(\Delta H_{298.15}^{\circ})_f'$, kcal/mole | $(\Delta H_{\text{O}}^{\circ})_f'$, kcal/mole | $\Delta H_{298.15}^{\circ}$, kcal/mole | $\Delta H_{\text{O}}^{\circ}$, kcal/mole | |
| BOF | Gas | ^a -144 | -143.9660 | -357.4148 | -355.0882 | 301 |
| (BOF) ₃ | Gas | ^a -567.8 | -565.8927 | -1208.0444 | -1199.2595 | 335 |
| BS | Gas | 82.4240 | 81.6842 | -119.0168 | ^a -118 | 32 |
| Be | Gas | ^a 77.9 | 76.8874 | 0 | 0 | 51 |
| Be | Crystal | ^a 0 | 0 | -77.9000 | -76.8874 | -- |
| BeCl | Gas | ^a -7 | -7.5524 | -113.8506 | -112.9883 | ^b 303 |
| BeCl ₂ | Gas | ^a -84 | -83.9380 | -219.8013 | -217.9223 | ^b 63, 64 |
| BeF | Gas | ^a -49.6 | -50.1586 | -146.3582 | -145.4010 | (b) |
| BeF ₂ | Gas | ^a -191.2 | -190.8666 | -306.8163 | -304.4641 | 336 |
| BeFCl | Gas | ^a -134 | -133.7733 | -259.7088 | -257.5642 | (b) |
| BeH | Gas | 78.1020 | 77.5158 | -51.8957 | ^a -51 | 16 |
| BeO | Gas | 30.4445 | 29.8740 | -107.0122 | ^a -106 | 71 |
| BeO | Crystal | ^a -143.1 | -142.2847 | -280.5567 | -278.1587 | 305 |
| (BeO) ₂ | Gas | ^a -104.5 | -104.3538 | -379.4133 | -376.1017 | ^b 71 |
| (BeO) ₃ | Gas | ^a -255.3 | -253.8171 | -667.6699 | -661.4390 | ^b 71 |
| (BeO) ₄ | Gas | ^a -380.4 | -378.1601 | -930.2266 | -921.6560 | ^b 71 |
| Be(OH) ₂ | Gas | ^a -156.7 | -154.5048 | -457.9088 | -452.6221 | ^b 72 |
| C | Gas | 171.3009 | 169.9898 | 0 | 0 | ^b 73 |
| C | Graphite | ^a 0 | 0 | -171.3009 | -169.9898 | --- |
| C ₂ | Gas | 200.0258 | ^a 198 | -142.5759 | -141.9796 | 306 |
| C ₃ | Gas | 189.6653 | ^a 188.1 | -324.2374 | -321.8695 | 306 |
| CCl | Gas | 122.4050 | 121.5082 | -77.8465 | ^a -77.03 | 307 |
| CCl ₄ | Gas | ^a -25.5 | -24.9808 | -312.6034 | -309.1642 | 50 |
| CF | Gas | 74.6954 | 73.8308 | -115.4636 | ^a -114.514 | 175 |
| CF ₂ | Gas | ^a -30 | -30.1046 | -239.0172 | -236.8044 | ^b 82 |
| CF ₃ | Gas | ^a -119.5 | -118.7361 | -347.3754 | -343.7909 | 308 |
| CF ₄ | Gas | ^a -217.2 | -215.7790 | -463.9336 | -459.1888 | ^c 309 |
| CH | Gas | 142.3847 | 141.5882 | -81.0139 | ^a -80.03 | 32 |
| CH ₂ | Gas | 68.9504 | 69.1407 | -206.5460 | -204.1059 | ^b 85 |
| CH ₃ | Gas | 33.4908 | 34.2892 | -294.1033 | -290.5858 | ^b 85 |
| CH ₄ | Gas | ^a -17.889 | -15.9824 | -397.5809 | -392.4858 | 50 |
| C ₂ H ₂ | Gas | ^a 54.194 | 54.3270 | -392.6033 | -388.9094 | 50 |
| C ₂ H ₄ | Gas | ^a 12.496 | 14.5204 | -538.4968 | -531.9728 | 50 |
| CN | Gas | 96.3547 | 95.5693 | -187.9708 | ^a -187 | 32 |
| C ₂ N ₂ | Gas | ^a 73.840 | 73.3876 | -494.8110 | -491.7510 | ^b 87 |
| CO | Gas | ^a -26.4157 | -27.1997 | -257.2732 | -256.1760 | 50 |
| CO ₂ | Gas | ^a -94.0518 | -93.9641 | -384.4660 | -381.9269 | 50 |

^aValue either assigned, taken directly from the original reference, or derived as discussed in appendix C.

^bSee appendix C.

^cCorrected by information received directly from Constantine A. Neugebauer.

TABLE IV. - Continued. HEATS OF FORMATION

| Substance | Phase | Formation from assigned reference elements | | Formation from gaseous atoms | | References |
|----------------------------------|---------|------------------------------------------------|-----------------------------------------|--------------------------------------------|-------------------------------------|---------------------|
| | | $(\Delta H_{298.15}^{\circ})_f$, kcal/mole | $(\Delta H_0^{\circ})_f$, kcal/mole | $\Delta H_{298.15}^{\circ}$, kcal/mole | ΔH_0° , kcal/mole | |
| COCl ₂ | Gas | ^a -53.3 | -52.8962 | -342.0588 | -338.9693 | 50 |
| COF ₂ | Gas | ^a -150.4 | -149.6593 | -418.9739 | -415.3456 | (b) |
| COFCl | Gas | ^a -101.85 | -101.2550 | -380.5163 | -377.1347 | (b) |
| COS | Gas | ^a -32.8 | -32.8306 | -330.0983 | -327.7104 | 50 |
| CP | Gas | 86.5204 | 85.9708 | -159.9605 | ^a -159 | 16 |
| CS | Gas | 54.6697 | 53.8932 | -183.0719 | ^a -182 | 310 |
| CS ₂ | Gas | ^a 27.980 | 27.7900 | -276.2025 | -274.0067 | 311 |
| Cl | Gas | 28.9506 | ^a 28.5484 | 0 | 0 | 32 |
| Cl ₂ | Gas | ^a 0 | 0 | -57.9013 | -57.0968 | -- |
| ClCN | Gas | ^a 31.641 | 31.4779 | -281.6351 | -279.6398 | ^b 50, 89 |
| ClF | Gas | -13.4524 | -13.4301 | -61.2612 | ^a -60.3335 | 32 |
| ClF ₃ | Gas | ^a -38.7380 | -37.7388 | -124.2631 | -121.3522 | ^b 90 |
| ClO | Gas | 24.2065 | 24.2249 | -64.3007 | ^a -63.31 | 179 |
| ClO ₂ | Gas | ^a 25 | 25.5910 | -123.0639 | -120.9305 | 312 |
| Cl ₂ O | Gas | ^a 18.1 | 18.6127 | -99.3579 | -97.4706 | 312 |
| F | Gas | 18.8582 | ^a 18.355 | 0 | 0 | 313 |
| F ₂ | Gas | ^a 0 | 0 | -37.7163 | -36.7101 | --- |
| H | Gas | 52.0977 | ^a 51.6284 | 0 | 0 | 314 |
| H ₂ | Gas | ^a 0 | 0 | -104.1955 | -103.2568 | --- |
| HBO ₂ | Gas | -135.7240 | ^a -134.9 | -441.9351 | -438.2822 | 315 |
| H ₃ BO ₃ | Gas | ^a -238.4 | -235.4733 | -708.3632 | -701.0989 | ^b 91, 92 |
| (HBO ₂) ₃ | Gas | -542.1945 | ^a -537.5 | -1460.8276 | -1447.6465 | 315 |
| HCN | Gas | 31.1895 | 31.2814 | -305.2337 | -302.9163 | ^b 93 |
| HCO | Gas | -3.2241 | -3.3110 | -286.1794 | -283.9157 | ^b 94 |
| HCl | Gas | ^a -22.063 | -22.0193 | -103.1114 | -102.1961 | 50 |
| HF | Gas | ^a -64.8 | -64.7886 | -135.7559 | -134.7720 | ^b 95, 96 |
| H ₂ O | Gas | ^a -57.7979 | -57.1035 | -221.5501 | -219.3468 | 50 |
| HS | Gas | 36.2377 | 36.1318 | -82.3009 | ^a -81.4 | 316 |
| H ₂ S | Gas | ^a -4.820 | -4.1220 | -175.4563 | -173.2823 | 317 |
| He | Gas | ^a 0 | 0 | 0 | 0 | --- |
| Li | Gas | 38.4251 | ^a 38.05 | 0 | 0 | 128 |
| Li | Crystal | ^a 0 | 0 | -38.4251 | -38.0500 | --- |
| Li ₂ | Gas | 50.4396 | 50.3400 | -26.4105 | ^a -25.76 | 128 |
| LiCl | Gas | ^a -47.8 | -47.7630 | -115.1757 | -114.3614 | 318 |
| LiCl | Crystal | ^a -97.7 | -97.7207 | -165.0757 | -164.3191 | 50 |
| (LiCl) ₂ | Gas | ^a -144.8 | -144.0955 | -279.5514 | -277.2923 | 318 |
| LiF | Gas | ^a -79.8 | -79.7483 | -137.0832 | -136.1533 | 318 |

^aValue either assigned, taken directly from the original reference, or derived as discussed in appendix C.

^bSee appendix C.

TABLE IV. - Continued. HEATS OF FORMATION

| Substance | Phase | Formation from assigned reference elements | | Formation from gaseous atoms | | References |
|-------------------------------|---------|------------------------------------------------|--------------------------------------------------|--------------------------------------------|----------------------------------------------|-----------------------|
| | | $(\Delta H_{298.15}^{\circ})_f$, kcal/mole | $(\Delta H_{\text{O}}^{\circ})_f$, kcal/mole | $\Delta H_{298.15}^{\circ}$, kcal/mole | $\Delta H_{\text{O}}^{\circ}$, kcal/mole | |
| LiF | Crystal | ^a -146.3 | -145.6833 | -203.5832 | -202.0883 | 50 |
| (LiF) ₂ | Gas | ^a -220.9 | -219.9632 | -335.4664 | -332.7732 | 318 |
| (LiF) ₃ | Gas | ^a -345.3 | -342.9722 | -517.1497 | -512.1872 | 3 |
| LiH | Gas | 33.6204 | 33.6624 | -56.9024 | ^a -56.016 | --- |
| LiO | Gas | 13.9877 | 14.0365 | -83.9940 | ^a -83 | 106 |
| Li ₂ O | Gas | -35.5425 | -34.7825 | -171.9492 | -169.8690 | ^b 106 |
| Li ₂ O | Crystal | ^a -142.4 | -140.8824 | -278.8067 | -275.9689 | 50 |
| LiOH | Gas | ^a -57.2 | -56.4466 | -207.2795 | -205.1115 | ^b 110 |
| LiOH | Crystal | ^a -116.45 | -115.0662 | -266.5294 | -263.7311 | 50 |
| (LiOH) ₂ | Gas | ^a -177.5 | -174.6321 | -477.6589 | -471.9619 | ^b 110 |
| Mg | Gas | ^a 35.6 | 35.3090 | 0 | 0 | 51 |
| Mg | Crystal | ^a 0 | 0 | -35.6000 | -35.3090 | -- |
| MgCl | Gas | 1.5079 | 1.5574 | -63.0427 | ^a -62.3 | 32 |
| MgCl ₂ | Gas | ^a -100.8 | -100.3903 | -194.3013 | -192.7961 | 296 |
| MgF | Gas | -20.2374 | -20.1360 | -74.6956 | ^a -73.8 | 32 |
| MgF ₂ | Gas | ^a -178.1 | -177.3239 | -251.4163 | -249.3429 | 318 |
| MgF ₂ | Crystal | ^a -263.5 | -262.5721 | -336.8163 | -334.5911 | 50 |
| MgFCl | Gas | ^a -139.45 | -138.8116 | -222.8588 | -221.0241 | (b) |
| MgH | Gas | 40.7102 | 40.8374 | -46.9875 | ^a -46.1 | 32 |
| MgO | Gas | 4.1970 | 4.2956 | -90.9596 | ^a -90 | 319 |
| MgO | Crystal | ^a -143.7 | -142.7391 | -238.8566 | -237.0346 | 320 |
| MgOH | Gas | -12.2185 | -11.4360 | -159.4729 | -157.3600 | ^b 120 |
| MgS | Gas | 34.2774 | 34.3125 | -67.7634 | ^a -66.9 | 16 |
| N | Gas | 113.0246 | ^a 112.5795 | 0 | 0 | 32 |
| N ₂ | Gas | ^a 0 | 0 | -226.0492 | -225.1590 | -- |
| NF | Gas | 65.9439 | 65.9345 | -65.9389 | ^a -65 | (b) |
| NF ₂ | Gas | ^a 9 | 9.6180 | -141.7409 | -139.6715 | ^b 121, 122 |
| NF ₃ | Gas | ^a -29.7 | -28.3267 | -199.2991 | -195.9712 | 321 |
| N ₂ F ₂ | Gas | ^a 19.4 | 20.6591 | -244.3655 | -241.2099 | 322 |
| NH | Gas | 78.9195 | 78.9079 | -86.2029 | ^a -85.3 | 32 |
| NH ₃ | Gas | ^a -11.04 | -9.3667 | -280.3579 | -276.8314 | 50 |
| NO | Gas | ^a 21.6 | 21.4765 | -150.9812 | -150.0895 | 50 |
| NO ₂ | Gas | 8.0075 | 8.6812 | -224.1304 | -221.8713 | ^b 124 |
| N ₂ O | Gas | ^a 19.49 | 20.3100 | -266.1159 | -263.8355 | 50 |
| N ₂ O ₄ | Gas | 2.3488 | 4.6525 | -461.9270 | -456.4526 | ^b 124 |
| NS | Gas | 63.6392 | 63.4829 | -115.8262 | ^a -115 | 32 |
| Na | Gas | 25.5969 | ^a 25.6499 | 0 | 0 | ^b 125 |

^aValue either assigned, taken directly from the original reference, or derived as discussed in appendix C.

^bSee appendix C.

TABLE IV. - Continued. HEATS OF FORMATION

| Substance | Phase | Formation from assigned reference elements | | Formation from gaseous atoms | | References |
|--------------------------------|-------------|------------------------------------------------|-----------------------------------------|--------------------------------------------|-------------------------------------|----------------------------|
| | | $(\Delta H_{298.15}^{\circ})_f$, kcal/mole | $(\Delta H_0^{\circ})_f$, kcal/mole | $\Delta H_{298.15}^{\circ}$, kcal/mole | ΔH_0° , kcal/mole | |
| Na | Crystal | ^a 0 | 0 | -25.5969 | -25.6499 | --- |
| Na ₂ | Gas | 33.8763 | 34.4598 | -17.3174 | ^a -16.84 | 125 |
| NaCl | Gas | ^a -43.5 | -43.1670 | -98.0475 | -97.3653 | 50 |
| (NaCl) ₂ | Gas | -136.6912 | -135.8379 | -245.7861 | -244.2345 | ^b 129 |
| NaF | Gas | ^a -70.6 | -70.2197 | -115.0550 | -114.2246 | ^b 131, 132, 133 |
| (NaF) ₂ | Gas | -199.3992 | -198.3218 | -288.3093 | -286.3316 | ^b 129 |
| NaH | Gas | 29.5388 | 29.9983 | -48.1558 | ^a -47.28 | 32 |
| NaO | Gas | 13.2231 | 13.6364 | -71.9304 | ^a -71 | 323 |
| NaOH | Gas | ^a -55.84 | -54.8271 | -193.0913 | -191.0919 | ^b 135 |
| (NaOH) ₂ | Gas | -166.7872 | -163.8329 | -441.2897 | -436.3625 | ^b 136 |
| Ne | Gas | ^a 0 | 0 | 0 | 0 | ---- |
| O | Gas | 59.5566 | ^a 58.9865 | 0 | 0 | 193 |
| O ₂ | Gas | ^a 0 | 0 | -119.1133 | -117.9730 | --- |
| OH | Gas | 9.3125 | 9.2549 | -102.3419 | ^a -101.36 | 324 |
| P | Gas | ^a 75.18 | 74.9810 | 0 | 0 | 50 |
| P | Crystal III | ^a 0 | 0 | -75.1800 | -74.9810 | -- |
| P ₂ | Gas | 33.4457 | 33.8821 | -116.9143 | ^a -116.08 | 32 |
| P ₄ | Gas | ^a 14.04 | 15.7913 | -286.6800 | -284.1329 | 325 |
| PCl ₃ | Gas | ^a -71.62 | -70.8642 | -233.6519 | -231.4904 | ^b 50, 138 |
| PF ₃ | Gas | -222.3084 | -220.9539 | -354.0629 | ^a -351 | ^b 139 |
| PH | Gas | 50.2825 | 50.5094 | -76.9952 | ^a -76.1 | ---- |
| PH ₃ | Gas | ^a 1.75 | 3.6452 | -229.7233 | -226.2210 | ^b 50, 140 |
| PN | Gas | 23.3220 | 23.5606 | -164.8826 | ^a -164 | 326 |
| PO | Gas | -6.1067 | -6.0324 | -140.8434 | ^a -140 | 327 |
| PS | Gas | 10.8465 | 10.8845 | -130.7743 | ^a -130 | 195 |
| S | Gas | 66.4408 | 65.9034 | 0 | 0 | ^b 141 |
| S | Crystal II | ^a 0 | 0 | -66.4408 | -65.9034 | ---- |
| S ₂ | Gas | ^a 30.84 | 30.8068 | -102.0416 | -101 | 317 |
| SCl | Gas | ^a 32 | 31.9432 | -63.3914 | -62.5086 | (b) |
| SCl ₂ | Gas | ^a -5.15 | -4.8763 | -129.4921 | -127.8766 | ^b 144 |
| S ₂ Cl ₂ | Gas | ^a -4.75 | -4.3917 | -195.5329 | -193.2953 | ^b 50 |
| SF | Gas | ^a 7.284 | 7.2752 | -78.0150 | -76.9833 | (b) |
| SF ₂ | Gas | ^a -51.87 | -51.2997 | -156.0271 | -153.9131 | (b) |
| SF ₄ | Gas | ^a -170.2 | -168.4117 | -312.0735 | -307.7351 | (b) |
| SF ₆ | Gas | ^a -288.5 | -285.1739 | -468.0898 | -461.2074 | 328 |
| S ₂ F ₂ | Gas | -54.5320 | -53.6634 | ^a -225.13 | -222.1803 | ^b 50, 6, 147 |
| SO | Gas | 1.3112 | 1.3149 | -124.6862 | ^a -123.575 | 198 |

^aValue either assigned, taken directly from the original reference, or derived as discussed in appendix C.

^bSee appendix C.

TABLE IV. - Concluded. HEATS OF FORMATION

| Substance | Phase | Formation from assigned reference elements | | Formation from gaseous atoms | | References |
|--------------------------------|---------|------------------------------------------------|--------------------------------------------------|--------------------------------------------|----------------------------------------------|----------------------|
| | | $(\Delta H_{298.15}^{\circ})_f$, kcal/mole | $(\Delta H_{\text{O}}^{\circ})_f$, kcal/mole | $\Delta H_{298.15}^{\circ}$, kcal/mole | $\Delta H_{\text{O}}^{\circ}$, kcal/mole | |
| SO ₂ | Gas | ^a -70.947 | -70.3398 | -256.5011 | -254.2162 | 317 |
| SO ₃ | Gas | ^a -94.47 | -93.1000 | -339.5807 | -335.9630 | 317 |
| SOCl | Gas | ^a -24.5 | -24.0397 | -179.4481 | -177.4781 | (b) |
| SOCl ₂ | Gas | ^a -50.37 | -49.6435 | -234.2687 | -231.6303 | ^b 50, 149 |
| SOF | Gas | ^a -29.9 | -29.3089 | -174.7556 | -172.5538 | ^b 151 |
| SOF ₂ | Gas | ^a -97.11 | -95.9084 | -260.8238 | -257.5083 | (b) |
| SO ₂ F ₂ | Gas | ^a -205 | -202.9859 | -428.2704 | -423.5724 | 151 |
| Si | Gas | ^a 112 | 110.9643 | 0 | 0 | 6 |
| Si | Crystal | ^a 0 | 0 | -112.0000 | -110.9643 | --- |
| Si ₂ | Gas | 147.6061 | 146.9285 | -76.3939 | ^a -75 | 262 |
| Si ₃ | Gas | 158.5323 | 157.8928 | -177.4677 | ^a -175 | 262 |
| SiCl | Gas | 47.7098 | 47.2127 | -93.2409 | ^a -92.3 | 16 |
| SiCl ₂ | Gas | ^a -37.2 | -37.2249 | -207.1013 | -205.2860 | ^b 155 |
| SiCl ₄ | Gas | ^a -151.8 | -151.2894 | -379.6025 | -376.4472 | 329 |
| SiF | Gas | 4.7565 | 4.3193 | -126.1016 | ^a -125 | 200 |
| SiF ₂ | Gas | ^a -125.5 | -125.2513 | -275.2163 | -272.9255 | (b) |
| SiF ₄ | Gas | ^a -386.02 | -384.6910 | -573.4527 | -569.0752 | 158 |
| SiH | Gas | 89.4269 | 89.0227 | -74.6708 | ^a -73.57 | 330 |
| SiH ₄ | Gas | ^a 7.8 | 10.0977 | -312.5910 | -307.3801 | 331 |
| SiN | Gas | 119.8258 | 119.5438 | -105.1988 | ^a -104 | 32 |
| SiO | Gas | ^a -21.411 | -21.6876 | -192.9676 | -191.6384 | 332 |
| SiO ₂ | Gas | ^a -82 | -81.6889 | -313.1133 | -310.6262 | ^b 158 |
| SiS | Gas | 29.1799 | 28.8677 | -149.2609 | ^a -148 | 32 |

^aValue either assigned, taken directly from the original reference, or derived as discussed in appendix C.

^bSee appendix C.

TABLE V. - TEMPERATURE COEFFICIENTS FOR THERMODYNAMIC FUNCTIONS

| Substance | Temperature interval of tabulated data, °K | | | | | | | |
|-------------------|--------------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|-------|
| | First temperature interval, °K | a_1 | a_2 | a_3 | a_4 | a_5 | a_6 | a_7 |
| AL1(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 2.5378209E 00 | -6.0990708E-05 | 3.9335798E-08 | -1.1559831E-11 | 1.2920262E-15 | 3.8209820E 04 | 5.3500915E 00 | |
| 300. 1000. | 2.8352368E 00 | -1.5134012E-03 | 2.7183744E-06 | -2.2060285E-09 | 6.7171701E-13 | 3.8160129E 04 | 3.9723901E 00 | |
| AL1(L) | 932.00 | 5000.00 | | | | | | |
| 1000. 5000. | 3.5224379E 00 | -0. | -0. | -0. | -0. | 1.6666163E 02 | -1.5510280E 01 | |
| 300. 1000. | 3.5224379E 00 | -0. | -0. | -0. | -0. | 1.6666163E 02 | -1.5510280E 01 | |
| AL1(O) | 300.00 | 932.00 | | | | | | |
| 1000. 5000. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | |
| 300. 1000. | 2.4875519E 00 | 1.4639947E-03 | 9.3250489E-08 | -1.2687230E-10 | 5.8175564E-14 | -8.0730728E 02 | -1.1203623E 01 | |
| AL2(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 4.4549828E 00 | 1.8373759E-04 | -1.9862610E-08 | 3.5811583E-12 | -2.3734398E-16 | 5.7473463E 04 | 1.6865048E 00 | |
| 300. 1000. | 3.8932024E 00 | 2.8553193E-03 | -4.9419969E-06 | 4.0952728E-09 | -1.2795968E-12 | 5.7573113E 04 | 4.3125746E 00 | |
| AL1CL1(C) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 4.3462051E 00 | 2.4174157E-04 | -7.8077159E-08 | 1.1941210E-11 | -1.2091977E-16 | -7.1686093E 03 | 2.4928314E 00 | |
| 300. 1000. | 3.1753092E 00 | 5.5148527E-03 | -9.2828834E-06 | 7.2879275E-09 | -2.1735175E-12 | -6.9503178E 03 | 8.0284057E 00 | |
| AL1CL3(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 9.4129367E 00 | 6.6854008E-04 | -2.9486243E-07 | 5.7343108E-11 | -4.1001364E-15 | -7.3642563E 04 | -1.6496710E 01 | |
| 300. 1000. | 4.9829524E 00 | 2.0161761E-02 | -3.3766128E-05 | 2.6217737E-08 | -7.7564701E-12 | -7.2791727E 04 | 4.5649076E 00 | |
| AL1F1(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 4.1340908E 00 | 4.5422738E-04 | -1.7790036E-07 | 3.4225395E-11 | -2.4257838E-15 | -3.2222100E 04 | 2.0063721E 00 | |
| 300. 1000. | 2.7071847E 00 | 5.6300473E-03 | -7.4106944E-06 | 4.6013384E-09 | -1.0856593E-12 | -3.1897305E 04 | 9.0521041E 00 | |
| AL1F3(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 8.5118072E 00 | 1.6603868E-03 | -7.2156854E-07 | 1.3874445E-10 | -9.8310091E-15 | -1.4559940E 05 | -1.6541272E 01 | |
| 300. 1000. | 2.8213823E 00 | 2.2989814E-02 | -3.2057084E-05 | 2.1351024E-08 | -5.5255999E-12 | -1.4432844E 05 | 1.1413303E 01 | |
| AL1F3(α) | 300.00 | 727.00 | | | | | | |
| 1000. 5000. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | |
| 300. 1000. | 5.7106439E 00 | 7.2679375E-03 | 2.7508380E-05 | -5.9904159E-08 | 3.5673299E-11 | -1.8144313E 05 | -2.7566668E 01 | |
| AL1F3(β) | 727.00 | 1500.00 | | | | | | |
| 1000. 5000. | 1.0532089E 01 | 1.5096163E-03 | -0. | -0. | -0. | -1.8256292E 05 | -5.2956950E 01 | |
| 300. 1000. | 1.0532089E 01 | 1.5096163E-03 | -0. | -0. | -0. | -1.8256292E 05 | -5.2956950E 01 | |
| AL1H1(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 3.3093060E 00 | 1.3387993E-03 | -5.3089117E-07 | 1.0029871E-10 | -7.0313409E-15 | 2.9877940E 04 | 3.2332524E 00 | |
| 300. 1000. | 3.7911536E 00 | -2.9142064E-03 | 9.1810306E-06 | -8.5995438E-09 | 2.7520485E-12 | 2.9908433E 04 | 1.5119898E 00 | |

| | | | | | | | | | | | | | |
|---------------|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--|--|--|--|--|
| AL1G1(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 3.9462470E 00 | 6.8235571E-04 | -2.8942852E-07 | 5.6748512E-11 | -3.8281270E-15 | 9.1898011E 03 | 3.3888134E 00 | | | | | |
| 300. | 1000. | 2.8420587E 00 | 3.7688103E-03 | -3.0275652E-06 | 5.9586224E-10 | 2.1292872E-13 | 9.4853444E 03 | 9.0649964E 00 | | | | | |
| AL2G1(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 5.8198313E 00 | 1.3194785E-03 | -5.7636541E-07 | 1.1151349E-10 | -7.9516522E-15 | -1.8420742E 04 | -2.9438478E 00 | | | | | |
| 300. | 1000. | 2.9262049E 00 | 1.0424973E-02 | -1.1117078E-05 | 5.2543485E-09 | -8.2194248E-13 | -1.7689203E 04 | 1.1698695E 01 | | | | | |
| AL202(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 7.6955147E 00 | 2.5772032E-03 | -1.1248998E-06 | 2.1739241E-10 | -1.5482209E-14 | -5.0418429E 04 | -1.3464856E 01 | | | | | |
| 300. | 1000. | 1.4479539E 00 | 2.2586728E-02 | -2.4689278E-05 | 1.1858866E-08 | -1.8545427E-12 | -4.8863394E 04 | 1.8043701E 01 | | | | | |
| AL203(L) | | 2318.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 1.7612190E 01 | -0. | -0. | -0. | -0. | -1.9851986E 05 | -9.5677512E 01 | | | | | |
| 300. | 1000. | -0. | -0. | -0. | -0. | -0. | -0. | -0. | | | | | |
| AL203(C) | | 300.00 | 2318.00 | | | | | | | | | | |
| 1000. | 5000. | 1.4382288E 01 | -1.4368353E-03 | 3.171C427E-06 | -1.3033940E-09 | 1.8825192E-13 | -2.0653581E 05 | -7.7440233E 01 | | | | | |
| 300. | 1000. | -4.2622560E 00 | 7.4915144E-02 | -1.2173507E-04 | 9.4042454E-08 | -2.7957937E-11 | -2.0263811E 05 | 1.2714287E 01 | | | | | |
| AL1G1CL1(C) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 6.7736887E 00 | 8.0905846E-04 | -3.5112550E-07 | 6.7436774E-11 | -4.7736052E-15 | -4.8523370E 04 | -8.4495442E 00 | | | | | |
| 300. | 1000. | 3.9041917E 00 | 1.1735658E-02 | -1.6664472E-05 | 1.1270356E-08 | -2.9514503E-12 | -4.7890785E 04 | 5.6046744E 00 | | | | | |
| AL101F1(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 6.4760534E 00 | 1.1461219E-03 | -5.0065889E-07 | 9.6820072E-11 | -6.8992213E-15 | -7.2203078E 04 | -8.5098885E 00 | | | | | |
| 300. | 1000. | 3.1376150E 00 | 1.3203182E-02 | -1.7474732E-05 | 1.1066294E-08 | -2.7209235E-12 | -7.1434709E 04 | 8.0032161E 00 | | | | | |
| AR1(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 2.5000000E 00 | -0. | -0. | -0. | -0. | -7.4537500E 02 | 4.3661076E 00 | | | | | |
| 300. | 1000. | 2.5000000E 00 | -0. | -0. | -0. | -0. | -7.4537500E 02 | 4.3661076E 00 | | | | | |
| B1(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 2.5039462E 00 | -9.2175533E-06 | 7.9345493E-09 | -2.9394601E-12 | 3.9486428E-16 | 6.7186310E 04 | 4.1775560E 00 | | | | | |
| 300. | 1000. | 2.5010513E 00 | 8.6405380E-06 | -4.0871525E-08 | 5.4272336E-11 | -2.2974091E-14 | 6.7186915E 04 | 4.1908697E 00 | | | | | |
| B1(L) | | 2379.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 3.7740406E 00 | -0. | -0. | -0. | -0. | 2.5120023E 02 | -2.1728040E 01 | | | | | |
| 300. | 1000. | -0. | -0. | -0. | -0. | -0. | -0. | -0. | | | | | |
| B1(AMORPHOUS) | | 300.00 | 2379.00 | | | | | | | | | | |
| 1000. | 5000. | 9.9895054E-01 | 3.3259404E-03 | -1.5910031E-06 | 3.5398969E-10 | -2.8892092E-14 | -2.8773326E 02 | -5.9614118E 00 | | | | | |
| 300. | 1000. | -1.9128091E 00 | 1.8526476E-02 | -3.1351135E-05 | 2.5767910E-08 | -7.9714613E-12 | 1.7883540E 02 | 7.3461752E 00 | | | | | |
| B1(L) | | 2313.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 3.7740406E 00 | -0. | -0. | -0. | -0. | 2.5120023E 02 | -2.1728033E 01 | | | | | |
| 300. | 1000. | -0. | -0. | -0. | -0. | -0. | -0. | -0. | | | | | |
| B1(C) | | 300.00 | 2313.00 | | | | | | | | | | |
| 1000. | 5000. | 2.4029899E-01 | 4.6656849E-03 | -2.3661139E-06 | 5.1301073E-10 | -3.4151968E-14 | -2.0487404E 02 | -1.8520247E 00 | | | | | |
| 300. | 1000. | -2.5977619E 00 | 2.1997003E-02 | -3.7998009E-05 | 3.1344911E-08 | -9.7274190E-12 | 7.5503780E 01 | 1.0383250E 01 | | | | | |
| B2(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 3.9008183E 00 | 7.1395074E-04 | -2.8524157E-07 | 5.4269035E-11 | -3.7760864E-15 | 1.0191354E 05 | 1.6395086E 00 | | | | | |
| 300. | 1000. | 3.0008608E 00 | 2.4023789E-03 | 8.5354848E-08 | -2.2921430E-09 | 1.1835695E-12 | 1.0219489E 05 | 6.4677697E 00 | | | | | |

TABLE V. - Continued. TEMPERATURE COEFFICIENTS FOR THERMODYNAMIC FUNCTIONS

| Substance | Temperature interval of tabulated data, °K | | | | | | |
|---------------------------------|--------------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| First temperature interval, °K | a_1 | a_2 | a_3 | a_4 | a_5 | a_6 | a_7 |
| Second temperature interval, °K | | | | | | | |
| B1CL1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 4.0994262E 00 | 4.9355555E-04 | -1.9365628E-07 | 3.7190412E-11 | -2.6324228E-15 | 2.1353757E 04 | 1.9544924E 00 |
| 300. 1000. | 2.7230058E 00 | 5.2469553E-03 | -6.4211035E-06 | 3.6495608E-09 | -7.6453540E-13 | 2.1678582E 04 | 8.8091444E 00 |
| B1CL2(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 6.3175519E 00 | 7.6570693E-04 | -3.3464808E-07 | 6.4693840E-11 | -4.6067968E-15 | -1.1879325E 04 | -3.6013064E 00 |
| 300. 1000. | 3.5692809E 00 | 1.1330490E-02 | -1.6318855E-05 | 1.1240241E-08 | -3.0124619E-12 | -1.1277693E 04 | 9.8371772E 00 |
| B1CL3(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 8.6202460E 00 | 1.5588465E-03 | -6.8620129E-07 | 1.3355931E-10 | -9.5694464E-15 | -5.1759400E 04 | -1.5290531E 01 |
| 300. 1000. | 3.1217850E 00 | 2.2849076E-02 | -3.3214510E-05 | 2.3162470E-08 | -6.3018435E-12 | -5.0561958E 04 | 1.1562869E 01 |
| B1F1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 3.5585053E 00 | 1.0551137E-03 | -4.3508964E-07 | 8.2845435E-11 | -5.8355714E-15 | -2.2886263E 04 | 3.3553494E 00 |
| 300. 1000. | 3.5594253E 00 | -1.6326178E-03 | 7.6465246E-06 | -8.1601832E-09 | 2.8423919E-12 | -2.2746077E 04 | 4.0315384E 00 |
| B1F2(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 5.4048659E 00 | 1.7572642E-03 | -7.6159899E-07 | 1.4671548E-10 | -1.0436172E-14 | -6.9780545E 04 | -2.0060292E 00 |
| 300. 1000. | 3.0815261E 00 | 7.9748360E-03 | -6.0853438E-06 | 1.2077530E-09 | 3.5803949E-13 | -6.9130364E 04 | 1.0041536E 01 |
| B1F3(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 6.9778523E 00 | 3.3156406E-03 | -1.4309333E-06 | 2.7457536E-10 | -1.9460308E-14 | -1.3849423E 05 | -1.0973744E 01 |
| 300. 1000. | 2.0993361E 00 | 1.7783707E-02 | -1.7120667E-05 | 7.3761153E-09 | -1.0208768E-12 | -1.3719496E 05 | 1.3985796E 01 |
| B1F1CL1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 5.9496496E 00 | 1.1728604E-03 | -5.1228678E-07 | 9.9161367E-11 | -7.0757069E-15 | -4.0864641E 04 | -2.6271113E 00 |
| 300. 1000. | 3.1846376E 00 | 1.0539199E-02 | -1.2658578E-05 | 7.1786186E-09 | -1.5415693E-12 | -4.0197001E 04 | 1.1203525E 01 |
| B1H1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 2.8597004E 00 | 1.6431933E-03 | -6.1830266E-07 | 1.1121117E-10 | -7.5164316E-15 | 5.7961852E 04 | 3.9604710E 00 |
| 300. 1000. | 3.7145066E 00 | -1.5094260E-03 | 3.1834925E-06 | -1.4384070E-09 | 3.8119703E-14 | 5.7794368E 04 | -1.8746893E-01 |
| B1H3(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 1.9521642E 00 | 7.4799288E-03 | -2.8865884E-06 | 5.1202655E-10 | -3.4264809E-14 | 8.1898866E 03 | 9.4388441E 00 |
| 300. 1000. | 4.0904762E 00 | -1.5638310E-03 | 1.0318767E-05 | -7.4637290E-09 | 1.6415834E-12 | 7.8304387E 03 | -6.5138592E-01 |
| B1N1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 3.4547687E 00 | 1.1522011E-03 | -4.6977453E-07 | 8.7952949E-11 | -6.0348455E-15 | 7.6753730E 04 | 5.3583872E 00 |
| 300. 1000. | 3.6825073E 00 | -2.3595167E-03 | 8.6251544E-06 | -8.6044776E-09 | 2.8750476E-12 | 7.6846699E 04 | 4.9239217E 00 |
| B1N1(C) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 2.2288903E 00 | 5.1927614E-03 | -2.5919529E-06 | 5.4548085E-10 | -4.1202103E-14 | -3.1458256E 04 | -1.2850304E 01 |
| 300. 1000. | -1.2199412E 00 | 1.6178927E-02 | -1.5538057E-05 | 6.5551550E-09 | -6.4210653E-13 | -3.0569377E 04 | 4.6072666E 00 |

| | | | | | | | | | | | | |
|-------------|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--|--|--|--|
| B1C1(G) | | 300.00 | 5000.00 | | | | | | | | | |
| 1000. | 5000. | 3.1207177E 00 | 1.4484813E-03 | -5.8963218E-07 | 1.0728721E-10 | -6.8022222E-15 | 1.8735010E 03 | 6.2204384E 00 | | | | |
| 300. | 1000. | 3.8635956E 00 | -3.0541906E-03 | 8.1699547E-06 | -6.9531605E-09 | 2.0534538E-12 | 1.8147577E 03 | 3.0473539E 00 | | | | |
| B1C2(G) | | 300.00 | 5000.00 | | | | | | | | | |
| 1000. | 5000. | 5.7532094E 00 | 1.9335753E-03 | -8.3905343E-07 | 1.6157219E-10 | -1.1480061E-14 | -4.4604281E 04 | -6.2167726E 00 | | | | |
| 300. | 1000. | 2.3856258E 00 | 1.2156260E-02 | -1.2240322E-05 | 5.5275384E-09 | -8.3127880E-13 | -4.3725148E 04 | 1.0939915E 01 | | | | |
| B2C2(G) | | 300.00 | 5000.00 | | | | | | | | | |
| 1000. | 5000. | 6.9393322E 00 | 3.6986884E-03 | -1.5406387E-06 | 2.8845158E-10 | -2.0082255E-14 | -5.8483724E 04 | -1.1896431E 01 | | | | |
| 300. | 1000. | 3.1271057E 00 | 1.9233773E-02 | -2.8164575E-05 | 2.2094198E-08 | -6.9247549E-12 | -5.7634897E 04 | 6.6719641E 00 | | | | |
| B2Q3(G) | | 300.00 | 5000.00 | | | | | | | | | |
| 1000. | 5000. | 8.2930986E 00 | 4.9323973E-03 | -2.0691496E-06 | 3.8966615E-10 | -2.7260455E-14 | -1.0464525E 05 | -1.5663101E 01 | | | | |
| 300. | 1000. | 2.7212897E 00 | 2.6177455E-02 | -3.5822750E-05 | 2.6253899E-08 | -7.8111472E-12 | -1.0335405E 05 | 1.1781893E 01 | | | | |
| B2Q3(L) | | 560.00 | 5000.00 | | | | | | | | | |
| 1000. | 5000. | 1.5322605E 01 | -0. | -0. | -0. | -0. | -1.5740265E 05 | -8.1447383E 01 | | | | |
| 300. | 1000. | 1.5322605E 01 | -0. | -0. | -0. | -0. | -1.5740265E 05 | -8.1447383E 01 | | | | |
| B2C3(GLASS) | | 300.00 | 560.00 | | | | | | | | | |
| 1000. | 5000. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | | |
| 300. | 1000. | -1.0897404E 02 | 8.8392164E-01 | -2.2318638E-03 | 1.9763627E-06 | -1.8168600E-10 | -1.4233523E 05 | 4.4882736E 02 | | | | |
| B2Q3(L) | | 723.15 | 5000.00 | | | | | | | | | |
| 1000. | 5000. | 1.5322605E 01 | -0. | -0. | -0. | -0. | -1.5740265E 05 | -8.1447383E 01 | | | | |
| 300. | 1000. | 1.5322605E 01 | -0. | -0. | -0. | -0. | -1.5740265E 05 | -8.1447383E 01 | | | | |
| B2Q3(C) | | 300.00 | 723.15 | | | | | | | | | |
| 1000. | 5000. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | | |
| 300. | 1000. | 5.2817200E-01 | 2.8264694E-02 | -1.2102028E-05 | -1.5695268E-08 | 1.5223977E-11 | -1.5492946E 05 | -4.2995594E 00 | | | | |
| B1C1C1(G) | | 300.00 | 5000.00 | | | | | | | | | |
| 1000. | 5000. | 5.5074947E 00 | 2.0717555E-03 | -8.6290401E-07 | 1.6145853E-10 | -1.1230792E-14 | -4.6163190E 04 | -3.9202287E 00 | | | | |
| 300. | 1000. | 2.5810318E 00 | 1.4242557E-02 | -2.1572670E-05 | 1.6708359E-08 | -5.0927059E-12 | -4.5539303E 04 | 1.0233876E 01 | | | | |
| B3C3C13(G) | | 300.00 | 5000.00 | | | | | | | | | |
| 1000. | 5000. | 1.7161500E 01 | 8.6462194E-03 | -3.7440381E-06 | 7.1995482E-10 | -5.1101860E-14 | -2.0608561E 05 | -5.8463484E 01 | | | | |
| 300. | 1000. | 3.5445800E 00 | 4.9260495E-02 | -4.7988508E-05 | 2.0852529E-08 | -2.9365617E-12 | -2.0248372E 05 | 1.1117335E 01 | | | | |
| B1C1F1(G) | | 300.00 | 5000.00 | | | | | | | | | |
| 1000. | 5000. | 5.0193965E 00 | 2.5701563E-03 | -1.0703641E-06 | 2.0058698E-10 | -1.3984380E-14 | -7.4226710E 04 | -2.7432969E 00 | | | | |
| 300. | 1000. | 2.2381286E 00 | 1.2908428E-02 | -1.6852067E-05 | 1.1728396E-08 | -3.3170968E-12 | -7.3575341E 04 | 1.1004774E 01 | | | | |
| B3C3F3(G) | | 300.00 | 5000.00 | | | | | | | | | |
| 1000. | 5000. | 1.6244890E 01 | 9.6560681E-03 | -4.1836756E-06 | 8.0517159E-10 | -5.7203293E-14 | -2.9201708E 05 | -5.6132537E 01 | | | | |
| 300. | 1000. | 3.2778566E 00 | 4.4105105E-02 | -3.3195356E-05 | 6.1588479E-09 | 2.1187989E-12 | -2.8837763E 05 | 1.1168800E 01 | | | | |
| B1S1(G) | | 300.00 | 5000.00 | | | | | | | | | |
| 1000. | 5000. | 3.6061010E 00 | 1.2159307E-03 | -6.5083423E-07 | 1.5857185E-10 | -1.2398068E-14 | 4.0284043E 04 | 4.9502415E 00 | | | | |
| 300. | 1000. | 3.2144716E 00 | 7.2379466E-04 | 3.3674428E-06 | -4.9520034E-09 | 1.9636666E-12 | 4.0464745E 04 | 7.3480286E 00 | | | | |
| BE1(G) | | 300.00 | 5000.00 | | | | | | | | | |
| 1000. | 5000. | 2.3978915E 00 | 2.0449278E-04 | -1.2906023E-07 | 2.7413253E-11 | -7.7685397E-16 | 3.8490518E 04 | 2.6893508E 00 | | | | |
| 300. | 1000. | 2.4945010E 00 | 4.1386213E-05 | -1.0781513E-07 | 1.1661783E-10 | -4.4729455E-14 | 3.8454870E 04 | 2.1557333E 00 | | | | |

TABLE V. - Continued. TEMPERATURE COEFFICIENTS FOR THERMODYNAMIC FUNCTIONS

| Substance | Temperature interval of tabulated data, °K | | | | | | | |
|---------------------------------|--------------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|-------|
| | First temperature interval, °K | a_1 | a_2 | a_3 | a_4 | a_5 | a_6 | a_7 |
| Second temperature interval, °K | | | | | | | | |
| BE1(L) | 1560.00 | 5000.00 | | | | | | |
| 1000. 5000. | 3.6230790E 00 | -0. | -0. | -0. | -0. | 9.3243961E 01 | -1.9513842E 01 | |
| 300. 1000. | -0. | -0. | -0. | -0. | -0. | -0. | -0. | |
| BE1(C) | 300.00 | 1560.00 | | | | | | |
| 1000. 5000. | 2.2493924E 00 | 8.6588699E-04 | 2.8228190E-07 | -1.5884374E-10 | 3.4167030E-14 | -7.7365751E 02 | -1.2092996E 01 | |
| 300. 1000. | -8.4742341E-01 | 1.5420137E-02 | -2.5303249E-05 | 1.9730606E-08 | -5.7271889E-12 | -2.4554819E 02 | 2.3480857E 00 | |
| BE1CL1(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 4.0946670E 00 | 4.9774987E-04 | -1.9342009E-07 | 3.5887167E-11 | -2.3436435E-15 | -4.8399966E 03 | 2.4706388E 00 | |
| 300. 1000. | 2.6853147E 00 | 5.5285666E-03 | -7.1607711E-06 | 4.4574707E-09 | -1.0780413E-12 | -4.5138589E 03 | 9.4540210E 00 | |
| BE1CL2(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 6.4623181E 00 | 1.1667456E-03 | -5.1165621E-07 | 9.9275091E-11 | -7.0940267E-15 | -4.4428475E 04 | -8.4562968E 00 | |
| 300. 1000. | 2.5053847E 00 | 1.6578593E-02 | -2.4237814E-05 | 1.7042856E-08 | -4.6794338E-12 | -4.3570175E 04 | 1.0848686E 01 | |
| BE1F1(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 3.7082887E 00 | 8.9588667E-04 | -3.6281525E-07 | 6.8014430E-11 | -4.6743957E-15 | -2.6187436E 04 | 3.1585513E 00 | |
| 300. 1000. | 3.2558872E 00 | 4.0024748E-04 | 3.7154658E-06 | -4.9094124E-09 | 1.8425131E-12 | -2.5971722E 04 | 5.9374745E 00 | |
| BE1F2(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 5.3899902E 00 | 2.3237275E-03 | -1.0049366E-06 | 1.9304005E-10 | -1.3690090E-14 | -9.8191642E 04 | -5.6574726E 00 | |
| 300. 1000. | 1.3999229E 00 | 1.4541094E-02 | -1.4679717E-05 | 6.5502111E-09 | -9.2338052E-13 | -9.7159351E 04 | 1.4633324E 01 | |
| BE1F1CL1(C) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 5.9541941E 00 | 1.7171621E-03 | -7.4713050E-07 | 1.4417413E-10 | -1.0261544E-14 | -6.9509701E 04 | -6.5790623E 00 | |
| 300. 1000. | 1.6825843E 00 | 1.7163736E-02 | -2.2759416E-05 | 1.4722006E-08 | -3.7507750E-12 | -6.8520306E 04 | 1.4563591E 01 | |
| BE1H1(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 3.0213501E 00 | 1.5644647E-03 | -6.0860459E-07 | 1.1244383E-10 | -7.7556899E-15 | 3.8324190E 04 | 3.5833704E 00 | |
| 300. 1000. | 3.8190803E 00 | -2.5429071E-03 | 6.4585046E-06 | -4.9247853E-09 | 1.2720065E-12 | 3.8227798E 04 | 5.7989205E-03 | |
| BE1C1(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 4.1807162E 00 | -2.4834712E-04 | 3.5022984E-07 | -5.5095477E-11 | 1.6058349E-15 | 1.3916785E 04 | -3.6730129E-01 | |
| 300. 1000. | 3.6652305E 00 | -2.2914847E-03 | 8.7253562E-06 | -8.9055942E-09 | 3.0356028E-12 | 1.4267956E 04 | 3.2407899E 00 | |
| BE1C1(L) | 2843.00 | 5000.00 | | | | | | |
| 1000. 5000. | 7.5480812E 00 | -0. | -0. | -0. | -0. | -6.8880567E 04 | -4.2635803E 01 | |
| 300. 1000. | -0. | -0. | -0. | -0. | -0. | -0. | -0. | |
| BE1C1(C) | 300.00 | 2843.00 | | | | | | |
| 1000. 5000. | 4.7664986E 00 | 1.0445156E-03 | 1.0162408E-08 | -4.8917086E-12 | 7.6941323E-16 | -7.3803983E 04 | -2.6519949E 01 | |
| 300. 1000. | -1.7862022E 00 | 2.2794850E-02 | -2.5310386E-05 | 1.1567546E-08 | -1.4487543E-12 | -7.2289472E 04 | 6.1593446E 00 | |

| | | | | | | | | | | | | | |
|---------------|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--|--|--|--|--|
| BE202(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 7.2656515E 00 | 3.0436593E-03 | -1.3278244E-06 | 2.5695786E-10 | -1.8339204E-14 | -5.5252811E 04 | -1.2939644E 01 | | | | | |
| 300. | 1000. | 2.2982095E 00 | 1.6953025E-02 | -1.4266072E-05 | 3.8338247E-09 | 4.0111862E-13 | -5.3905411E 04 | 1.2636834E 01 | | | | | |
| BE3C3(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 1.0223629F 01 | 6.4242786E-03 | -2.7986060E-06 | 5.4071499E-10 | -3.8530851E-14 | -1.3260649E 05 | -2.9645351E 01 | | | | | |
| 300. | 1000. | -1.3603821E 00 | 4.0799953E-02 | -3.8954026E-05 | 1.5142194E-08 | -1.2762531E-12 | -1.2956134E 05 | 2.9518469E 01 | | | | | |
| BE4C4(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 1.4202648F 01 | 8.6602491E-03 | -3.7657523E-06 | 7.2611208E-10 | -5.1637712E-14 | -1.9714700E 05 | -5.0375427E 01 | | | | | |
| 300. | 1000. | -2.4858102F 00 | 6.0230479E-02 | -6.2223024E-05 | 2.8461635E-08 | -4.2116622E-12 | -1.9285977E 05 | 3.4357588E 01 | | | | | |
| BE1C2H2(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 4.2208179F 00 | 8.4240535E-03 | -3.2176763E-06 | 5.6853551E-10 | -3.8013086E-14 | -8.0770285E 04 | -3.3544744E-01 | | | | | |
| 300. | 1000. | 2.4543474E 00 | 7.4940014E-03 | 9.6269834E-06 | -1.5767075E-08 | 6.1494642E-12 | -7.9973934E 04 | 1.0272955E 01 | | | | | |
| C1(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 2.5794996E 00 | -1.4364657E-04 | 7.2256145E-08 | -7.4166784E-12 | 1.3706331E-17 | 8.5425551E 04 | 4.3213724E 00 | | | | | |
| 300. | 1000. | 2.5408928E 00 | -2.2109736E-04 | 4.7363607E-07 | -4.5292348E-10 | 1.6019824E-13 | 8.5448430E 04 | 4.5732760E 00 | | | | | |
| C1 (GRAPHITE) | | 300.00 | 4000.00 | | | | | | | | | | |
| 1000. | 5000. | 1.3632519E 00 | 1.8560488E-03 | -7.6675262E-07 | 1.5104311E-10 | -1.1389399E-14 | -6.4967214E 02 | -7.9890326E 00 | | | | | |
| 300. | 1000. | -7.1244164E-01 | 7.3406462E-03 | -5.5261839E-06 | 1.5139967E-09 | -2.3815506E-14 | -6.8053340E 01 | 2.7932569E 00 | | | | | |
| C2(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 4.0454028F 00 | 1.6972698E-04 | 1.5858551E-07 | -5.5265835E-11 | 4.8591982E-15 | 9.9609724E 04 | 1.2813032E 00 | | | | | |
| 300. | 1000. | 7.5089036E 00 | -1.0647103E-02 | 1.0075659E-05 | -8.6214489E-10 | -1.7520064E-12 | 9.8802041E 04 | -1.6077243E 01 | | | | | |
| C3(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 4.7124744E 00 | 2.9026521E-03 | -1.2142448E-06 | 2.2847047E-10 | -1.5986400E-14 | 9.3752700E 04 | -2.5304385E 00 | | | | | |
| 300. | 1000. | 2.6325874E 00 | 9.4185729E-03 | -9.5932409E-06 | 5.5795525F-09 | -1.4241068E-12 | 9.4311478E 04 | 8.0788261E 00 | | | | | |
| C1C11(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 4.1030458E 00 | 4.8645376E-04 | -1.9445336E-07 | 3.7549711E-11 | -2.6635339E-15 | 6.0282548E 04 | 3.3185081E 00 | | | | | |
| 300. | 1000. | 3.1527801E 00 | 3.1064390E-03 | -2.3613980E-06 | 2.0995338E-10 | 3.2215796E-13 | 6.0537070E 04 | 8.2075245E 00 | | | | | |
| C1C14(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 1.1506170F 01 | 1.7129154E-03 | -7.6324114E-07 | 1.5007068E-10 | -1.0844894E-14 | -1.6652707E 04 | -2.9550475E 01 | | | | | |
| 300. | 1000. | 3.3645211E 00 | 3.5599740E-02 | -5.6167723E-05 | 4.1742284E-08 | -1.1943756E-11 | -1.4997782E 04 | 9.6246173E 00 | | | | | |
| C1F1(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 3.6640409E 00 | 9.5848955E-04 | -3.9586490E-07 | 7.6138251E-11 | -5.4116391E-15 | 3.6376130E 04 | 4.2853585E 00 | | | | | |
| 300. | 1000. | 3.5867220E 00 | -1.5380358E-03 | 7.7687077E-06 | -8.6182187E-09 | 3.0982182E-12 | 3.6533051E 04 | 5.3559095E 00 | | | | | |
| C1F2(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 5.0065632E 00 | 2.2465121E-03 | -9.3662620E-07 | 1.7927463E-10 | -1.2681222E-14 | -1.6900027E 04 | -8.6252537E-01 | | | | | |
| 300. | 1000. | 3.0767297E 00 | 5.1817707E-03 | 1.4246166E-06 | -5.9330440E-09 | 2.7329712E-12 | -1.6245954E 04 | 9.7034388E 00 | | | | | |
| C1F3(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 6.8635124E 00 | 3.4591758E-03 | -1.4966167E-06 | 2.8747657E-10 | -2.0382213E-14 | -6.2742191E 04 | -1.0110471E 01 | | | | | |
| 300. | 1000. | 1.3053779E 00 | 1.9188677E-02 | -1.6596245E-05 | 5.0328097E-09 | 1.6254684E-13 | -6.1238517E 04 | 1.8476564E 01 | | | | | |
| C1F4(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 9.0219456E 00 | 4.8141869E-03 | -1.9233018E-06 | 3.7153520E-10 | -2.6475250E-14 | -1.1274889E 05 | -2.2627487E 01 | | | | | |
| 300. | 1000. | 4.2603580E-01 | 3.2316566E-02 | -3.5029545E-05 | 1.7874827E-08 | -3.3299949E-12 | -1.1058388E 05 | 2.0793144E 01 | | | | | |

TABLE V. - Continued. TEMPERATURE COEFFICIENTS FOR THERMODYNAMIC FUNCTIONS

| Substance | Temperature interval of tabulated data, °K | | | | | | | | |
|---------------------------------|--------------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|-------|-------|
| | First temperature interval, °K | | a_1 | a_2 | a_3 | a_4 | a_5 | a_6 | a_7 |
| Second temperature interval, °K | | | | | | | | | |
| C1H1(C) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 1.9605259E 00 | 3.3122166E-03 | -1.4697647E-06 | 2.9293395E-10 | -2.1241511E-14 | 7.1056560E 04 | 1.0206282E 01 | | |
| 300. 1000. | 3.5445188E 00 | 8.7948177E-05 | -1.8263876E-06 | 4.4548009E-09 | -2.1858109E-12 | 7.0596423E 04 | 1.8236435E 00 | | |
| C1H2(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 2.2296977E 00 | 4.7109215E-03 | -1.7660321E-06 | 3.0648681E-10 | -2.0167044E-14 | 3.3832948E 04 | 7.7079836E 00 | | |
| 300. 1000. | 3.5513649E 00 | -2.5069870E-03 | 1.2354987E-05 | -1.1750895E-08 | 3.8124390E-12 | 3.3661053E 04 | 1.7966064E 00 | | |
| C1H3(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 2.8027662E 00 | 6.2504497E-03 | -2.2891516E-06 | 3.8993098E-10 | -2.5275780E-14 | 1.5787492E 04 | 5.6841170E 00 | | |
| 300. 1000. | 3.3995052E 00 | 4.2678348E-03 | 2.0332684E-07 | -1.1548308E-09 | 4.1288359E-13 | 1.5649793E 04 | 2.7037468E 00 | | |
| C1H4(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 1.1795744E 00 | 1.0950594E-02 | -4.0622131E-06 | 7.1370281E-10 | -4.7490353E-14 | -9.8556627E 03 | 1.2505934E 01 | | |
| 300. 1000. | 4.2497678E 00 | -6.9126562E-03 | 3.1602134E-05 | -2.9715432E-08 | 9.5103580E-12 | -1.0186632E 04 | -9.1754991E-01 | | |
| C2H2(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 4.4965644E 00 | 5.2698321E-03 | -1.8402668E-06 | 3.1054295E-10 | -2.0004309E-14 | 2.5637191E 04 | -3.1448152E 00 | | |
| 300. 1000. | 7.9032340E-01 | 2.3466122E-02 | -3.5541928E-05 | 2.7950550E-08 | -8.4484125E-12 | 2.6254844E 04 | 1.4005228E 01 | | |
| C2H4(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 3.5023516E 00 | 1.1592101E-02 | -4.4745225E-06 | 7.9452132E-10 | -5.3235681E-14 | 4.4543960E 03 | 2.4667528E 00 | | |
| 300. 1000. | 1.1202436E 00 | 1.3905716E-02 | 2.6568374E-06 | -1.1560272E-08 | 5.2386929E-12 | 5.3328896E 03 | 1.5837760E 01 | | |
| C1N1(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 3.6022629E 00 | 3.4086228E-04 | 9.7162446E-08 | -1.5825029E-11 | -4.1424717E-16 | 4.7310367E 04 | 3.5520520E 00 | | |
| 300. 1000. | 3.8528145E 00 | -2.7632042E-03 | 6.8570434E-06 | -5.4131979E-09 | 1.4905933E-12 | 4.7409697E 04 | 2.9718018E 00 | | |
| C2N2(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 6.5024264E 00 | 4.0532184E-03 | -1.6635966E-06 | 3.0947405E-10 | -2.1482992E-14 | 3.4904749E 04 | -9.4419093E 00 | | |
| 300. 1000. | 3.4026925E 00 | 1.7756299E-02 | -2.6860559E-05 | 2.1968412E-08 | -7.0872074E-12 | 3.5550207E 04 | 5.4122791E 00 | | |
| C1O1(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 2.9511519E 00 | 1.5525567E-03 | -6.1911411E-07 | 1.1350336E-10 | -7.7882732E-15 | -1.4231827E 04 | 6.5314450E 00 | | |
| 300. 1000. | 3.7871332E 00 | -2.1709526E-03 | 5.0757337E-06 | -3.4737726E-09 | 7.7216841E-13 | -1.4363508E 04 | 2.6335459E 00 | | |
| C1O2(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 4.4125266E 00 | 3.1922896E-03 | -1.2978230E-06 | 2.4147446E-10 | -1.6742986E-14 | -4.8944043E 04 | -7.2875769E-01 | | |
| 300. 1000. | 2.1701000E 00 | 1.0378115E-02 | -1.0733938E-05 | 6.3459175E-09 | -1.6280701E-12 | -4.8352602E 04 | 1.0664388E 01 | | |
| C1O1CL2(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 7.6818485E 00 | 2.5120332E-03 | -1.0776482E-06 | 2.0619275E-10 | -1.4596992E-14 | -2.9469427E 04 | -1.0945890E 01 | | |
| 300. 1000. | 2.4834310E 00 | 2.3088765E-02 | -3.4041696E-05 | 2.5093821E-08 | -7.3164953E-12 | -2.8332887E 04 | 1.4398393E 01 | | |

| | | | | | | | | | |
|-------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|--|--|
| C101F2(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 6.5091203E 00 | 3.7656297E-03 | -1.6076160E-06 | 3.0615788E-10 | -2.1580198E-14 | -7.8145662E 04 | -7.8705310E 00 | | |
| 300. 1000. | 1.4318693E 00 | 1.9221617E-02 | -1.9197032E-05 | 9.0148940E-09 | -1.5196377E-12 | -7.6810839E 04 | 1.8012198E 01 | | |
| C101F1C1(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 7.1322265E 00 | 3.0947576E-03 | -1.3206792E-06 | 2.5131857E-10 | -1.7698570E-14 | -5.3821797E 04 | -8.9578875E 00 | | |
| 300. 1000. | 1.9395674E 00 | 2.1032168E-02 | -2.5821236E-05 | 1.5923102E-08 | -3.9336786E-12 | -5.2565742E 04 | 1.6979664E 01 | | |
| C101S1(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 5.2068373E 00 | 2.4717661E-03 | -1.0011287E-06 | 1.8787369E-10 | -1.3103525E-14 | -1.8327771E 04 | -2.9133806E 00 | | |
| 300. 1000. | 2.0885523E 00 | 1.4613989E-02 | -2.0465884E-05 | 1.5062439E-08 | -4.4468532E-12 | -1.7624238E 04 | 1.2367372E 01 | | |
| C1P1(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 4.4762312E 00 | -9.8515403E-04 | 1.0831803E-06 | -2.8508109E-10 | 2.3184956E-14 | 4.2086024E 04 | 3.9308498E-01 | | |
| 300. 1000. | 3.2595751E 00 | 9.8920403E-05 | 4.6023020E-06 | -6.0170738E-09 | 2.3286386E-12 | 4.2519509E 04 | 7.0118032E 00 | | |
| C1S1(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 3.6766152E 00 | 9.2679896E-04 | -3.8873364E-07 | 7.4392024E-11 | -5.2475514E-15 | 2.6292309E 04 | 3.9156151E 00 | | |
| 300. 1000. | 3.3981992E 00 | -5.8923594E-04 | 5.9449817E-06 | -7.0858714E-09 | 2.6157526E-12 | 2.6483370E 04 | 5.9195268E 00 | | |
| C1S2(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 5.9491526E 00 | 1.7245610E-03 | -7.2111106E-07 | 1.3744760E-10 | -9.6838965E-15 | 1.2053749E 04 | -6.2051076E 00 | | |
| 300. 1000. | 2.9174620E 00 | 1.2498700E-02 | -1.6109132E-05 | 1.0567832E-08 | -2.7944978E-12 | 1.2777076E 04 | 8.8763481E 00 | | |
| CL1(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 2.9657881E 00 | -4.3004990E-04 | 1.6643053E-07 | -2.9717571E-11 | 2.0047255E-15 | 1.3670965E 04 | 3.0001737E 00 | | |
| 300. 1000. | 1.9842061E 00 | 3.6198919E-03 | -6.0840653E-06 | 4.2326431E-09 | -1.0782205E-12 | 1.3861529E 04 | 7.7052771E 00 | | |
| CL2(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 4.3120535E 00 | 2.7351354E-04 | -9.2259884E-08 | 1.7749065E-11 | -1.2566223E-15 | -1.3447369E 03 | 2.0545109E 00 | | |
| 300. 1000. | 2.9388173E 00 | 6.2636200E-03 | -1.0320071E-05 | 7.9903872E-09 | -2.3629547E-12 | -1.0781035E 03 | 8.5971680E 00 | | |
| CL1C1N1(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 5.3758627E 00 | 2.1534362E-03 | -8.8346049E-07 | 1.6377827E-10 | -1.1325954E-14 | 1.4128968E 04 | -3.0896394E 00 | | |
| 300. 1000. | 2.9784910E 00 | 1.2798814E-02 | -2.0140175E-05 | 1.6317202E-08 | -5.1560426E-12 | 1.4613143E 04 | 8.3555009E 00 | | |
| CL1F1(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 4.1467179E 00 | 4.5093129E-04 | -1.7399058E-07 | 3.3700158E-11 | -2.4041155E-15 | -8.0963179E 03 | 2.2741272E 00 | | |
| 300. 1000. | 2.7109502E 00 | 5.7431642E-03 | -7.7018793E-06 | 4.8788760E-09 | -1.1761569E-12 | -7.7739140E 03 | 9.3421503E 00 | | |
| CL1F3(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 8.9129541E 00 | 1.2550383E-03 | -5.6216105E-07 | 1.1099172E-10 | -8.0475754E-15 | -2.2448643E 04 | -1.7873577E 01 | | |
| 300. 1000. | 1.9837740E 00 | 3.1211177E-02 | -5.1355206E-05 | 3.9531326E-08 | -1.1662299E-11 | -2.1090751E 04 | 1.5205337E 01 | | |
| CL1C1(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 4.0801625E 00 | 5.2934256E-04 | -2.0312189E-07 | 3.9034156E-11 | -2.7646554E-15 | 1.0863818E 04 | 3.6656737E 00 | | |
| 300. 1000. | 2.7287737E 00 | 5.1002967E-03 | -6.0303089E-06 | 3.2978907E-09 | -6.5399980E-13 | 1.1187659E 04 | 1.0419900E 01 | | |
| CL102(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 5.6845585E 00 | 1.5554443E-03 | -6.4426875E-07 | 1.2495456E-10 | -8.9321992E-15 | 1.0617978E 04 | -2.4192053E 00 | | |
| 300. 1000. | 2.7120020E 00 | 1.0556362E-02 | -1.0311884E-05 | 4.1101144E-09 | -3.5483798E-13 | 1.1385505E 04 | 1.2705468E 01 | | |
| CL201(G) | 300.00 | 5000.00 | | | | | | | |
| 1000. 5000. | 6.1295246E 00 | 9.8370521E-04 | -4.3316926E-07 | 8.4340974E-11 | -6.0450358E-15 | 7.0759267E 03 | -3.5699167E 00 | | |
| 300. 1000. | 2.8367006E 00 | 1.3274620E-02 | -1.8343989E-05 | 1.2066459E-08 | -3.0754364E-12 | 7.8119147E 03 | 1.2613908E 01 | | |

TABLE V. - Continued. TEMPERATURE COEFFICIENTS FOR THERMODYNAMIC FUNCTIONS

| Substance | Temperature interval of tabulated data, °K | | | | | | |
|---------------------------------|--------------------------------------------|-----------------|----------------|----------------|----------------|----------------|----------------|
| First temperature interval, °K | a ₁ | a ₂ | a ₃ | a ₄ | a ₅ | a ₆ | a ₇ |
| Second temperature interval, °K | | | | | | | |
| F1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 2.6959312E 00 | -2.1447184E-04 | 9.2868868E-08 | -1.7910205E-11 | 1.2762900E-15 | 8.7171463E 03 | 3.8314370E 00 |
| 300. 1000. | 2.7898969E 00 | 1.4936162E-04 | -1.6455151E-06 | 2.0348707E-09 | -7.7092015E-13 | 8.6619693E 03 | 3.1964920E 00 |
| F2(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 4.0240982E 00 | 6.3222651E-04 | -2.3649289E-07 | 4.6128262E-11 | -3.3134068E-15 | -1.3068762E 03 | 1.0818022E 00 |
| 300. 1000. | 2.7945929E 00 | 4.3680840E-03 | -4.1385481E-06 | 1.4449032E-09 | -5.9853059E-15 | -9.9364058E 02 | 7.3247036E 00 |
| H1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 2.5000000E 00 | -0. | -0. | -0. | -0. | 2.5470497E 04 | -4.6001096E-01 |
| 300. 1000. | 2.5000000E 00 | -0. | -0. | -0. | -0. | 2.5470497E 04 | -4.6001096E-01 |
| H2(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 3.0436897E 00 | 6.1187110E-04 | -7.3993551E-09 | -2.0331907E-11 | 2.4593791E-15 | -8.5491002E 02 | -1.6481339E 00 |
| 300. 1000. | 2.8460849E 00 | 4.1932116E-03 | -9.6119332E-06 | 9.5122662E-09 | -3.3093421E-12 | -9.6725372E 02 | -1.4117850E 00 |
| H18102(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 4.6750708E 00 | 4.8997343E-03 | -1.8885174E-06 | 3.3572758E-10 | -2.2542063E-14 | -7.0093944E 04 | 3.4501874E-01 |
| 300. 1000. | 2.8104845E 00 | 8.3318495E-03 | -1.5559113E-06 | -3.4769974E-09 | 1.8900492E-12 | -6.9485621E 04 | 1.0419467E 01 |
| H38103(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 8.3026662E 00 | 1.0010852E-02 | -3.8983557E-06 | 6.9769799E-10 | -4.7068517E-14 | -1.2333024E 05 | -1.7933229E 01 |
| 300. 1000. | 1.1485070E 00 | 3.2252374E-02 | -2.8816685E-05 | 1.1716992E-08 | -1.2357961E-12 | -1.2150821E 05 | 1.8324914E 01 |
| H38306(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 2.0000767E 01 | 1.3342715E-02 | -5.2837418E-06 | 9.5898505E-10 | -6.5437443E-14 | -2.8058727E 05 | -7.8870089E 01 |
| 300. 1000. | -4.7344757E 00 | 1.0471222E-01 | -1.3604820E-04 | 8.6187482E-08 | -2.1163747E-11 | -2.7503609E 05 | 4.2872714E 01 |
| H1C1N1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 3.6538032E 00 | 3.4436455E-03 | -1.2585128E-06 | 2.1691615E-10 | -1.4296311E-14 | 1.4421804E 04 | 2.3726015E 00 |
| 300. 1000. | 2.1681150E 00 | 1.0728954E-02 | -1.5088089E-05 | 1.1933018E-08 | -3.7004453E-12 | 1.4682900E 04 | 9.2810199E 00 |
| H1C1O1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 3.2708241E 00 | 3.5195799E-03 | -1.3772859E-06 | 2.4731356E-10 | -1.6727435E-14 | -2.7820147E 03 | 7.3044232E 00 |
| 300. 1000. | 3.8647056E 00 | -5.3708648E-04 | 6.9034500E-06 | -6.6450605E-09 | 2.0576966E-12 | -2.7995993E 03 | 4.8971867E 00 |
| H1C1I1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 2.7356497E 00 | 5.134979644E-03 | -5.0699071E-07 | 8.2790246E-11 | -5.1747522E-15 | -1.1906174E 04 | 6.6280129E 00 |
| 300. 1000. | 3.5127954E 00 | 1.0648349E-04 | -1.0344968E-06 | 2.2632198E-09 | -1.0437634E-12 | -1.2149134E 04 | 2.4477521E 00 |
| H1F1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 3.0027529E 00 | 6.9264447E-04 | -5.3422875E-08 | -1.4891104E-11 | 2.3158465E-15 | -3.3452607E 04 | 3.7531290E 00 |
| 300. 1000. | 3.4714781E 00 | 2.8482667E-04 | -8.6756213E-07 | 1.0442415E-09 | -3.0358504E-13 | -3.3649646E 04 | 1.0536081E 00 |

| | | | | | | | | | | | | | |
|-----------|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--|--|--|--|--|
| H2C1(G) | | 300.00 | 000.00 | | | | | | | | | | |
| 1000. | 5000. | 2.6707532E 00 | 3.0317115E-03 | -8.5351570E-07 | 1.1790853E-10 | -6.1973568E-15 | -2.9888994E 04 | 6.8838391E 00 | | | | | |
| 300. | 1000. | 4.1565016E 00 | 1.7244334E-03 | 5.6982316E-06 | -4.5930044E-09 | 1.4233654E-12 | -3.0288770E 04 | -6.8616246E-01 | | | | | |
| H1S1(G) | | 300.00 | 0.00 | | | | | | | | | | |
| 1000. | 5000. | 2.9882040E 00 | 1.585811E-03 | -4.7105835E-07 | 7.9044628E-11 | -5.0575843E-15 | 1.7386935E 04 | 6.3482781E 00 | | | | | |
| 300. | 1000. | 4.2586855E 00 | -1.2783317E-03 | -8.3785906E-07 | 3.8324212E-09 | -2.0252030E-12 | 1.7022862E 04 | -3.5367303E-01 | | | | | |
| H2S1(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 2.7657149E 00 | 4.0131914E-03 | -1.5044898E-06 | 2.6807998E-10 | -1.7967681E-14 | -3.3859808E 03 | 7.9327186E 00 | | | | | |
| 300. | 1000. | 3.9163074E 00 | -3.5138671E-04 | 4.2191312E-06 | -2.7453665E-09 | 4.8584365E-13 | -3.6095585E 03 | 2.3660042E 00 | | | | | |
| HE1(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 2.5000000E 00 | -0. | -0. | -0. | -0. | -7.4537500E 02 | 9.1545583E-01 | | | | | |
| 300. | 1000. | 2.5000000E 00 | -0. | -0. | -0. | -0. | -7.4537500E 02 | 9.1545583E-01 | | | | | |
| LI1(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 2.4186482E 00 | 2.0671278E-04 | -1.7839798E-07 | 5.7531326E-11 | -4.4937075E-15 | 1.8614297E 04 | 2.8603804E 00 | | | | | |
| 300. | 1000. | 2.5130726E 00 | -9.5912070E-05 | 2.4587596E-07 | -2.6299537E-10 | 9.9959610E-14 | 1.8589002E 04 | 2.3793367E 00 | | | | | |
| LI1(L) | | 453.70 | 2500.00 | | | | | | | | | | |
| 1000. | 5000. | 3.5284764E 00 | -6.0384650E-05 | -0. | -0. | -0. | -7.1424976E 02 | -1.5884776E 01 | | | | | |
| 300. | 1000. | 3.9804012E 00 | 4.1579974E-04 | -4.9799002E-06 | 6.7559643E-09 | -2.7041750E-12 | -8.9245645E 02 | -1.8568740E 01 | | | | | |
| LI1(C) | | 300.00 | 453.70 | | | | | | | | | | |
| 1000. | 5000. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | | | |
| 300. | 1000. | -2.0720175E 00 | 4.1908892E-02 | -1.3202140E-04 | 1.9183852E-07 | -9.9351875E-11 | -4.1253148E 02 | 7.1720114E 00 | | | | | |
| LI2(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 4.4223629E 00 | 2.5427722E-04 | -3.8941545E-08 | 7.5349503E-12 | -5.3554000E-16 | 2.4029544E 04 | -1.6492218E 00 | | | | | |
| 300. | 1000. | 3.6230605E 00 | 3.9654308E-03 | -6.7075894E-06 | 5.4166135E-09 | -1.6528183E-12 | 2.4174339E 04 | 2.1053784E 00 | | | | | |
| LI1CL1(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 4.2543279E 00 | 3.5438117E-04 | -1.2235100E-07 | 2.3738075E-11 | -1.6943940E-15 | -2.5393103E 04 | 1.1135900E 00 | | | | | |
| 300. | 1000. | 2.7628126E 00 | 6.6661283E-03 | -1.0635345E-05 | 8.0724281E-09 | -2.3576236E-12 | -2.5094117E 04 | 8.2674479E 00 | | | | | |
| LI1CL1(L) | | 883.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 7.5480813E 00 | -0. | -0. | -0. | -0. | -4.9548926E 04 | -3.4304961E 01 | | | | | |
| 300. | 1000. | 7.5480813E 00 | -0. | -0. | -0. | -0. | -4.9548926E 04 | -3.4304961E 01 | | | | | |
| LI1CL1(C) | | 300.00 | 883.00 | | | | | | | | | | |
| 1000. | 5000. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | | | |
| 300. | 1000. | 4.1293749E 00 | 8.2039067E-03 | -1.2176473E-05 | 1.1904299E-08 | -4.3417178E-12 | -5.0672438E 04 | -1.8396714E 01 | | | | | |
| LI2CL2(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 9.5027437E 00 | 5.6917429E-04 | -2.5146305E-07 | 4.8899217E-11 | -3.4930086E-15 | -7.5860679E 04 | -1.9927422E 01 | | | | | |
| 300. | 1000. | 4.5302625E 00 | 2.3683796E-02 | -4.1905119E-05 | 3.3973792E-08 | -1.0416876E-11 | -7.4959504E 04 | 3.4285122E 00 | | | | | |
| LI1F1(G) | | 300.00 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 4.0450236E 00 | 5.7229782E-04 | -2.1664833E-07 | 4.1347110E-11 | -2.9105736E-15 | -4.1467681E 04 | 6.5141279E-01 | | | | | |
| 300. | 1000. | 2.7679245E 00 | 4.5900019E-03 | -4.7792480E-06 | 2.1200546E-09 | -2.5962349E-13 | -4.1146902E 04 | 7.1081727E 00 | | | | | |
| LI1F1(L) | | 1121.30 | 5000.00 | | | | | | | | | | |
| 1000. | 5000. | 7.8047160E 00 | -0. | -0. | -0. | -0. | -7.3824911E 04 | -3.9424132E 01 | | | | | |
| 300. | 1000. | -0. | -0. | -0. | -0. | -0. | -0. | -0. | | | | | |

TABLE V. - Continued. TEMPERATURE COEFFICIENTS FOR THERMODYNAMIC FUNCTIONS

| Substance | Temperature interval of tabulated data, °K | | | | | | |
|-------------|-----------------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | a_1 | a_2 | a_3 | a_4 | a_5 | a_6 | a_7 |
| L11F1(C) | 300.00 | 1121.30 | | | | | |
| 1000. 5000. | -3.1395574E 00 | 2.1989822E-02 | -1.3326050E-05 | -1.3659478E-09 | 3.0068768E-12 | -7.2896678E 04 | 1.7699711E 01 |
| 300. 1000. | 1.3242741E 00 | 2.0185500E-02 | -3.2792970E-05 | 2.5369342E-08 | -6.9210086E-12 | -7.4667621E 04 | -8.0273533E 00 |
| L12F2(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 9.2076713E 00 | 9.0756503E-04 | -4.0226463E-07 | 7.8550836E-11 | -5.6355238E-15 | -1.1414612E 05 | -2.1616613E 01 |
| 300. 1000. | 2.7137739E 00 | 3.0033169E-02 | -5.1280303E-05 | 4.0443889E-08 | -1.2124649E-11 | -1.1292321E 05 | 9.1296935E 00 |
| L13F3(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 1.2888686E 01 | 3.5230060E-03 | -1.5545971E-06 | 3.0329660E-10 | -2.1777982E-14 | -1.7832249E 05 | -4.0009658E 01 |
| 300. 1000. | 1.5326555E 00 | 4.5414791E-02 | -6.1760529E-05 | 3.9967174E-08 | -1.0015482E-11 | -1.7576094E 05 | 1.5923332E 01 |
| L11H1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 3.5679055E 00 | 1.1148891E-03 | -4.3044857E-07 | 8.1947232E-11 | -5.7721421E-15 | 1.5729171E 04 | -2.7663389E-01 |
| 300. 1000. | 3.5402114E 00 | -1.5148568E-03 | 7.6971804E-06 | -8.3240097E-09 | 2.9299974E-12 | 1.5876864E 04 | 5.4864496E-01 |
| L11C1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 3.9159309E 00 | 7.0120414E-04 | -2.7707159E-07 | 5.2945546E-11 | -3.7339448E-15 | 5.7546803E 03 | 2.0970903E 00 |
| 300. 1000. | 2.9743168E 00 | 2.6180807E-03 | -3.6500352E-07 | -1.8944877E-09 | 1.0563693E-12 | 6.0420044E 03 | 7.1127383E 00 |
| L12C1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 5.5208548E 00 | 1.6454723E-03 | -7.1562096E-07 | 1.3793244E-10 | -9.8034855E-15 | -1.9830528E 04 | -4.2914982E 00 |
| 300. 1000. | 2.3313988E 00 | 1.0745175E-02 | -9.3120489E-06 | 2.4978836E-09 | 3.1642729E-13 | -1.8980680E 04 | 1.2070786E 01 |
| L12C1(L) | 1700.00 | 5000.00 | | | | | |
| 1000. 5000. | 1.0818916E 01 | -0. | -0. | -0. | -0. | -6.8510057E 04 | -5.5243520E 01 |
| 300. 1000. | -0. | -0. | -0. | -0. | -0. | -0. | -0. |
| L12C1(C) | 300.00 | 1700.00 | | | | | |
| 1000. 5000. | 5.0716245E 00 | 8.8082200E-03 | -5.4272404E-06 | 2.3325164E-09 | -3.7832933E-13 | -7.3561133E 04 | -2.6880981E 01 |
| 300. 1000. | -1.2982745E 00 | 4.3138418E-02 | -7.3089629E-05 | 6.0476338E-08 | -1.8820072E-11 | -7.2649812E 04 | 1.8508762E 00 |
| L11C1H1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 4.1299474E 00 | 2.3293982E-03 | -8.1280131E-07 | 1.3368891E-10 | -8.4443508E-15 | -3.0199600E 04 | 2.0673063E 00 |
| 300. 1000. | 3.0810010E 00 | 4.2006429E-03 | 5.0029624E-07 | -4.0845978E-09 | 2.0744473E-12 | -2.9885982E 04 | 7.6707506E 00 |
| L11C1H1(L) | 744.30 | 5000.00 | | | | | |
| 1000. 5000. | 1.0436480E 01 | -0. | -0. | -0. | -0. | -6.0418929E 04 | -5.3645379E 01 |
| 300. 1000. | 1.0436480E 01 | -0. | -0. | -0. | -0. | -6.0418929E 04 | -5.3645379E 01 |
| L11C1H1(C) | 300.00 | 744.30 | | | | | |
| 1000. 5000. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 300. 1000. | -1.8866820E 00 | 4.6623059E-02 | -9.2573321E-05 | 9.2598799E-08 | -3.5188964E-11 | -5.9455448E 04 | 5.3669263E 00 |

| | | | | | | | | | | | |
|-------------|-------|---------------|----------------|----------------|----------------|----------------|-----------------|----------------|--|--|--|
| LI2C2+2(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 9.3671224E 00 | 5.6738668E-C3 | -2.0732870E-06 | 3.5446933E-10 | -2.3117794E-14 | -9.2728269E 04 | -2.3256818E 01 | | | |
| 300. | 1000. | 9.9967430F-C1 | 3.7433501E-C2 | -4.8454394E-05 | 3.1000617E-08 | -7.6803471E-12 | -9.0910360E 04 | 1.7673306E 01 | | | |
| MG1(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 2.4043590E 00 | 1.9005770E-C4 | -1.1793682E-07 | 2.3792231E-11 | -3.3893521E-16 | 1.7202796E 04 | 4.1436162E 00 | | | |
| 300. | 1000. | 2.4896392E 00 | 7.78111114E-05 | -2.0215519E-07 | 2.1803364E-10 | -8.3395625E-14 | 1.7169763E 04 | 3.6648936E 00 | | | |
| MG1(L) | | 923.00 | 2500.00 | | | | | | | | |
| 1000. | 5000. | 4.0256433E 00 | -0. | -0. | -0. | -0. | -4.8613583E 02 | -1.8608633E 01 | | | |
| 300. | 1000. | 4.0256433E 00 | -0. | -0. | -0. | -0. | -4.8613583E 02 | -1.8608633E 01 | | | |
| MG1(C) | | 300.00 | 923.00 | | | | | | | | |
| 1000. | 5000. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |
| 300. | 1000. | 2.0686157E 00 | 5.2235864E-C3 | -1.0158455E-05 | 1.1092926E-08 | -4.1245988E-12 | -7.7914337E 02 | -9.0668067E 00 | | | |
| MG1CL1(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 4.3693863E 00 | 2.0291060E-C4 | -6.1061697E-08 | 1.0431818E-11 | -5.2222300E-16 | -5.8761307E 02 | 3.0160849E 00 | | | |
| 300. | 1000. | 3.2096883E 00 | 5.4943849E-C3 | -9.4731671E-06 | 7.6160759E-09 | -2.3258383E-12 | -3.7263176E 02 | 8.4876869E 00 | | | |
| MG1CL2(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 7.1103608E 00 | 4.5064700E-C4 | -2.0163150E-07 | 3.9715346E-11 | -2.8715039E-15 | -5.2961129E 04 | -9.9360510E 00 | | | |
| 300. | 1000. | 3.8275892E 00 | 1.5386366E-C2 | -2.6656943E-05 | 2.1304965E-08 | -6.4661607E-12 | -5.2351835E 04 | 5.5571101E 00 | | | |
| MG1F1(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 4.2062912E 00 | 3.7247087E-C4 | -1.3734467E-07 | 2.4894861E-11 | -1.5516431E-15 | -1.1519246E 04 | 2.3507615E 00 | | | |
| 300. | 1000. | 2.7293920E 00 | 6.1504978E-C3 | -8.9508238E-06 | 6.1671103E-09 | -1.6313164E-12 | -1.1203035E 04 | 9.5422596E 00 | | | |
| MG1F2(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 6.6280724F 00 | 9.8972087E-C4 | -4.3613185E-07 | 8.4836800E-11 | -6.0705504E-15 | -9.1837662E 04 | -1.0607086E 01 | | | |
| 300. | 1000. | 1.4228098E 00 | 2.2815310F-C2 | -3.6302199E-05 | 2.7070620E-08 | -7.7461175E-12 | -9.0788276E 04 | 1.4396788E 01 | | | |
| MG1F2(L) | | 1536.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 1.1404648E 01 | -0. | -0. | -0. | -0. | -1.31444003E 05 | -5.7163736E 01 | | | |
| 300. | 1000. | -0. | -0. | -0. | -0. | -0. | -0. | -0. | | | |
| MG1F2(C) | | 300.00 | 1536.00 | | | | | | | | |
| 1000. | 5000. | 5.8667424E 00 | 7.7455716E-C3 | -5.9423375E-06 | 2.3122872E-09 | -3.0562419E-13 | -1.3457422E 05 | -2.8335949E 01 | | | |
| 300. | 1000. | 1.4042837E 00 | 3.5577578E-C2 | -6.5336640E-05 | 5.5875825E-08 | -1.7844417E-11 | -1.3411279E 05 | -9.1150490E 00 | | | |
| MG1F1CL1(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 6.9029469E 00 | 6.7837384E-C4 | -2.9851752E-07 | 5.7930295E-11 | -4.1341373E-15 | -7.2409112E 04 | -9.8966951E 00 | | | |
| 300. | 1000. | 2.3765399E 00 | 2.0661519E-C2 | -3.4758738E-05 | 2.7125349E-08 | -8.0680747E-12 | -7.1541604E 04 | 1.1611092E 01 | | | |
| MG1H1(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 3.4475375E 00 | 1.2743598E-C3 | -5.2129363E-07 | 1.0305964E-10 | -7.1466261E-15 | 1.9336871E 04 | 3.0733103E 00 | | | |
| 300. | 1000. | 3.6495548E 00 | -2.2267861E-C3 | 8.8829679E-06 | -9.1547737E-09 | 3.1455552E-12 | 1.9434591E 04 | 2.7746090E 00 | | | |
| MG1C1(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 1.5816811E 00 | 5.3868595E-C3 | -2.5748059E-06 | 5.0321327E-10 | -3.5184406E-14 | 1.6518298E 03 | 1.5648695E 01 | | | |
| 300. | 1000. | 2.5386522E 00 | 7.3272379E-C3 | -1.2835994E-05 | 1.1513465E-08 | -3.6815996E-12 | 1.1217851E 03 | 9.4699082E 00 | | | |
| MG1C1(C) | | 300.00 | 3000.00 | | | | | | | | |
| 1000. | 5000. | 2.7123117E 01 | -4.5010900E-C2 | 3.2479526E-05 | -9.7202840E-09 | 1.0532670E-12 | -8.1716796E 04 | -1.4583140E 02 | | | |
| 300. | 1000. | 1.5475902E 00 | 1.6511386E-C2 | -2.7548849E-05 | 2.2095515E-08 | -6.6809206E-12 | -7.3300067E 04 | -9.3417419E 00 | | | |

TABLE V. - Continued. TEMPERATURE COEFFICIENTS FOR THERMODYNAMIC FUNCTIONS

| Substance | Temperature interval of tabulated data, °K | | | | | | | |
|---------------------------------|--------------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|-------|
| | First temperature interval, °K | a_1 | a_2 | a_3 | a_4 | a_5 | a_6 | a_7 |
| Second temperature interval, °K | | | | | | | | |
| MGIC1F1(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 4.5759437E 00 | 1.8490882E-03 | -6.0850884E-07 | 9.4941726E-11 | -5.7237369E-15 | -7.6561618E 03 | 2.3118177E 00 | |
| 300. 1000. | 2.5035181E 00 | 1.0218725E-02 | -1.3051919E-05 | 8.0713687E-09 | -1.8359527E-12 | -7.2488124E 03 | 1.2278443E 01 | |
| MC1S1(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 4.3279184E 00 | 2.6026952E-04 | -9.0679711E-08 | 1.8047441E-11 | -1.3178392E-15 | 1.5905315E 04 | 2.2859202E 00 | |
| 300. 1000. | 3.0485904E 00 | 5.9094476E-03 | -9.8047438E-06 | 7.6104985E-09 | -2.2495559E-12 | 1.6149610E 04 | 8.3623005E 00 | |
| N1(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 2.4422261E 00 | 1.2276187E-04 | -8.4992719E-08 | 2.1400830E-11 | -1.2511058E-15 | 5.6148821E 04 | 4.4925708E 00 | |
| 300. 1000. | 2.5147937E 00 | -1.1243791E-04 | 2.9647506E-07 | -3.2464049E-10 | 1.2595465E-13 | 5.6127767E 04 | 4.1193032E 00 | |
| N2(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 2.8545761E 00 | 1.5976316E-03 | -6.2566254E-07 | 1.1315849E-10 | -7.6897070E-15 | -8.9017445E 02 | 6.3902879E 00 | |
| 300. 1000. | 3.6916148E 00 | -1.3332552E-03 | 2.6503100E-06 | -9.7688341E-10 | -9.9772234E-14 | -1.0628336E 03 | 2.2874980E 00 | |
| N1F1(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 3.9617527E 00 | 6.6673228E-04 | -2.6302304E-07 | 5.0938003E-11 | -3.6361340E-15 | 3.1890599E 04 | 2.7589592E 00 | |
| 300. 1000. | 2.8312862E 00 | 3.8325543E-03 | -3.1590759E-06 | 7.7572379E-10 | 1.3227553E-13 | 3.2195127E 04 | 8.5745765E 00 | |
| N1F2(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 5.7002123E 00 | 1.4543718E-03 | -6.3545299E-07 | 1.2294505E-10 | -8.7656577E-15 | 2.5519082E 03 | -3.3475432E 00 | |
| 300. 1000. | 2.2413802E 00 | 1.7604969E-02 | -1.3947211E-05 | 6.8871256E-09 | -1.1529538E-12 | 3.4104868E 03 | 1.4081824E 01 | |
| N1F3(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 7.9441813E 00 | 2.3094832E-03 | -1.0110005E-06 | 1.9577462E-10 | -1.3962918E-14 | -1.7792092E 04 | -1.5481892E 01 | |
| 300. 1000. | 4.8049905E-01 | 2.9816530E-02 | -4.0633512E-05 | 2.6467749E-08 | -6.7067937E-12 | -1.6103857E 04 | 2.1295488E 01 | |
| N2F2(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 7.3338740E 00 | 2.9250710E-03 | -1.2628060E-06 | 2.4239800E-10 | -1.7186564E-14 | 7.1257440E 03 | -1.1795642E 01 | |
| 300. 1000. | 2.3938213E 00 | 1.8865115E-02 | -2.1068271E-05 | 1.1480892E-08 | -2.4502086E-12 | 8.3745769E 03 | 1.3153811E 01 | |
| N1H1(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 2.7273936E 00 | 1.4195974E-03 | -4.5828662E-07 | 7.5551953E-11 | -4.6169041E-15 | 3.8927885E 04 | 6.0442761E 00 | |
| 300. 1000. | 3.4545182E 00 | 5.2804574E-04 | -1.9725738E-06 | 2.9579088E-09 | -1.2082601E-12 | 3.8671438E 04 | 2.0102977E 00 | |
| N1H3(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 2.1493986E 00 | 6.4928521E-03 | -2.2695193E-06 | 3.7393857E-10 | -2.3605554E-14 | -6.4019616E 03 | 9.2389071E 00 | |
| 300. 1000. | 3.7716198E 00 | -4.8621368E-04 | 9.8742257E-06 | -9.5678898E-09 | 3.1313236E-12 | -6.7280933E 03 | 1.4654049E 00 | |
| N1C1(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 3.1529360E 00 | 1.4059955E-03 | -5.7078462E-07 | 1.0628209E-10 | -7.3720783E-15 | 9.8522048E 03 | 6.9446465E 00 | |
| 300. 1000. | 4.1469476E 00 | -4.1197237E-03 | 9.6922467E-06 | -7.8633639E-09 | 2.2309512E-12 | 9.7447894E 03 | 2.5694290E 00 | |

| | | | | | | | | | | | |
|-----------|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--|--|--|
| N1C2(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 4.6135219E 00 | 2.6386639E-03 | -1.0948541E-06 | 2.0818425E-10 | -1.4654391E-14 | 2.3403782E 03 | 1.3676372E 00 | | | |
| 300. | 1000. | 3.4344563E 00 | 2.2234297E-03 | 6.7148975E-06 | -9.7427719E-09 | 3.7212523E-12 | 2.8647685E 03 | 8.4084647E 00 | | | |
| N2Q1(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 4.6265479E 00 | 3.0216807E-03 | -1.2156014E-06 | 2.2855952E-10 | -1.5849701E-14 | 8.1356645E 03 | -1.1463655E 00 | | | |
| 300. | 1000. | 2.3821171E 00 | 1.0350556E-02 | -1.1167634E-05 | 6.9583165E-09 | -1.8780192E-12 | 8.7229964E 03 | 1.0227044E 01 | | | |
| N2C4(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 1.0427700E 01 | 6.0360197E-03 | -2.5834339E-06 | 4.9280602E-10 | -3.4775803E-14 | -2.7412705E 03 | -2.5824178E 01 | | | |
| 300. | 1000. | 3.1652553E 00 | 2.7191496E-02 | -2.5350636E-05 | 1.0992581E-08 | -1.6603821E-12 | -7.6731966E 02 | 1.1477609E 01 | | | |
| N1S1(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 3.8404466E 00 | 7.4574590E-04 | -3.0578184E-07 | 5.8053531E-11 | -4.0693848E-15 | 3.0785184E 04 | 4.4723207E 00 | | | |
| 300. | 1000. | 4.0622151E 00 | -2.8190179E-03 | 9.3158088E-06 | -9.5089130E-09 | 3.2843034E-12 | 3.0872668E 04 | 4.0612628E 00 | | | |
| NA1(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 2.4170021E 00 | 1.7967941E-04 | -1.2687355E-07 | 3.1369786E-11 | -1.2333492E-15 | 1.2162966E 04 | 4.6776707E 00 | | | |
| 300. | 1000. | 2.4905986E 00 | 6.7882638E-05 | -1.7628961E-07 | 1.9003832E-10 | -7.2645642E-14 | 1.2135995E 04 | 4.2682656E 00 | | | |
| NA1(L) | | 370.98 | 2500.00 | | | | | | | | |
| 1000. | 5000. | 2.2368925E 00 | 2.1812933E-03 | -1.1964327E-06 | 2.9309190E-10 | -2.6160561E-14 | -1.5568212E 02 | -5.7059283E 00 | | | |
| 300. | 1000. | 3.3348296E 00 | 5.2097527E-03 | -1.5572293E-05 | 1.5906473E-08 | -5.3900798E-12 | -8.0645725E 02 | -1.2994219E 01 | | | |
| NA1(C) | | 300.00 | 370.98 | | | | | | | | |
| 1000. | 5000. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | |
| 300. | 1000. | -1.5395770E 01 | 4.1264357E-02 | 2.9918608E-04 | -8.7938205E-07 | 3.9933674E-10 | 1.6620997E 03 | 7.5260683E 01 | | | |
| NA2(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 4.4862458E 00 | 2.1374698E-04 | -5.4087933E-09 | 8.9502819E-13 | -5.3328965E-17 | 1.5694318E 04 | 2.0374668E 00 | | | |
| 300. | 1000. | 4.2903398E 00 | 1.1244569E-03 | -1.6337002E-06 | 1.3072228E-09 | -3.9289382E-13 | 1.5729618E 04 | 2.9569409E 00 | | | |
| NA1CL1(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 4.4260228E 00 | 1.6777751E-04 | -3.0996042E-08 | 5.4328400E-12 | -3.4959106E-16 | -2.3241252E 04 | 2.2961729E 00 | | | |
| 300. | 1000. | 3.5818939E 00 | 4.0450981E-03 | -6.9457741E-06 | 5.5826335E-09 | -1.6959647E-12 | -2.3086035E 04 | 6.2721135E 00 | | | |
| NA2CL2(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 9.8080539E 00 | 2.2798217E-04 | -1.0426106E-07 | 2.0902814E-11 | -1.5331015E-15 | -7.1770914E 04 | -1.7095255E 01 | | | |
| 300. | 1000. | 7.6591907E 00 | 1.0498897E-02 | -1.9001406E-05 | 1.5645651E-08 | -4.8511906E-12 | -7.1394716E 04 | -7.0696132E 00 | | | |
| NA1F1(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 4.3320317E 00 | 2.6411754E-04 | -8.4645588E-08 | 1.6489458E-11 | -1.1809987E-15 | -3.6872016E 04 | 1.2154635E 00 | | | |
| 300. | 1000. | 3.0467419E 00 | 5.9100445E-03 | -9.7501857E-06 | 7.5417007E-09 | -2.2214902E-12 | -3.6625084E 04 | 7.3274472E 00 | | | |
| NA2F2(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 9.7092780E 00 | 3.3126807E-04 | -1.4540149E-07 | 2.8074367E-11 | -1.9914816E-15 | -1.0333330E 05 | -1.9580773E 01 | | | |
| 300. | 1000. | 6.4443763E 00 | 1.5783285E-02 | -2.8413355E-05 | 2.3336745E-08 | -7.2298273E-12 | -1.0275336E 05 | -4.3082723E 00 | | | |
| NA1H1(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 3.7957045E 00 | 8.9082140E-04 | -3.3472808E-07 | 6.4226210E-11 | -4.5502470E-15 | 1.3607882E 04 | 5.6523558E-01 | | | |
| 300. | 1000. | 3.1501344E 00 | 1.2050952E-03 | 2.6519336E-06 | -4.4145020E-09 | 1.8188135E-12 | 1.3855770E 04 | 4.2541407E 00 | | | |
| NA1C1(G) | | 300.00 | 5000.00 | | | | | | | | |
| 1000. | 5000. | 4.2398042E 00 | 3.5864951E-04 | -1.2843692E-07 | 2.4834200E-11 | -1.7675778E-15 | 5.3149839E 03 | 2.1065041E 00 | | | |
| 300. | 1000. | 2.7675754E 00 | 6.3739320E-03 | -9.7471759E-06 | 7.0671271E-09 | -1.9683760E-12 | 5.6185660E 03 | 9.2146077E 00 | | | |

TABLE V. - Continued. TEMPERATURE COEFFICIENTS FOR THERMODYNAMIC FUNCTIONS

| Substance | Temperature interval of tabulated data, °K | | | | | | |
|---------------------------------|--------------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| First temperature interval, °K | a_1 | a_2 | a_3 | a_4 | a_5 | a_6 | a_7 |
| Second temperature interval, °K | | | | | | | |
| NA10H1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 4.7843294E 00 | 1.6167787E-03 | -5.0747480E-07 | 7.5486578E-11 | -4.3429220E-15 | -2.9622465E 04 | 8.5953650E-01 |
| 300. 1000. | 3.1046053E 00 | 9.2793559E-03 | -1.3285201E-05 | 9.3398837E-09 | -2.4738677E-12 | -2.9336982E 04 | 8.7181932E 00 |
| NA2O2H2(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 1.0505065E 01 | 4.4261241E-03 | -1.5361864E-06 | 2.5175804E-10 | -1.5863686E-14 | -8.7490021E 04 | -2.4514853E 01 |
| 300. 1000. | 3.6596561E 00 | 3.2417922E-02 | -4.5186514E-05 | 3.0788616E-08 | -8.0487859E-12 | -8.6118033E 04 | 8.4341999E 00 |
| NE1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 2.5000000E 00 | -0. | -0. | -0. | -0. | -7.4537500E 02 | 3.3421506E 00 |
| 300. 1000. | 2.5000000E 00 | -0. | -0. | -0. | -0. | -7.4537500E 02 | 3.3421506E 00 |
| O1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 2.5372567E 00 | -1.8422190E-05 | -8.8017921E-09 | 5.9643621E-12 | -5.5743608E-16 | 2.9230007E 04 | 4.9467942E 00 |
| 300. 1000. | 3.0218894E 00 | -2.1737249E-03 | 3.7542203E-06 | -2.9947200E-09 | 9.0777547E-13 | 2.9137190E 04 | 2.6460076E 00 |
| O2(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 3.5976129E 00 | 7.8145603E-04 | -2.2386670E-07 | 4.2490159E-11 | -3.3460204E-15 | -1.1927918E 03 | 3.7492659E 00 |
| 300. 1000. | 3.7189946E 00 | -2.5167288E-03 | 8.5837353E-06 | -8.2998716E-09 | 2.7082180E-12 | -1.0576706E 03 | 3.9080704E 00 |
| O1H1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 2.8895544E 00 | 9.9835061E-04 | -2.1879904E-07 | 1.9802785E-11 | -3.8452940E-16 | 3.8811792E 03 | 5.5597016E 00 |
| 300. 1000. | 3.8234708E 00 | -1.1187229E-03 | 1.2466819E-06 | -2.1035896E-10 | -5.2546551E-14 | 3.5852787E 03 | 5.8253029E-01 |
| P1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 2.6258122E 00 | -1.6768917E-04 | 6.6485428E-09 | 4.1060775E-11 | -5.7533818E-15 | 3.7032312E 04 | 4.6539916E 00 |
| 300. 1000. | 2.5016955E 00 | -1.3327000E-05 | 3.6614834E-08 | -4.1852754E-11 | 1.6948331E-14 | 3.7085446E 04 | 5.3639764E 00 |
| P1(L) | 317.30 | 2500.00 | | | | | |
| 1000. 5000. | 3.1410082E 00 | -0. | -0. | -0. | -0. | -8.6206968E 02 | -1.2640002E 01 |
| 300. 1000. | 3.1410082E 00 | -0. | -0. | -0. | -0. | -8.6206968E 02 | -1.2640002E 01 |
| P1(C) | 300.00 | 317.30 | | | | | |
| 1000. 5000. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 300. 1000. | -3.7495680E-01 | 1.4195329E-02 | 6.2682657E-06 | -7.0971389E-08 | 4.1878967E-11 | -4.5410067E 02 | 3.1917264E 00 |
| P2(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 4.1440200E 00 | 4.2981666E-04 | -1.7589353E-07 | 3.3655387E-11 | -2.3331858E-15 | 1.5505858E 04 | 2.3200494E 00 |
| 300. 1000. | 2.6943141E 00 | 5.8599281E-03 | -8.0869497E-06 | 5.3041531E-09 | -1.3421810E-12 | 1.5827871E 04 | 9.4378082E 00 |
| P4(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 9.2031642E 00 | 9.1623123E-04 | -4.0762939E-07 | 7.9887887E-11 | -5.7511910E-15 | 4.0788743E 03 | -1.9530057E 01 |
| 300. 1000. | 2.5715787E 00 | 3.0975467E-02 | -5.3531558E-05 | 4.2748750E-08 | -1.2978341E-11 | 5.3161196E 03 | 1.1802231E 01 |

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|----------|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--|--|--|--|--|--|--|--|--|--|--|--|
| P1CL3(G) | | 300.00 | 5000.00 | | | | | | | | | | | | | | | | | |
| 1000. | 5000. | 9.443C151E 00 | 6.4477134E-04 | -2.8862788E-07 | 5.6866007E-11 | -4.1121315E-15 | -3.9025650E 04 | -1.6844987E 01 | | | | | | | | | | | | |
| 300. | 1000. | 4.668C09CE 00 | 2.2371831E-02 | -3.8739624E-05 | 3.0919916E-08 | -9.3682240E-12 | -3.8140116E 04 | 5.6913673E 00 | | | | | | | | | | | | |
| PIF3(G) | | 300.00 | 5000.00 | | | | | | | | | | | | | | | | | |
| 1000. | 5000. | 8.4249765E 00 | 1.7648911E-03 | -7.6941576E-07 | 1.4830457E-10 | -1.0528660E-14 | -1.1476953E 05 | -1.6469200E 01 | | | | | | | | | | | | |
| 300. | 1000. | 1.6557811E 00 | 2.7864932E-02 | -4.0281940E-05 | 2.7718709E-08 | -7.3992590E-12 | -1.1329437E 05 | 1.6604011E 01 | | | | | | | | | | | | |
| PIH1(G) | | 300.00 | 5000.00 | | | | | | | | | | | | | | | | | |
| 1000. | 5000. | 2.8456353E 00 | 1.6094930E-03 | -6.0535565E-07 | 1.0654182E-10 | -6.9452517E-15 | 2.4415992E 04 | 6.9932091E 00 | | | | | | | | | | | | |
| 300. | 1000. | 3.7084953E 00 | -1.4383028E-03 | 2.9345121E-06 | -1.2777200E-09 | 2.2384554E-14 | 2.4237273E 04 | 2.7647333E 00 | | | | | | | | | | | | |
| PIF3(G) | | 300.00 | 5000.00 | | | | | | | | | | | | | | | | | |
| 1000. | 5000. | 3.2334978E 00 | 6.7953927E-03 | -2.7728745E-06 | 5.1259668E-10 | -3.5402238E-14 | -5.4760672E 02 | 4.5450955E 00 | | | | | | | | | | | | |
| 300. | 1000. | 3.2409646E 00 | 1.9397981E-03 | 1.0328140E-05 | -1.1518390E-08 | 3.7427002E-12 | -2.4215422E 02 | 5.8644083E 00 | | | | | | | | | | | | |
| PIH1(G) | | 300.00 | 5000.00 | | | | | | | | | | | | | | | | | |
| 1000. | 5000. | 3.623C830E 00 | 9.8152442E-04 | -4.1235843E-07 | 7.8915622E-11 | -5.5722314E-15 | 1.0534506E 04 | 4.2810563E 00 | | | | | | | | | | | | |
| 300. | 1000. | 3.4684102E 00 | -1.0495913E-03 | 6.6748644E-06 | -7.5272009E-09 | 2.6991113E-12 | 1.0702922E 04 | 5.6962042E 00 | | | | | | | | | | | | |
| PICL1(G) | | 300.00 | 5000.00 | | | | | | | | | | | | | | | | | |
| 1000. | 5000. | 3.8203486E 00 | 7.6739756E-04 | -3.1783011E-07 | 6.0504577E-11 | -4.2392939E-15 | -4.3053504E 03 | 4.6638622E 00 | | | | | | | | | | | | |
| 300. | 1000. | 4.1121643E 00 | -3.1899852E-03 | 1.0134874E-05 | -1.0283121E-08 | 3.5522511E-12 | -4.2281009E 03 | 3.9378541E 00 | | | | | | | | | | | | |
| PIH1(G) | | 300.00 | 5000.00 | | | | | | | | | | | | | | | | | |
| 1000. | 5000. | 4.3651079E 00 | 1.8194182E-04 | -6.5387628E-08 | 1.2557388E-11 | -8.8878497E-16 | 4.1196033E 03 | 3.1712815E 00 | | | | | | | | | | | | |
| 300. | 1000. | 3.6525487E 00 | 3.1064765E-03 | -4.7901410E-06 | 3.5226572E-09 | -9.9821116E-13 | 4.2667524E 03 | 6.6106048E 00 | | | | | | | | | | | | |
| S1(G) | | 300.00 | 5000.00 | | | | | | | | | | | | | | | | | |
| 1000. | 5000. | 2.9145770E 00 | -5.6619390E-04 | 2.8497584E-07 | -5.1868520E-11 | 3.2709932E-15 | 3.2604940E 04 | 3.7640850E 00 | | | | | | | | | | | | |
| 300. | 1000. | 2.9137258E 00 | 3.1294061E-04 | -2.6092508E-06 | 3.1382439E-09 | -1.1708988E-12 | 3.2568272E 04 | 3.5681154E 00 | | | | | | | | | | | | |
| S1(L) | | 388.357 | 2500.00 | | | | | | | | | | | | | | | | | |
| 1000. | 5000. | 3.8716625E 00 | -0. | -0. | -0. | -0. | -8.4632533E 02 | -1.7492768E 01 | | | | | | | | | | | | |
| 300. | 1000. | -4.1562591E 01 | 2.8300951E-01 | -6.2124646E-04 | 5.7917986E-07 | -1.9550879E-10 | 4.4720883E 03 | 1.7978686E 02 | | | | | | | | | | | | |
| S1(C) | | 300.00 | 388.357 | | | | | | | | | | | | | | | | | |
| 1000. | 5000. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | | | | | | | | | | | | |
| 300. | 1000. | -3.7836657E 00 | -1.2642081E-01 | 1.0408762E-03 | -2.1584163E-06 | 1.1150175E-09 | 1.2900773E 03 | 3.3734180E 01 | | | | | | | | | | | | |
| S2(G) | | 300.00 | 5000.00 | | | | | | | | | | | | | | | | | |
| 1000. | 5000. | 4.1896932E 00 | 3.8469704E-04 | -1.5566633E-07 | 3.0368010E-11 | -2.1795849E-15 | 1.4188133E 04 | 3.2930300E 00 | | | | | | | | | | | | |
| 300. | 1000. | 2.6995349E 00 | 6.2749549E-03 | -9.2870775E-06 | 6.5393276E-09 | -1.7802282E-12 | 1.4504935E 04 | 1.0534222E 01 | | | | | | | | | | | | |
| S1CL1(G) | | 300.00 | 5000.00 | | | | | | | | | | | | | | | | | |
| 1000. | 5000. | 4.3295944E 00 | 2.8882918E-04 | -8.2451284E-08 | 1.5753388E-11 | -1.1078891E-15 | 1.4754934E 04 | 3.9490384E 00 | | | | | | | | | | | | |
| 300. | 1000. | 3.0083714E 00 | 6.1189659E-03 | -1.0140617E-05 | 7.9273653E-09 | -2.3630694E-12 | 1.5008700E 04 | 1.0230719E 01 | | | | | | | | | | | | |
| S1CL2(G) | | 300.00 | 5000.00 | | | | | | | | | | | | | | | | | |
| 1000. | 5000. | 6.6394959E 00 | 4.0871595E-04 | -1.7937080E-07 | 3.4719758E-11 | -2.4722546E-15 | -4.6829007E 03 | -4.3616910E 00 | | | | | | | | | | | | |
| 300. | 1000. | 3.7137667E 00 | 1.3423299E-02 | -2.2748116E-05 | 1.7826863E-08 | -5.3147269E-12 | -4.1271335E 03 | 9.5156676E 00 | | | | | | | | | | | | |
| S2CL2(G) | | 300.00 | 5000.00 | | | | | | | | | | | | | | | | | |
| 1000. | 5000. | 9.4975237E 00 | 5.8247583E-04 | -2.6107393E-07 | 5.1496647E-11 | -3.7276878E-15 | -5.3764057E 03 | -1.6107415E 01 | | | | | | | | | | | | |
| 300. | 1000. | 5.1172788E 00 | 2.0590267E-02 | -3.5788533E-05 | 2.8649146E-08 | -8.7014681E-12 | -4.5674348E 03 | 4.5480663E 00 | | | | | | | | | | | | |

TABLE V. - Continued. TEMPERATURE COEFFICIENTS FOR THERMODYNAMIC FUNCTIONS

| Substance | Temperature interval of tabulated data, °K | | | | | | |
|---------------------------------|--------------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| First temperature interval, °K | a ₁ | a ₂ | a ₃ | a ₄ | a ₅ | a ₆ | a ₇ |
| Second temperature interval, °K | | | | | | | |
| S1F1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 4.0896332E 00 | 5.1024618E-04 | -2.0132350E-07 | 3.8948793E-11 | -2.7758106E-15 | 2.3481203E 03 | 3.7139927E 00 |
| 300. 1000. | 2.6994499E 00 | 5.3980051E-03 | -6.8203240E-06 | 4.1048977E-09 | -9.4730036E-13 | 2.6731752E 03 | 1.0619594E 01 |
| S1F2(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 6.0851821E 00 | 1.0280998E-03 | -4.4922603E-07 | 8.6753557E-11 | -6.1691687E-15 | -2.8148979E 04 | -4.7625440E 00 |
| 300. 1000. | 1.8826741E 00 | 1.7473374E-02 | -2.5745472E-05 | 1.8034050E-08 | -4.8999888E-12 | -2.7245086E 04 | 1.5711223E 01 |
| S1F4(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 1.0858537E 01 | 2.4388583E-03 | -1.0795835E-06 | 2.1098535E-10 | -1.5163652E-14 | -8.9434278E 04 | -2.8382562E 01 |
| 300. 1000. | 1.9724238E-02 | 4.6534521E-02 | -7.1627428E-05 | 5.2161754E-08 | -1.4674945E-11 | -8.7183084E 04 | 2.4015583E 01 |
| S1F6(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 1.5245670E 01 | 4.2781334E-03 | -1.8957742E-06 | 3.7096750E-10 | -2.6696924E-14 | -1.5067551E 05 | -5.4851047E 01 |
| 300. 1000. | -3.3342495E 00 | 7.9620210E-02 | -1.2204395E-04 | 8.8573794E-08 | -2.4843513E-11 | -1.4680458E 05 | 3.5029756E 01 |
| S2F2(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 8.8929510E 00 | 1.2525046E-03 | -5.5002082E-07 | 1.0662411E-10 | -7.6047184E-15 | -3.0392761E 04 | -1.6748931E 01 |
| 300. 1000. | 2.4890794E 00 | 2.8077569E-02 | -4.4734178E-05 | 3.3534880E-08 | -9.6728998E-12 | -2.9097375E 04 | 1.4028032E 01 |
| S101(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 3.8116451E 00 | 7.8966107E-04 | -3.2986127E-07 | 6.3513293E-11 | -4.5139892E-15 | -5.9599488E 02 | 4.5442232E 00 |
| 300. 1000. | 3.1364326E 00 | 1.3080689E-03 | 2.1837364E-06 | -3.9518236E-09 | 1.6540306E-12 | -3.4572672E 02 | 8.3570292E 00 |
| S102(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 5.1982451E 00 | 2.0595095E-03 | -8.6254450E-07 | 1.6636523E-10 | -1.1847837E-14 | -3.7541457E 04 | -8.3059963E-01 |
| 300. 1000. | 3.2257132E 00 | 5.6551207E-03 | -2.4970208E-07 | -4.2206766E-09 | 2.1392733E-12 | -3.6904476E 04 | 9.8177036E 00 |
| S103(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 7.0246624E 00 | 3.2795509E-03 | -1.4202267E-06 | 2.7322076E-10 | -1.9404513E-14 | -5.0133303E 04 | -1.0922853E 01 |
| 300. 1000. | 2.2848661E 00 | 1.6691404E-02 | -1.4610560E-05 | 4.9787393E-09 | -2.0664641E-13 | -4.8841587E 04 | 1.3480117E 01 |
| S101CL1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 5.9428694E 00 | 1.1758460E-03 | -5.1258242E-07 | 9.9117589E-11 | -7.0688534E-15 | -1.4298216E 04 | -1.2432830E 00 |
| 300. 1000. | 3.4894447E 00 | 9.5158262E-03 | -1.1543801E-05 | 6.8182543E-09 | -1.5815428E-12 | -1.3702598E 04 | 1.1033909E 01 |
| S101CL2(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 8.8098024E 00 | 1.3249441E-03 | -5.7607141E-07 | 1.1093920E-10 | -7.8757446E-15 | -2.8228216E 04 | -1.3997456E 01 |
| 300. 1000. | 4.4039369E 00 | 1.8923960E-02 | -2.8589269E-05 | 2.0877523E-08 | -5.9544158E-12 | -2.7286464E 04 | 7.4092064E 00 |
| S101F1(G) | 300.00 | 5000.00 | | | | | |
| 1000. 5000. | 5.6545506E 00 | 1.4957070E-03 | -6.5095184E-07 | 1.2562635E-10 | -8.9416380E-15 | -1.6993754E 04 | -1.4675105E 00 |
| 300. 1000. | 2.5617712E 00 | 1.1435034E-02 | -1.2670618E-05 | 6.5163001E-09 | -1.2264968E-12 | -1.6218240E 04 | 1.4141323E 01 |

| | | | | | | | | | | |
|-----------|-------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|--|--|
| SI01F2(G) | | 300.00 | 5000.00 | | | | | | | |
| 1000. | 5000. | 8.0572094E 00 | 2.1584769E-03 | -9.3721943E-07 | 1.8032010E-10 | -1.2792647E-14 | -5.1680242E 04 | -1.3772482E 01 | | |
| 300. | 1000. | 1.7573080E 00 | 2.5719805E-02 | -3.5754326E-05 | 2.4093588E-08 | -6.3703846E-12 | -5.0262102E 04 | 1.7211227E 01 | | |
| SI02F2(G) | | 300.00 | 5000.00 | | | | | | | |
| 1000. | 5000. | 9.5554476E 00 | 3.8178422E-03 | -1.6590504E-06 | 3.1989962E-10 | -2.2756691E-14 | -1.0665961E 05 | -2.2588924E 01 | | |
| 300. | 1000. | 8.9849854E-01 | 3.4435946E-02 | -4.4314682E-05 | 2.8000068E-08 | -7.0084518E-12 | -1.0461607E 05 | 2.0440570E 01 | | |
| SI1(G) | | 300.00 | 5000.00 | | | | | | | |
| 1000. | 5000. | 2.6559558E 00 | -3.6840495E-04 | 3.0270032E-07 | -7.4482263E-11 | 5.9387936E-15 | 5.5596485E 04 | 5.1916656E 00 | | |
| 300. | 1000. | 3.2966773E 00 | -3.5868839E-03 | 6.5040211E-06 | -5.3803138E-09 | 1.6882078E-12 | 5.5487900E 04 | 2.2315808E 00 | | |
| SI1(L) | | 1685.00 | 5000.00 | | | | | | | |
| 1000. | 5000. | 3.0911909E 00 | -0. | -0. | -0. | -0. | 5.2005274E 03 | -1.1911148E 01 | | |
| 300. | 1000. | -0. | -0. | -0. | -0. | -0. | -0. | -0. | | |
| SI1(C) | | 300.00 | 1685.00 | | | | | | | |
| 1000. | 5000. | 2.2207922E 00 | 1.7430861E-03 | -1.2007852E-06 | 5.0841201E-10 | -8.1686169E-14 | -7.4966061E 02 | -1.0916017E 01 | | |
| 300. | 1000. | 4.2459291E-01 | 1.1186585E-02 | -1.9539205E-05 | 1.6109161E-08 | -4.9913170E-12 | -4.8066559E 02 | -2.7554443E 00 | | |
| SI2(G) | | 300.00 | 5000.00 | | | | | | | |
| 1000. | 5000. | 4.3406971E 00 | 2.3205786E-04 | -8.2565527E-08 | 1.6298050E-11 | -1.1812293E-15 | 7.2931986E 04 | 2.7440717E 00 | | |
| 300. | 1000. | 3.1010459E 00 | 5.7199940E-03 | -9.5334183E-06 | 7.4051778E-09 | -2.1874942E-12 | 7.3167995E 04 | 8.6283863E 00 | | |
| SI3(G) | | 300.00 | 5000.00 | | | | | | | |
| 1000. | 5000. | 7.0880004E 00 | 4.7014225E-04 | -2.0758091E-07 | 4.0394582E-11 | -2.8895204E-15 | 7.7534916E 04 | -1.0264577E 01 | | |
| 300. | 1000. | 3.6720107E 00 | 1.5889358E-02 | -2.7344845E-05 | 2.1745958E-08 | -6.5744189E-12 | 7.8174967E 04 | 5.8893536E 00 | | |
| SI1CL1(G) | | 300.00 | 5000.00 | | | | | | | |
| 1000. | 5000. | 4.4178274E 00 | 1.3112192E-04 | -3.2742526E-08 | 5.4972693E-12 | -3.3022321E-16 | 2.2660741E 04 | 3.2772562E 00 | | |
| 300. | 1000. | 3.7783607E 00 | 2.8341378E-03 | -4.5116467E-06 | 3.3987709E-09 | -9.7824888E-13 | 2.2788933E 04 | 6.3443629E 00 | | |
| SI1CL2(G) | | 300.00 | 5000.00 | | | | | | | |
| 1000. | 5000. | 6.6644083E 00 | 3.8696751E-04 | -1.7280492E-07 | 3.4003540E-11 | -2.4577474E-15 | -2.0809096E 04 | -4.5436022E 00 | | |
| 300. | 1000. | 3.8973806E 00 | 1.2794421E-02 | -2.1807538E-05 | 1.7146774E-08 | -5.1209245E-12 | -2.0288717E 04 | 8.5556196E 00 | | |
| SI1CL4(G) | | 300.00 | 5000.00 | | | | | | | |
| 1000. | 5000. | 1.2095396E 01 | 1.0357682E-03 | -4.5955290E-07 | 8.9889058E-11 | -6.4616065E-15 | -8.0262952E 04 | -2.9971771E 01 | | |
| 300. | 1000. | 5.3559090E 00 | 3.0538688E-02 | -5.0773945E-05 | 3.9098130E-08 | -1.1463749E-11 | -7.8964064E 04 | 2.0988014E 00 | | |
| SI1F1(G) | | 300.00 | 5000.00 | | | | | | | |
| 1000. | 5000. | 4.1256089E 00 | 4.6598025E-04 | -1.8558360E-07 | 3.5495287E-11 | -2.3955463E-15 | 1.0818990E 03 | 3.3608692E 00 | | |
| 300. | 1000. | 3.2233765E 00 | 3.1511764E-03 | -2.9828783E-06 | 1.1260406E-09 | -7.8609915E-14 | 1.3165715E 03 | 7.9622594E 00 | | |
| SI1F2(G) | | 300.00 | 5000.00 | | | | | | | |
| 1000. | 5000. | 6.0376078E 00 | 1.0809764E-03 | -4.7290586E-07 | 9.1501851E-11 | -6.5206444E-15 | -6.5182244E 04 | -4.7496359E 00 | | |
| 300. | 1000. | 2.3534930E 00 | 1.4783392E-02 | -2.0382495E-05 | 1.3386508E-08 | -3.4102400E-12 | -6.4355815E 04 | 1.3370966E 01 | | |
| SI1F4(G) | | 300.00 | 5000.00 | | | | | | | |
| 1000. | 5000. | 1.0508028E 01 | 2.8008750E-03 | -1.2282377E-06 | 2.3834352E-10 | -1.7035166E-14 | -1.9793183E 05 | -2.7754243E 01 | | |
| 300. | 1000. | 2.3678519E 00 | 3.2149310E-02 | -4.2428603E-05 | 2.6765728E-08 | -6.5523172E-12 | -1.9605721E 05 | 1.2519206E 01 | | |
| SI1H1(G) | | 300.00 | 5000.00 | | | | | | | |
| 1000. | 5000. | 3.0678234E 00 | 1.5081642E-03 | -5.8922600E-07 | 1.0854302E-10 | -7.4762824E-15 | 4.4021004E 04 | 5.9161079E 00 | | |
| 300. | 1000. | 4.2365784E 00 | -4.3651757E-03 | 9.6988895E-06 | -7.5517386E-09 | 2.0692759E-12 | 4.3859267E 04 | 6.0615635E-01 | | |

TABLE V. - Concluded. TEMPERATURE COEFFICIENTS FOR THERMODYNAMIC FUNCTIONS

| Substance | Temperature interval of tabulated data, °K | | | | | | | |
|--------------------------------------|-----------------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|--|
| | First tempera- ture interval, °K | | | | | | | |
| Second tempera- ture interval, °K | a ₁ | a ₂ | a ₃ | a ₄ | a ₅ | a ₆ | a ₇ | |
| SI1H4(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 4.2864439E 00 | 8.9421998E-03 | -3.7030738E-06 | 6.9171116E-10 | -4.8137695E-14 | 1.9035952E 03 | -3.1698731E 00 | |
| 300. 1000. | 1.6111312E 00 | 1.2719990E-02 | -1.6884339E-06 | -4.5135745E-09 | 2.0400319E-12 | 2.9021544E 03 | 1.1738476E 01 | |
| SI1N1(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 3.8063403E 00 | 7.9712358E-04 | -3.3158207E-07 | 6.2840384E-11 | -4.2600825E-15 | 5.9042866E 04 | 3.9540278E 00 | |
| 300. 1000. | 3.1471330E 00 | 1.2265928E-03 | 2.3774131E-06 | -4.1441265E-09 | 1.7234504E-12 | 5.9290540E 04 | 7.6940989E 00 | |
| SI1C1(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 3.7295164E 00 | 8.6335951E-04 | -3.5894469E-07 | 6.8212796E-11 | -4.7844561E-15 | -1.2008310E 04 | 3.7472829E 00 | |
| 300. 1000. | 3.3495882E 00 | -2.6538250E-04 | 5.4814021E-06 | -6.8793292E-09 | 2.6110821E-12 | -1.1797081E 04 | 6.2421835E 00 | |
| SI1O2(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 6.0437403E 00 | 1.6137498E-03 | -7.0033700E-07 | 1.3480464E-10 | -9.5718915E-15 | -4.3344032E 04 | -7.9015665E 00 | |
| 300. 1000. | 2.7328389E 00 | 1.2359266E-02 | -1.3902723E-05 | 7.3205169E-09 | -1.4275135E-12 | -4.2517933E 04 | 8.7842538E 00 | |
| SI1S1(G) | 300.00 | 5000.00 | | | | | | |
| 1000. 5000. | 4.1728212E 00 | 3.9618379E-04 | -1.5985232E-07 | 3.0306992E-11 | -2.0739258E-15 | 1.3354838E 04 | 2.8391688E 00 | |
| 300. 1000. | 2.6860287E 00 | 6.1744527E-03 | -8.9647337E-06 | 6.2071096E-09 | -1.6654723E-12 | 1.3675935E 04 | 1.0090654E 01 | |

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