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Title	A ^{12} (d,) Mg^{2} Reaction at 14.7 MeV
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Angular Distributions of the Alpha Particles from the (p, α) Reactions on Na²³ and K³⁹ at 6.9～7.3 MeV

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The angular distributions of the reactions Na²³(p, α)Ne²⁰ and K³⁹(p, α)A³⁶ leading to the ground and first excited states of the residual nuclei have been measured at 6.9, 7.1 and 7.3 MeV of the incident proton energy, respectively, by the use of a semiconductor detector.

For the reaction Na²³(p, α)Ne²⁰ the angular distributions of these alpha particles are almost 90° symmetrical at 7.1 MeV of the incident proton energy, and they are slightly unsymmetrical about 90° at 7.3 and 6.9 MeV. For the reaction K³⁹(p, α)A³⁶, the angular distributions are almost 90° symmetrical at all energies of the incident protons.

It is considered that the reactions Na²³(p, α)Ne²⁰ and K³⁹(p, α)A³⁶ leading to the ground and first excited states of the residual nuclei, at around 7 MeV of incident proton energy, occur through a compound nucleus process and in the former reaction the number of the compound states excited by the about 7 MeV protons are probably not so many as to justify the statistical assumption.

O¹⁶ (d, α)N¹⁴ Reaction with Deuterons near 15 MeV

Takuji YANABU, Sukeaki YAMASHITA, Teruo NAKAMURA,
Kunio TAKAMATSU, Akira MASAIKE, Shigeru KAKIGI,
Dai Ca NGUYEN and Kiyohiko TAKIMOTO

O¹⁶(d, α)N¹⁴ reaction was investigated at deuteron energy 14.5 MeV and compared with the resuls at 14.7 MeV and 15 MeV. Angular distributions were obtained for alpha-particle groups leading to the ground and second excited states of N¹⁴. Integrated cross sections for α_1 and α_2 were 8mb and 13mb respectively. Alpha partiles leading to the first T=1 state of N¹⁴ were also observed but scarce.

Al²⁷(d, α)Mg²⁵ Reaction at 14.7 MeV

Takuji YANABU, Sukeaki YAMASHITA, Teruo NAKAMURA,
Kunio TAKAMATSU, Akira MASAIKE, Shigeru KAKIGI,
Dai Ca NGUYEN and Kiyohiko TAKIMOTO

The angular distributions have been measured for the eight groups of alpha

particles leading to the ground state and the excited sttes of Mg^{25} from the reaction $Al^{27}(d, \alpha)Mg^{25}$ with 14.7 MeV deuterons, by using a semiconductor detector of p-n junction. The differential cross-sections of the reactions leading to the single levels of Mg^{25} are compared with a formula obtained from the two-nucleon pick-up theory. The experimental angular distribution for each alpha group with a comparatively large cross-section is in agreement, at least in forward angle, with the theoretical curve. The alpha group leading to the 3.4 MeV level of Mg^{25} is considered to come from the transition to the 9/2+ state rather than to the 3/2- state. The total cross-sections for the levels of Mg^{25} corresponding to the same K-band 5/2+ as that of the ground state of Al^{27} are larger than the others.

Viscoelastic Properties of Asphalts

Hiroshi AIDA

Journal of Japan Petrolium Institute, 4, 845 (1961)

Viscoelastic propertis of several kinds of asphalts were measured by a cone-and-plate type viscometer. The viscosity coefficients, the delayed elastic compliances at steady state, and the retardation spectra were obtained from the strain-time and recovery curves at various temperatures.

The following results were obtained: (1) The viscosity coefficients when expressed by Andrade's equation gave the apparent activation energies as 30~40 kcal/mole. (2) The delayed elastic compliances at steady state were in the order of $10^{-6}cm^2/dyne$ and increased with the rise in temperature. (3) When time-temperature superposition principle was applied to the asphalt, the apparent activation energies for retardation process were 20~28 kcal/mole. (4) The retardation spectra were wedge type with a slope of about 0.4 on logrithmic scales independent to the kinds of asphalts, and the maximum value of each spectrum shifted to the longer time with decrease of resins to asphaltenes or oil to asphaltenes ratio.

Viscoelastic Properteis of Bentonite Pastes

Hiroshi AIDA, Tetsuya HANAI and Rempei GOTOH

Nippon Kagaku Zasshi, (Journal of the Chemical Society of Japan, Pure Chemistry Section) 83, 536 (1962)

Viscoelastic properties of several kinds of bentonite pastes were measured under a constant shearing stress by use of a cone-and-plate type viscometer. It was found that the paste had two threshold values of shearing stress which were