The reaction kinetics of amino radicals with sulfur dioxide - DTU Orbit (08/11/2017)

The reaction kinetics of amino radicals with sulfur dioxide

Application of the laser photolysis-laser-induced fluorescence method to the reaction NH_2+SO_2 in argon bath gas yields pressure-dependent, third-order kinetics which may be summarized as k = (1.49 ± 0.15) × 10^{-31} (T/298 K)$^{-0.83}$ cm^6 $molecule^{-2}$ s^{-1} over 292-555K, where the uncertainty is the 95% confidence interval and includes possible systematic errors. The quenching of vibrationally excited NH_2 is consistent with a high-pressure limit for NH_2+SO_2 of (1.62 ± 0.25) × 10^{-11} cm^3 $molecule^{-1}$ s^{-1} over the temperature range 295-505K, where again the 95% confidence interval is shown. *Ab* initio analysis yields a H_2N-SO_2 dissociation enthalpy of 73.5 kJ mol^{-1}, and comparison with RRKM theory and the exponential down model for energy transfer yields $\langle\Delta E\rangle_{down}$ = 350 cm^{-1} for Ar at room temperature.

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