

Observation of enhanced rate coefficients in the $H+2+H_2 \rightarrow H+3+H$ reaction at low collision energies

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The Journal of Chemical Physics 145, 244316

URL:

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The energy dependence of the rate coefficient of the $H_2^+ + H_2 \rightarrow H_3^+ + H$ reaction has been measured in the range of collision energies between $k_B \cdot 10$ K and $k_B \cdot 300$ mK. A clear deviation of the rate coefficient from the value expected on the basis of the classical Langevin-capture behavior has been observed at collision energies below $k_B \cdot 1$ K, which is attributed to the joint effects of the ion-quadrupole and Coriolis interactions in collisions involving ortho- H_2 molecules in the $j = 1$ rotational level, which make up 75% of the population of the neutral H_2 molecules in the experiments. The experimental results are compared to very recent predictions by Dashevskaya et al. [J. Chem. Phys. 145, 244315 (2016)], with which they are in agreement.

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