DIFFUSION OF HYDROGEN FLUORIDE IN SOLID PARAHYDROGEN.

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In general, atoms and molecules diffuse thermally in solid with rate which has Arrhenius-type temperature dependence. On the other hand, it is known that diffusion rate at low temperature sometimes shows non-Arrhenius behavior, which is called gquantum diffusionh[a]. We have studied hydrogen fluoride (HF) in solid parahydrogen (p-H_2) by FTIR absorption spectroscopy and found that HF diffuses in solid p-H_2 even at 3.6 K[b]. In this study, dependence of the rate on temperature, HF concentration and IR irradiation was investigated. Assuming Arrhenius-type dependence, activation energy of the diffusion is less than a few Kelvin, which suggests that the diffusion has the quantum nature. Recent experimental results and a possible mechanism of the diffusion will be discussed.

[a] Y. Kagan and A. J. Leggett *gQuantum Tunneling In Condensed Mediah*, North Holland, 1992.

[b] Y. Miyamoto et al. *J. Phys. Chem. A* **115**, 14254 (2011).