

Electronic and Vibrational Absorption Spectra of NH₂ in Solid Ne

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Abstract

Irradiation of ammonia dispersed in solid neon near 4 K with tunable far-ultraviolet light from a synchrotron yielded amidogen, NH₂, and imidogen, NH, radicals as products. The electronic absorption spectra of amidogen radicals in isotopic variants NH₂, NHD, and ND₂ were recorded in the visible and near-ultraviolet regions after photolysis of NH₃ and ND₃. The infrared absorption lines of NH₂ associated with vibration-rotational levels of vibrational modes ν_1 at 3234.3 (0_{0,0}-1_{0,1}), 3244.9 (0_{0,0}-1_{1,1}) and 3249.3 cm⁻¹ (0_{0,0}-1_{1,0}), and ν_2 at 1498.7 (1_{0,1}-1_{1,1}), 1509.5 (1_{1,0}-1_{0,1}), 1516.5 (0_{0,0}-1_{0,1}), 1528.6 (0_{0,0}-1_{1,1}), and 1533.7 cm⁻¹ (0_{0,0}-1_{1,0}) were unambiguously identified according to the results of experiments with deuterium isotopes. The 0_{0,0}-0_{0,0} lines of ν_1 and ν_2 for NH₂ were derived to be at 3213.5 and 1494.6 cm⁻¹ in solid neon.

Keywords – Ammonia photodissociation, NH₂, Infrared and visible spectra