THE Mg-NC STRETCHING VIBRONIC BANDS OF THE MgNC $\tilde{A}\ ^2\Pi$ – $\tilde{X}\ ^2\Sigma^+$ TRANSITION

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We have generated MgNC in supersonic free jet expansions, and measured the laser induced fluorescence excitation spectra of the Mg-NC stretching vibronic bands of the $\tilde{A}\ ^2\Pi$ – $\tilde{X}\ ^2\Sigma^+$ transition. In addition to the bands already reported by Wright and Miller[a], the 3_0^2 and 3_0^3 bands have been observed for the first time, and the molecular constants of the vibronic levels, (0,0,2) and (0,0,3), in the $\tilde{A}\ ^2\Pi$ state have been newly determined through rotational analysis of the observed bands. Comparing all of the spin-orbit constants, A_{SO}, on the vibrational levels for the two stretching modes, Mg-NC and C-N, obtained in this work and reported previously[b], we find opposite dependence of A_{SO} upon the two stretching vibrational modes, i.e. A_{SO} increases with the excitation of the Mg-NC stretching vibrational mode, while it decreases with the excitation of the C-N mode. The experimental finding is supported by an attempt to calculate the dependence of A_{SO} upon the distance along the vibrational modes.

[a] R. R. Wright and T. A. Miller, *J. Mol. Spectrosc.* **194**, 219 (1999).
[b] M. Fukushima and T. Ishiwata, *J. Mol. Spectrosc.* **216**, 159 (2002).