THE ULTRA VIOLET SPECTUM OF THE NCN RADICAL

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The (0,0) band of the $\tilde{\mathrm{A}}^3\Pi_\mathrm{u} - \tilde{\mathrm{X}}^3\Sigma_\mathrm{g}^-$ transition of NCN, observed previously by Herzberg and Travis[a], has been reinvestigated by means of laser-induced fluorescence at 329 nm. A frequency doubled dye laser was used to record the spectrum of NCN downstream of a microwave discharge through N_2 and CF_4 in He[b]. From the rotational analysis, improved values for the molecular constants of NCN in both states were obtained, including Λ-type doubling parameters for the $^3\Pi_\mathrm{u}$ upper state.
The main molecular constants obtained were

$$\tilde{\mathrm{X}}^3\Sigma_\mathrm{g}^-: \quad B''_{000} = 0.3972458(95)\mathrm{cm}^{-1} \quad \lambda'' = 0.79402(50)\mathrm{cm}^{-1}$$

$$\tilde{\mathrm{A}}^3\Pi_\mathrm{u}: \quad \mathrm{B}'_{000} = 0.3966487(95)\mathrm{cm}^{-1} \quad \mathrm{A}' = -37.4493(38)\mathrm{cm}^{-1}$$

$$\mathrm{T}'_{000} = 30383.8110(51)\mathrm{cm}^{-1}$$

The B values (and hence bond lengths) are very similar in the two states and therefore the spectrum is dominated by $\Delta v = 0$ transitions.
The (010)-(010) band occurs in a similar wavelength region, the excited state of this transition exhibiting the Renner-Teller effect. Analyses of both the $^3\Delta_\mathrm{g} -^3 \Pi_\mathrm{u}$ and the $^3\Sigma_\mathrm{g} -^3 \Pi_\mathrm{u}$ components of this hot band will be presented.

[a]G.HERZBERG AND D.N.TRAVIS, *Can.J.Phys.* **42**,1658-1675 (1964).
[b]G.P.SMITH, R.A.COPELAND AND D.R.CROSLEY, *J.Chem.Phys.* **91**,1987-1993 (1989).