FOURIER TRANSFORM UV EMISSION SPECTROSCOPY OF THE $B\,^2\Sigma^+ - X\,^2\Sigma^+$ BAND OF THE PN^+

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High resolution Fourier transform emission spectrum of the $B\,^2\Sigma^+ - X\,^2\Sigma^+$ band of the PN^+ ion was observed in the ultra violet region around 31000 cm^{-1} with Bruker IFS120HR. The rotationally resolved spectrum of PN^+, produced by an ac discharge of the PCl_3, N_2, and He gas mixture, was recorded for about 11 h accumulating the interferogram 1600 times. The monochromator placed just before a photomultiplier worked effectively as an optical filter with a band width of 200 cm^{-1}. The (0,0) band lines split into doublet due to the spin-rotation splitting were assigned to the *R*- and *P*- branch lines of *N"* up to 35. The determined band origin ν_0=31058.9963(81) cm^{-1} is consistent with the previous low resolution result [1]. The rotational, centrifugal distortion constants for both states were determined as well as the spin-rotation constant for the ground state. The $B\,^2\Sigma^+$ state has weaker bond than that of the ground state, since the bond length of the $B\,^2\Sigma^+$ (v=0) state (1.570 Å) is by 0.076 Å longer, and the force constant (k = 2.90 mdyne/Å) is by about 70 % smaller than those of the ground state. Present results support the *ab initio* calculation which predicts a shallow minimum for the $B\,^2\Sigma^+$ state due to avoided crossing [2].

1. I. K. Ahmad and P. A. Hamilton, J. Mol. Spectrosc., **163**, 214 (1994).
2. F. Grein, Chem. Phys. Lett., **120**, 383 (1988).