MILLIMETER WAVE SPECTRUM OF THE NH_3 - N_2 COMPLEX

KALEY A. WALKER[a] and A. R. W. McKELLAR, *Steacie Institute for Molecular Sciences, National Research Council of Canada, Ottawa, Ontario K1A 0R6, Canada*.

The only previous spectroscopic study of the ammonia - nitrogen van der Waals complex was made by Fraser et al.[b] in 1986. They observed one main $K = 0$ series of rotational transitions, $R(0)$ to $R(3)$, in the 6 to 27 GHz region using the MBER technique. Another pair of lines near 13.5 GHz (reported in a footnote) was evidently the first member, $R(1)$, of a series with $K = 1$.
We have studied the NH_3 - N_2 spectrum in the 76 to 106 GHz region using a newly-developed pulsed jet millimeter wave spectrometer.[c] Thirty-five lines were observed and assigned as $R(11)$ to $R(15)$ pure rotational transitions, belonging to six series which involve all combinations of the parent molecule nuclear spin species, *ortho/para* ammonia and *ortho/para* nitrogen. Two of these series are continuations to higher J-values of the transitions observed in the microwave region,[b] and the remaining four series are new. We are thus able to predict a number of new microwave transitions for NH_3 - N_2 whose observation will help to confirm the present assignments of K-values and spin species.

---

[a]Present address: Department of Chemistry, University of Waterloo, Waterloo, Ontario N2L 3G1, Canada
[b]G.T. Fraser, D.D. Nelson, Jr., K.I. Peterson, and W. Klemperer, *J. Chem. Phys.* **84**, 2472 (1986)
[c]K.A. Walker and A.R.W. McKellar, *J. Mol. Spectrosc.* **205**, 331 (2001).