NUCLEAR QUADRUPOLE HYPERFINE STRUCTURES OF THE ROTATIONAL TRANSITIONS OF THE NH_3-N_2 VAN DER WAALS DIMER

WENDY C. TOPIC, YUNJIE XU and WOLFGANG JÄGER, *Department of Chemistry, University of Alberta, Edmonton, AB T6G 2G2, Canada*.

An initial study of the K = 0 ortho-ortho $R(0)$ to $R(3)$ transitions of NH_3 - N_2, measured with a molecular beam electric resonance spectrometer, was previously reported.[a] The hyperfine structures of these transitions were partially resolved, but not assigned. More recently, six series of NH_3 - N_2 rotational transitions were observed and assigned in the millimetre wave region for $R(11)$ to $R(16)$, without resolving the hyperfine structures.[b] The lack of resolved and assigned hyperfine structure for this van der Waals complex was evidence that further studies in the microwave region were warranted. In addition, the identities of the previously assigned series of NH_3 - N_2 would be further confirmed by investigations of the corresponding low J transitions. In the present study, the low J transitions of the six series were investigated, with particular emphasis on resolving and assigning the nuclear quadrupole hyperfine structures. The complex ^{14}N hyperfine patterns were simplified by the use of $^{15}NH_3$ enriched samples. Information about the structure and internal dynamics of the NH_3 - N_2 van der Waals dimer will be presented in this paper.

[a] G. T. Fraser, D. D. Nelson Jr., K. I. Peterson and W. Klemperer, *J. Chem. Phys.* **84**, 2472 (1986).
[b] K. A. Walker and A. R. W. McKellar, *Mol. Phys.* **99**, 1391 (2001).