MICROWAVE SPECTRA OF THE Ar₃-NH₃ AND Ne₃-NH₃ VAN DER WAALS TETRAMERS

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Rotational spectra of the Ar₃-NH₃ and Ne₃-NH₃ van der Waals complexes were measured between 4 and 18 GHz using a pulsed jet Fourier transform microwave spectrometer. The isotopomers studied include those of NH₃, ¹⁵NH₃, ND₃, ND₂H, and NDH₂ in combination with Ar, ⁴⁰Ne³, ²²Ne₂, ⁴⁰Ne²²Ne, and ²⁰Ne²²Ne. The isotopomers containing Ar, ²⁰Ne₂, and ²²Ne are symmetric tops for which a-type transitions with K=3n (n=0,1,2,...) were observed. The other isotopomers are asymmetric tops and due to the reduced symmetry, all rotational levels are present in these complexes. For ⁴⁰Ne²²Ne, both a- and b-type transitions were observed whereas the slightly different mass distribution in ⁴⁰Ne²²Ne led to the detection of a- and c-type transitions. For the deuterium containing isotopomers, each rotational transition is split by the inversion motion of ammonia within the complex. This inversion splitting is not observed in the NH₃ and ¹⁵NH₃ containing species for spin statistical reasons. The spectroscopic constants, including the ¹⁴N nuclear quadrupole coupling constants, were fit for each isotopomer and used to derive structural and dynamical information for the Ar₃-NH₃ and Ne₃-NH₃ van der Waals complexes.