ROTATIONAL SPECTRA OF THE AR-AR-NH_3 AND NE-NE-NH_3 VAN DER WAALS TRIMERS

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Rotational spectra of Ar-Ar-NH_3 and Ne-Ne-NH_3 were measured between 4 and 23 GHz using a pulsed jet Fourier transform microwave spectrometer. Isotopomers containing $^{14}NH_3$ and $^{15}NH_3$ were studied in combination with Ar-Ar, ^{20}Ne-^{20}Ne, ^{22}Ne-^{20}Ne and ^{22}Ne-^{22}Ne. For the Ar-Ar-NH_3 complex, the b-axis is the symmetry axis and only b-type transitions were observed. In contrast, the ^{20}Ne-^{20}Ne and ^{22}Ne-^{22}Ne isotopomers have dipole moments along their a-axes and as a result, only a-type transitions were measured. The reduced symmetry of ^{22}Ne-^{20}Ne-NH_3 allowed the observation of both a- and b-type transitions. The spectra were fitted using an asymmetric rotor model and the resulting rotational constants were used to estimate the effective structures. Nuclear quadrupole hyperfine structure arising from the ^{14}N nucleus was resolved. The corresponding quadrupole coupling costants were determined and analyzed in terms of the intermolecular dynamics.