ROTATIONAL SPECTROSCOPIC INVESTIGATION OF NITROUS OXIDE SOLVATED WITH HYDROGEN MOLECULES

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High resolution microwave spectra of $(ortho\mathrm{H}_2)_N$-$\mathrm{N}_2\mathrm{O}$ and $(para\mathrm{H}_2)_N$-$\mathrm{N}_2\mathrm{O}$ clusters with N ranging from 1 to 8 were investigated using a pulsed jet, Balle-Flygare type Fourier transform microwave spectrometer. The assignment of N, the number of solvating hydrogen molecules interacting with nitrous oxide, was supported by the spectral intensity dependence under different backing pressures and previous infrared work by Tang and McKellar [J. Chem. Phys. **123**, 114314 (2005)]. The $ortho\mathrm{H}_2$ nuclear spin-spin hyperfine structures could be resolved and were included in the spectroscopic fits of the various clusters. The resulting rotational and hyperfine constants were used to determine trends in the structural and dynamical properties of the clusters. The moments of inertia smoothly increase from N = 1 to 8; the onset of "molecular superfluidity" is expected at larger cluster sizes for $para\mathrm{H}_2$ containing complexes.