IR SPECTRUM OF THE CO-N_2 COMPLEX: ASSIGNMENTS FOR CO-*para*N_2 AND OBSERVATION OF A BENDING STATE FOR CO-*ortho*N_2

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The infrared spectrum of the weakly-bound complex CO-N_2 has been studied using a pulsed supersonic slit-jet and a rapid-scan tunable diode laser. A mirror system giving 182 passes of the laser through the jet helped to give improved spectra with lower effective rotational temperatures (0.5 to 4 K) and less interference by CO dimer transitions. In the case of the CO-*para*N_2 spin modification, for which only one subband was previously[a] known, over 10 linked subbands were assigned in terms of three ground (v_{CO} = 0) state stacks of levels (with K = 0 and 1), and 7 excited state (v_{CO} = 1) stacks (with K = 0, 1, and 2). The infrared analysis relied on precise ground state energy level differences obtained from microwave data.[b] There is a strong Coriolis interaction between the K = 0 and 1e stacks of levels in both the ground and excited states. However, their energy ordering changes, with K = 0 being lower for v_{CO} = 0, and K = 1 being lower for v_{CO} = 1. For the more abundant nuclear spin modification of the complex, CO-*ortho*N_2, an excited bending state was observed for the first time. The bending frequency is 4.67 cm^{-1}.

[a] Y. Xu and A.R.W. McKellar, J. Chem. Phys. **104**, 2488 (1996).

[b] Y. Xu and W. Jäger, J. Chem. Phys., submitted (2000).