

MILLIMETER-WAVE SPECTROSCOPY FOR VAN DER WAALS BENDING HOT BANDS OF THE Ar-HCN COMPLEX

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We report a millimeter-wave spectroscopic study for the vdW bending $j=2-1$ hot bands of the Ar-HCN complex. In the frequency region of 150 - 300 GHz, in total 154 rovibrational lines including hyperfine splittings for all $j=2-1$ subbands have been observed by using direct absorption spectroscopy combined with a pulsed nozzle. The spectroscopic constants including the Coriolis interaction constants were determined precisely. The energies of the $|K|$ sublevels in the $j=2$ state decrease with increasing $|K|$. The order is reversed against that in the $j=1$ state^a. The change in distance between Ar and center of mass of HCN for the Σ and Π states due to the excitation of the bending vibration from $j=1$ to 2 is not obvious as in the case of that from $j=0$ to 1. The eQq_{aa} constants in the Σ_2 , Π_2 and Δ_2 states are determined to be -0.4, -0.6 and 1.2 MHz [-1.3, -0.7 and 1.3 MHz in the free rotor limit respectively], suggesting the Π_2 and Δ_2 states have more free rotor character.

^aS. Drucker, A. L. Cooksy and W. Klemperer, *J. Chem. Phys.*, **98**, 5158(1993).