DIRECT OBSERVATION OF THE vdW BENDING BAND OF THE OCO-HF CLUSTER IN THE MILLIMETER-WAVE REGION

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The rovibrational transitions in the low frequency bending (vdW) mode of the intermolecular hydrogen bond in the OCO-HF cluster have been observed by millimeter-wave and submillimeter-wave spectroscopy combined with pulsed supersonic jet expansion technique. In this study, we observed 30 lines belonging to the $v^J_{\text{bend}} = 1^J - 0^J$ band in the frequency region from 260 to 320 GHz, where $v^J$ denotes quanta of OCO-HF skeletal bend excitation with $J$ units of vibrational angular momentum. The observed spectra were analyzed with a linear molecule Hamiltonian and the band origin is determined to be 272,548.8016(49) MHz. We also detected several lines of the P-branch transitions of the $v^J_{\text{bend}} = 2^J - 1^J$ hot band.