ROTATIONAL RESOLVED SPECTRA OF TRANSITIONS INVOLVING MOTION OF METHYL GROUP OF ACETALDHEYDE IN THE FIRST ELECTRONICALLY EXCITED STATE

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Fluorescence excitation spectra, at resolution 0.02 cm^{-1}, in the system $\tilde{A}\leftarrow\tilde{X}$ were recorded for acetaldehyde in a supersonic jet. We performed full rotational analysis of bands with torsional vibrational quanta up to 4. Torsional levels from near the methyl torsional barrier to beyond that barrier are assigned. Torsional sublevel A below the torsional barrier is fitted as an asymmetric rotor but the resulting value of rotational parameter A is affected significantly by the torsional motion. For the E sublevel, K doublet states split significantly with torsional quantum number v_t. Anomalous transitions to A sublevels are observed arising from interaction of torsion and rotation. The positions of A and E sublevels at high v_t state cannot be fitted with the program involving only interaction of torsion and rotation. For v_t = 0-2 states the A/E splitting is reversed from those in the levels with excitation in acetyl hydrogen wagging; interaction with inversion varies the splitting of torsional sublevels and the K structures.

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