FLUORESCENCE DIP INFRARED SPECTROSCOPY (FDIRS) OF JET-COOLED 5-HYDROXYTROPOLONE

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Ground state infrared spectra of jet-cooled 5-hydroxytropolone are recorded in the region from 2600 to 4200 cm^{-1}. In this technique, a near-ultraviolet laser pulse (not tuned) excites a chosen fluorescence transition in order to monitor a unique ground state population in the molecular beam. A high-power infrared pulse generated from a Nd:YAG-pumped OPO system is tuned through the infrared region. The infrared is spatially overlapped with the near-ultrviolet but preceeds it by roughly 100 ns. When resonance with an infrared transition occurs, population is excited out of the ground state which is manifested as a dip in fluorescence signal. Ground state infrared spectra of both the syn and anti conformations of 5-hydroxytropolone are recorded with excellent signal-to-noise. Large red shifts are observed for the intramolecularly hydrogen bonded O-H stretch in 5-hydroxytropolone which contrast to characteristic shifts for intermolecularly hydrogen bonded modes. Additionally, the syn and anti conformations show distinct infrared spectra which will be discussed in light of the density of bath states and the interaction between the asymmetric syn and anti potential energy wells.