LASER INDUCED FLUORESCENCE SPECTROSCOPY OF THE KETENYL RADICAL

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The ketenyl radical, HCCO, is widely recognized as a critical reaction intermediate in hydrocarbon combustion. In order to enable laser-based diagnostics of ketenyl in combustion and kinetics environments, we have examined the electronic spectroscopy of the B $^2\Pi$ - X ^2A" band system of H(D)CCO using laser-induced fluorescence in a free-jet environment. We obtain both vibronically resolved excitation spectra and fully rotationally resolved spectra for the origin band and for four bands terminating on levels of Σ vibronic symmetry, which are assigned to the two pairs of Σ states derived from one quantum of excitation in each of the Renner-Teller active modes, the CCO and CCH(D) bend. In addition to the Renner-Teller and spin-orbit couplings, there is substantial evidence for additional perturbations among the low-lying bending levels in the first excited state of ketenyl.

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