LASER-INDUCED FLUORESCENCE AND DISPERSED FLUORESCENCE SPECTROSCOPY OF THE TROPYL $C_7H_7$ RADICAL IN THE JET EXPANSION: THE ANALYSIS OF THE GAS-PHASE ELECTRONIC SPECTRA CONTINUES

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The tropyl radical ($C_7H_7$) has been proposed to be a possible intermediate in the decay of the benzyl radical following similar pathways of isomerization to the ones between their cationic forms. Besides the fact that very little is known about such reactions, tropyl has also received considerable theoretical attention, since the doubly degenerate ground $\tilde{X}^2E_2''$ and excited $\tilde{A}^2E_3''$ $D_{7h}$ electronic states exhibit Jahn-Teller (JT) activity. To gain further insight about the molecule's vibrational properties, the laser-induced fluorescence (LIF) spectroscopy was combined with supersonic free jet expansion techniques to record the wavelength dispersed fluorescence (DF) spectra of tropyl. The DF emission was collected by pumping different vibronic bands of the $\tilde{A}^2\mathrm{E}_3'' \leftarrow \tilde{X}^2\mathrm{E}_2''$ LIF excitation spectrum. An analysis reveals significant Jahn-Teller activity in 4 $e_3'$ modes for the $\tilde{X}^2\mathrm{E}_2''$ state and 3 $e_1'$ modes for the $\tilde{A}^2\mathrm{E}_3''$ and provides values for their deperturbed vibrational frequencies as well as their linear Jahn-Teller constants. The experimental observations and intensity simulations for the observed emission traces will be presented and discussed.