CONFORMATION-SPECIFIC EFFECTS ON INTERNAL MIXING: INFRARED AND ULTRAVIOLET SPECTROSCOPY OF 1,1-DIPHENYLPROPANE

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Over the past few years, our group has studied a series of flexible bichromophores (e.g. Diphenylmethane) in which the degree of symmetry or asymmetry between the two UV chromophores is dictated by the position and type of substitution on the two rings. These studies provided fundamental insight into the vibronic coupling between the close-lying, intermingled excited states. Here, we present a study of the vibronic spectroscopy of 1,1-Diphenylpropane (DPP), in which the two phenyl rings are unsubstituted, but the alkyl chain itself is long enough to interact differently with the two rings, leading to an asymmetry in the local environments in which the two rings move. In this talk, we will discuss the results of single- and double-resonance spectroscopy methods applied to DPP, providing single-conformation UV spectra in the region of the S_0-S_1 and S_0-S_2 transitions. To this end, the LIF, R2PI and UV-UV holeburning spectra were recorded for DPP, identifying a single conformation under the isolated-molecule conditions of a jet-cooled environment. Dispersed fluorescence provided information on the vibronic make-up of the S_1 and S_2 states and on the degree to which these coupled states are shifted by introducing the propyl chain asymmetry. Furthermore, results from IR-UV holeburning, RIDIRS and infrared-ion gain spectroscopy (IR-IGS) in the alkyl and aromatic CH stretch regions provided further evidence for our assignments. Analogous data on 1,1-Diphenylethane will also be discussed.