A Transient Study of the Excited States Dynamics of Light-induced Intramolecular Hydrogen Abstraction in 2,5-dibenzoyl-p-xylene.

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Photoenolization of 2,5-dibenzoyl-*p*-xylene (1) has been shown to generate two photoenol moieties which can undergo Diels Alder cycloaddition reaction with bismaleimide to produce a polyimide.[1]

We report here the results of steady state and time-resolved study into the photophysics of 2,5-dibenzoyl-*p*-xylene in different solvents. Upon irradiation in degassed toluene, (1) forms a colored fluorescent (?$_{max}$=491nm) intermediate with a well resolved absorption band around 400 nm. The broad structureless fluorescent spectrum exhibited by this intermediate is almost the mirror image of its absorption spectrum. This intermediate decays with a rate constant of $1.21 \times 10^{-6} s^{-1}$. Oxygen was found to facilitates the disappearance of this intermediate. The phosphorescence quantum yield measured at 77 K was much less than that of benzophenone (?). Laser flash photolysis study of (1) using (excimer) and 355 nrn (Nd:YaG) produced a transient kinetics and spectra of intermediates consistent with an intermediate involved in the intramolecular hydrogen abstraction. The mechanism of the photolysis of (1) will be presented.

References:

1. Meador MA, Meador MA, Williams LL, Scheiman DA (1996) Macromolecules 29: 8983

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