STUDIES OF DIARYLMETHYL RADICAL PAIRS IN CRYSTALLINE TETRAARYLACETONES VIA LASER FLASH PHOTOLYSIS USING NANOCRYSTALLINE SUSPENSIONS

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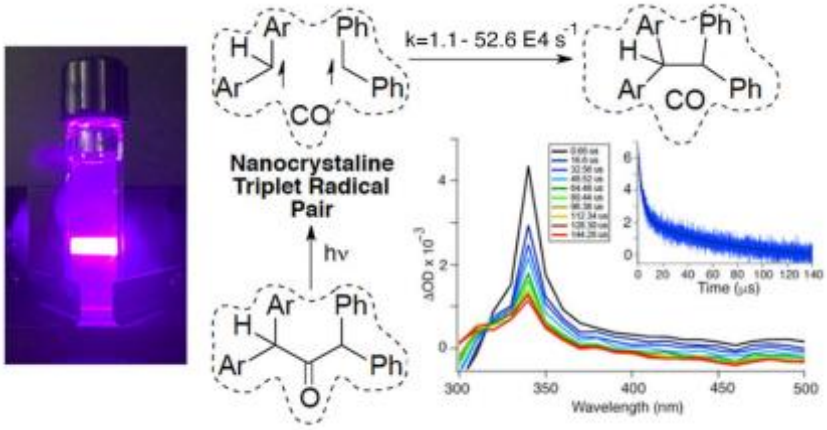
Aqueous suspensions of nanocrystals in the 200-500 nm size range display good absorption and transmission characteristics that can be used to carry out flash photolysis experiments in a flow system [1]. The nanosecond electronic spectra and kinetics of the radical pairs from various crystalline tetraarylacetones were obtained using transmission laser flash photolysis methods by taking advantage of aqueous nanocrystalline suspensions in the presence of submicellar CTAB, which acts as a surface passivator. After showing that all tetraarylacetones react efficiently by a photodecarbonylation reaction in the crystalline state, we were able to detect the intermediate radical pairs within the ca. 8 ns laser pulse of our laser setup. We showed that the solid state spectra of the radical pairs are very similar to those detected in solution, with λ_{max} in the 330-360 nm range. Kinetics in the solid state was observed to be bi-exponential and impervious to the presence of oxygen or variations in laser power. A relatively short lived component (0.3-1.7 μs) accounts for only 3-8% of the total decay with a longer-lived component having a time constant in the range of 40 to 90 μs depending on the nature of the substituents..



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