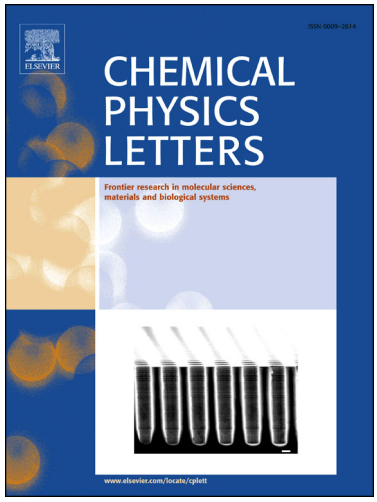

Research paper

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Photoluminescence Dynamics in Singlet Fission Chromophore Liquid Melts

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Abstract

The effect of high temperature melting on the photophysics of three prototypical singlet fission molecules is investigated. Time-resolved photoluminescence is used to look at the melt phase of the molecules tetracene, diphenylhexatriene and rubrene. Chemical decomposition of tetracene precluded any detailed measurements on this molecule. In the diphenylhexatriene melt, a rapid singlet state nonradiative relaxation process outcompetes singlet fission. In the rubrene melt, singlet fission occurs at a rate similar to that of the crystal, but the decay of the delayed fluorescence is much more rapid. The rapid decay of the delayed fluorescence suggests that either the triplet lifetime is shortened, or the fusion probability decreases, or that both factors are operative at higher temperatures.