

Accepted Manuscript

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PII: S0301-0104(13)00447-3

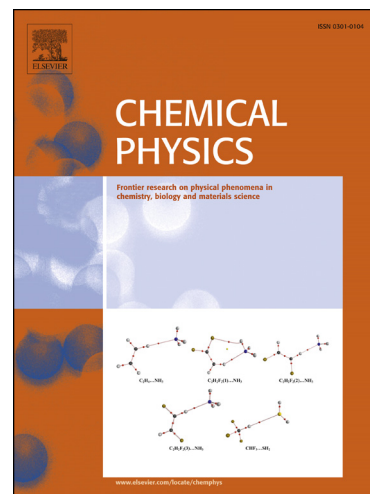
DOI: <http://dx.doi.org/10.1016/j.chemphys.2013.12.004>

Reference: CHEMPH 9010

To appear in: *Chemical Physics*

Received Date: 24 July 2013

Accepted Date: 2 December 2013



Please cite this article as: R. Karpicz, S. Puzinas, V. Gulbinas, A. Vakhnin, A. Kadashchuk, B.P. Rand, Exciton dynamics in an energy up-converting solid state system based on diphenylanthracene doped with platinum octaethylporphyrin, *Chemical Physics* (2013), doi: <http://dx.doi.org/10.1016/j.chemphys.2013.12.004>

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Exciton dynamics in an energy up-converting solid state system based on diphenylanthracene doped with platinum octaethylporphyrin

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(Received)

Abstract.

Photophysics of composite solid films based on 9,10-diphenylanthracene (DPA) doped with Pt(II)octaethylporphyrin (PtOEP) has been investigated by means of transient absorption and luminescence spectroscopy. The DPA:PtOEP host:guest system is a benchmark for incoherent energy up-conversion via triplet fusion in solution and we focus here on photophysical processes of this system in solid films. The triplet energy transfer from PtOEP to DPA takes place during tens of ns, featuring a thermally activated behavior. This implies that, before being transferred to the host, triplets migrate within PtOEP aggregates, defining a rate limiting step for the overall energy transfer to DPA. In contrast to other porphyrin-based sensitizers, no significant triplet-triplet annihilation was found to happen during triplet migration within PtOEP aggregates, implying that such a triplet loss mechanism does not universally apply to porphyrine-based organometallic complexes.

Keywords

Incoherent photon upconversion; phosphorescence; energy transfer; triplet-triplet annihilation; host-guest system; platinum-octaethyl-porphyrin; ultrafast spectroscopy

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