Search for New Chromophore Pairs for Triplet-Triplet Annihilation Upconversion

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Triplet-triplet annihilation (TTA) upconversion is a process in which low energy photons are converted into higher energy photons in various sensitizer and emitter chromophore pairs. This process represents a feasible direction towards converting low energy solar wavelengths to a range in which solar cells can absorb and convert into electricity. Sensitizer-emitter solutions were created with differing concentrations. Palladium (II) octaethylporphyrin (PdOEP) was employed as the sensitizer and remained at a constant concentration in solution. Diphenylanthracene (DPA), 9-bromo-10-phenylanthracene (9BPA), methoxy-alpha-cyano-oligo(phenylene vinylene) (alpha-OPV), and methoxy-beta-cyano-OPV (beta-OPV) were utilized as the emitters and differed in concentration in solution. DPA and 9BPA upconverted in solution while alpha-OPV and beta-OPV did not exhibit any upconversion. This current work is the first affirmation that 9BPA can effectively succeed as a TTA emitter in conjunction with PdOEP.

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