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**Geminate and non-geminate recombination of triplet excitons formed by singlet fission** SAM L. BAYLISS, ALEXEI CHEPELIANSKII, ALESSANDRO SEPE, BRUNO EHRLER, BRIAN J. WALKER, Cavendish Laboratory, University of Cambridge, J.J. Thomson Avenue, Cambridge, CB3 0HE, U.K., MATT J. BRUZEK, JOHN E. ANTHONY, Department of Chemistry, University of Kentucky, Lexington, KY 40506 (USA), NEIL C. GREENHAM, Cavendish Laboratory, University of Cambridge, J.J. Thomson Avenue, Cambridge, CB3 0HE, U.K. —
Singlet fission is a promising route to enhance solar cells by harvesting two electron-hole pairs from high-energy photons. Through singlet fission, an optically generated singlet exciton is transformed into two spin-correlated triplet excitons, which serve as a unique signature of the process. We use optically detected magnetic resonance to identify and study triplet excitons created through singlet fission in the solution-processable small molecule TIPS-tetracene (bis(triisopropylsilylethynyl)tetracene). Through changes in photoluminescence under spin resonance, we identify geminate recombination of triplet pairs directly following singlet fission, as well as recombination from bimolecular triplet-triplet annihilation. We show that both processes can be present in spin-coated films, and correlate the two distinct annihilation pathways to film morphology.

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