Singlet fission and triplet transfer to Si (and perhaps to a metal halide perovskite).

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We look at the electronic structure and energy level alignment at the double interface between tetracene (Tc), zinc phthalocyanine (ZnPc) and Si, designed to transfer to Si triplets generated by singlet fission in Tc. The ultra-thin intermediate layer of ZnPc is introduced to allow the formation of a ZnPc-Si charge transfer (CT) state with proper energy and transfer of charges to Si. The peak efficiency of charge generation per photon absorbed in Tc is shown to be (138±6)%. We also describe on-going experiments attempting to apply a similar concept to a metal halide perovskite.