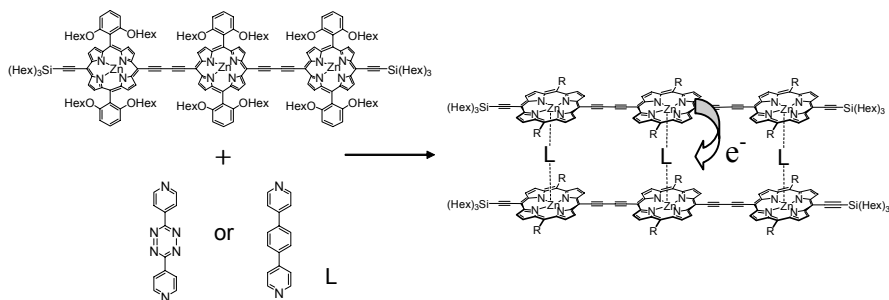


CHARGE SEPARATION WITHIN A SELF-ASSEMBLED LADDER REVEALED BY TRANSIENT ABSORPTION SPECTROSCOPY AND TRANSIENT DC PHOTOCONDUCTIVITY

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Highly conjugated porphyrin oligomeric self-assemblies are potential candidates for light-harvesting applications due to their high extinction and reasonably long singlet excited-state lifetime (~1 ns). Designing self-assemblies that work for solar-to-electricity conversion requires fundamental understandings of charge separation in those systems. We report charge-separation studies of a self-assembled oligomeric ladder structure ligated by tetrazine using absorption, fluorescence and transient absorption spectroscopies and transient direct current photoconductivity (TDCP). In this system, butadiynene-linked porphyrinic trimer acts as an electron donor and tetrazine as an acceptor. We observe that in the trimer-tetrazine ladder charges separate between the centers of porphyrin subunit and tetrazine with a lifetime of 0.19 ns. As a comparison, we do not observe charge separation in a previously reported prism structure incorporating with triazine.



Charge separation in trimer-tetrazine ladder