

CUNY NANO DAY

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12.55 pm

Peptide-porphyrin self-assembled nanostructures for artificial light harvesting in aqueous medium

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In here, we demonstrate the formation of a nanofibrous Fmoc (9-Fluorenylmethyloxycarbonyl) protected di-peptide/porphyrin self-assembly in aqueous medium using enzyme catalyzed amide condensation to generate a light harvesting hydrogel. Bio-catalytic self-assembly via amide condensation is capable of generating self-healing nanostructures that form structurally optimized conformations enabling effective incorporation of porphyrin. A highly organized nano fiber network through minimal kinetic defects lead to good performance with the critical distance (10 Å) and preferred aggregation (J-aggregation) between porphyrin molecules by forming β -sheets locked together via π - π stacking interactions of Fmoc moieties. The resulting xerogel produces steady photocurrent under a robust broadband light source (425 nm-800 nm) when used as the photoactive layer in a thin film organic photodetector (OPD).