

Water-Soluble graphene nanoensembles with dual porphyrin donor moieties.

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Hybrid materials based on graphene have the potential to cater to a variety of nanotechnological applications ranging from optoelectronics, to biomedical as well as, industrial.[1] We would like to present an array of novel graphene-based materials targeted for energy conversion systems that incorporate multichromophore systems, anchored onto graphene through non-covalent interactions.

The graphene itself has been prepared through ultrasonication processes, introducing minimal defects onto the graphitic backbone.[2] The non-covalent hybrid graphene materials comprise of multiple porphyrin systems stabilized through electrostatic interactions. The porphyrin moieties are negatively and positively charged, respectively and water soluble, forming a multi-chromophore water-soluble graphene trimer. Time-resolved photoluminescence experiments verify the promotion of electronic communication of the second porphyrin with the graphene through a formed porphyrin/graphene antennae dimer system.[3]

The introduction of these organic and aqueous soluble materials opens up a wide array of artificial photosynthesis applications in both solid state and electrochemical organic photovoltaic cells, while allowing more importantly for low-temperature deposition and precise optoelectronic chemical tailoring.

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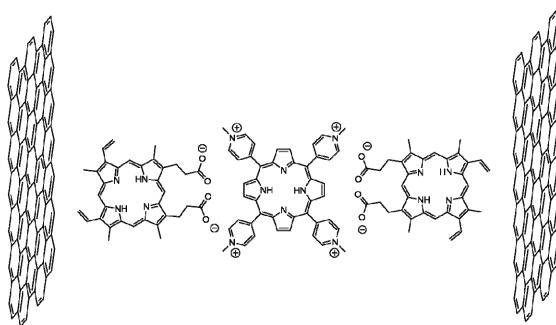


Figure 1: Schematic representation of exfoliated graphene-porphyrin-porphyrin supramolecular structure.

References

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