

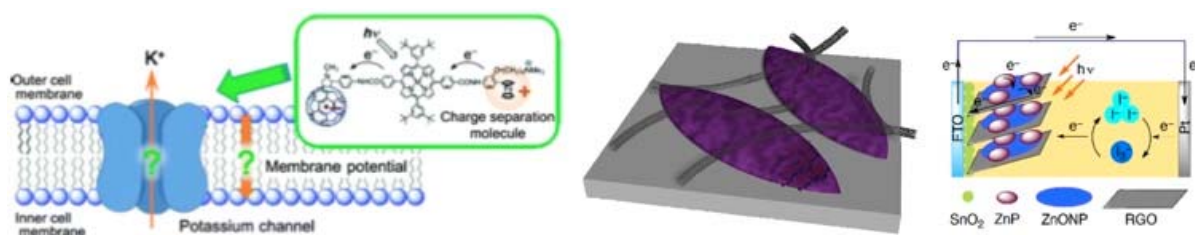
Molecular Engineering of Organic Materials for Energy and Biological Applications

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Large π -conjugated systems are promising building blocks for organic thin-film electronics such as organic light-emitting diodes, organic field-effect transistors, and organic photovoltaics. For instance, utilization of donor-acceptor (D-A) π -conjugated based nano- and micro-scale structures for the purpose is highly fascinating because of their excellent electric, photophysical, and electrochemical properties as well as intense self-assembling abilities arising from π - π stacking interactions. In this talk I will focus on fundamental aspects of self-assembled nano- and micro-structures that have been obtained from various D-A building blocks and more complex composites for photoinduced charge separation and charge transport toward potential energy and biological applications. Examples include D-A linked molecules, nanocarbon materials such as fullerenes, carbon nanotubes, and graphenes, conjugated polymers, porphyrins, and phthalocyanines. In connection with them I will also present an overview of our recent advances in dye-sensitized solar cells and bulk heterojunction solar cells.



References:

- 1) *J. Am. Chem. Soc.* **2009**, *131*, 3198. 2) *Acc. Chem. Res.* **2009**, *42*, 1809. 3) *Adv. Mater.* **2010**, *22*, 1767. 4) *Angew. Chem. Int. Ed.* **2011**, *50*, 4615. 5) *J. Am. Chem. Soc.* **2011**, *133*, 7684. 6) *J. Am. Chem. Soc.* **2011**, *133*, 10736. 7) *J. Phys. Chem. Lett.* **2012**, *3*, 478. 8) *Chem. Commun.* (Feature Article) **2012**, *48*, 4032. 9) *J. Am. Chem. Soc.* **2012**, *134*, 6092. 10) *J. Am. Chem. Soc.* **2012**, *134*, 17862. 11) *Angew. Chem. Int. Ed.* **2012**, *51*, 10315. 12) *J. Phys. Chem. C* (Feature Article) **2013**, *117*, 3195. 13) *Chem. Eur. J.* **2013**, *19*, 17075. 14) *J. Mater. Chem. A* (Feature Article) **2014**, *2*, 11545.