**Abstract**

**Engineering Nanostructured Material Systems for Enhanced Photoinduced Charge Transfer**

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Photoinduced charge transfer (PCT) plays a vital role in photosynthesis in nature, photovoltaics and optoelectronic devices. The overall performance of optoelectronic devices would much depend on the efficiency of PCT processes. Thus, design and assembly of materials to construct structurally optimized systems is a key step towards development of next-generation optoelectronic devices. In this talk, I should first introduce some basics of the PCT processes. I will then highlight a number of nanostructured material systems that have been studied recently in our group via collaborations with several international research groups. These systems include semiconductor nanoparticles (i.e. quantum dots (QDs) [1], rGO (reduced graphene oxide)-QD hybrid composites [2], flexible and ultralight metal oxide (MO) papers for photoelectrochmeical water splitting [3], photoresponsive core-shell fibers with anti-oxidation character [4], and nanocarbon-thylakoid membrane bioelectrochemical systems [5]. I will finally comment on current challenges and future perspective of possible emerging research lines.



**References**

1. (a) K. Zheng et al. *J. Am. Chem. Soc.* **2014**, *136*, 6259-6268; (b) M. Abdellah et al. *Nanoscale* **2017**, *9*, 12503-12508.
2. (a) S. Gan et al. *Adv. Mater.* **2012**, *24*, 3958-3964; (b) Nan Zhu et al. *Sci. Rep.* **2015**, *5*, 09860.
3. M. Zhang et al. *ACS Appl. Mater. Interfaces* **2017**, *9*, 3922-3930.
4. C. Hou et al. *Adv. Mater.* **2016**, *28*, 4097-4104.
5. (a) D. Pankratov et al. *ACS Energy Lett.* **2017**, *2*, 2635-2639; (b) G. Pankratova et al. *ACS Appl. Energy Mater.* **2018**, *1*, 319-323.

**Short biography**

Qijin Chi received his Ph.D. in analytical and physical chemistry from Changchun Institute of Applied Chemistry, Chinese Academy of Sciences (1994). After his postdoc experiences as a DFG fellow at Tübingen University, Germany (1994-1995) and as a JSPS fellow in Japan (1996-1998); he joined DTU Chemistry, Technical University of Denmark (DTU) in 1998, where he is currently an associate professor of physical and materials chemistry. He also studied biological chemistry and molecular biology at Johns Hopkins University School of Medicine for a period of three years (2000-2003). Dr. Chi is a member of several professional societies, notably as an elected member of the Danish Academy of Natural Sciences and a fellow of Royal Society of Chemistry (FRSC). He is a senior electrochemist. Dr. Chi has engaged in studying bioelectrochemistry and bioelectronics for over 20 years will high international recognition in the field. His current research interests focus on chemical design and assembly of nanostructured materials and interfaces for potential applications in flexible and wearable chemical sensors & biosensors, electrocatalysis and photo-electrocatalysis, and photoelectrochemical energy conversion.