For favour of posting

The Chinese University of Hong Kong
Department of Chemistry
Research Seminar Series

Speaker: Dr. Hsien-Yi Hsu
Chemistry and Biochemistry Department
University of Texas at Austin

Title: Photophysics & Photoelectrochemistry of Organic-inorganic Perovskites and Organometallic Polymers for Solar Energy Applications

<< *Abstract* >>

Hybrid organic-inorganic perovskite materials in photovoltaics have been making a rapid progress since 2009; as a result of impressive features, including high absorption coefficient, high charge-carrier mobility, long diffusion length, and low exciton binding energy. In addition, organometallic polymers have attracted interests because their photophysics features dominant long-lived triplet excited states. This feature gives a significant potential for diverse applications, such as solar cells, photocatalytic water splitting and solar energy conversion. Central to my research is the design of hybrid organometallic materials which consist of organic-inorganic perovskites and organometallic polymers, striving to explore photophysical and photoelectrochemical properties for enhancing energy conversion efficiency.

Date: March 1, 2016 (Tuesday)

Time: 2:30 p.m.

Venue: L3, Science Centre

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Contact Person:
Prof. Y.Y. Yeung

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The Chinese University of Hong Kong
Department of Chemistry
Research Seminar Series

Speaker: Prof. Xianzheng Zhang
Key Laboratory of Biomedical Polymers &
Department of Chemistry
Wuhan University

Title: Functional Peptides for Biomedical Applications

Date: March 17, 2016 (Thursday)

Time: 10:30 a.m.

Venue: Room 139
Science Centre

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Contact Person:
Prof. Chi Wu

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Revised

The Chinese University of Hong Kong
Department of Chemistry
Research Seminar Series

Speaker: Prof. Oren A. Scherman
Department of Chemistry
University of Cambridge

Title: Functional materials: Exploiting dynamic self-assembly at interfaces

<< Abstract >>

We are interested in the development of controlled polymer architectures, hybrid nanoparticle-soft matter assemblies and the integration of dynamic supramolecular systems at interfaces. Current research projects in the group include the application of macrocyclic host-guest chemistry using cucurbit[n]urils in the development of novel microcapsules, supramolecular hydrogels, drug-delivery systems based on dynamic hydrogels, adhesion between a variety of surfaces, the conservation and restoration of important historical artefacts[1a] through the exploitation of supramolecular polymer chemistry and sensing and catalysis using self-assembled nanophotonic systems.

Modification of solution viscosity using multivalent polymers has been accomplished through dynamic cross-linking in water using CB[8]. These hydrogels, with extremely high water content (up to 99.75% water by weight), have also been prepared by utilising renewable cellulose derivatives. Their rapid formation[1b] and shear-induced flow properties make these materials perfectly suited for use as injectable hydrogels for delivery of therapeutics.

Polymer-inorganic composite materials can be readily prepared based on the CB[8] coupling of multivalent gold nanoparticles (AuNPs) to functional copolymers. When these systems are attached onto gold surfaces intricate control is achieved over the site-selective immobilisation of colloids and peptides. This has great scope for the development of optical materials, chemical sensors[2] and biological separations. Additionally, we have developed an innovative new technique for manufacturing 'smart' microcapsules in large quantities using continuous flow in a single step from tiny droplets of water.[3a] The major advantage of this manufacturing platform over current methods is that a variety of cargos can be efficiently loaded during the microcapsule formation at room temperature, and the dynamic supramolecular interactions provide control over the porosity of the capsules and the timed release of their contents using stimuli.[3b] Our CB[n] based host-guest systems exhibit dynamic self assembly and are capable of responding to stimuli (photochemical, chemical, and thermal) allowing for external control and function to be built into the materials.

References

1. (a) Walsh, Z.; Janecek, E.R.; Hodgkinson, J.T.; Sedlmair, J.; Koutsioubas, A.; Spring, D.R.; Welch, M.; Hirschmugl, C.J.; Toprakcioglu, C.; Nitschke, J.R.; Jones, M.; Scherman, O.A. Proc. Nat. Acad. Sci. USA, **2014**, 111, 17743–17748. (b) Appel, E.A.; Forster, R.A.; Koutsioubas, A.; Toprakcioglu, C.; Scherman, O.A. Angew. Chem. Int. Ed., **2014**, 53, 10038–10043.
2. (a) Kasera, S.; Herrmann, L.O.; del Barrio, J.; Baumberg, J.J.; Scherman, O.A. Sci. Rep., **2014**, 4, 6785. (b) Herrmann, L.O.; Valev, V.K.; Tserkezis, C.; Barnard, J.S.; Kasera, S.; Scherman, O.A.; Aizpurua, J.; Baumberg, J.J. Nat. Commun., **2014**, 5, 4568.
3. (a) Zheng, Y.; Yu, Z.; Parker, R.M.; Wu, Y.; Abell, C.; Scherman, O.A. Nat. Commun. **2014**, 5, 5772. (b) Zhang, J.; Coulston, R.J.; Jones, S.T.; Geng, J.; Scherman, O.A.*; Abell, C.* Science, **2012**, 335, 690–694.

Date: March 29, 2016 (Tuesday)

Time: 9:15 a.m.

Venue: Room 103
Y.C. Liang Hall（潤昌堂）

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Contact Person:
Prof. To Ngai