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

Speaker: Professor Dawei Ma
Shanghai Institute of Organic Chemistry
Chinese Academy of Science

Title: Exploring New Methodologies to Enhance Synthetic Efficiency

Date: August 23, 2017 (Wednesday)

Time: 4:30 p.m.

Venue: LT4
Lady Shaw Building

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Contact Person:
Prof. Qian Miao

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

Speaker: Prof. Chin-Fa Lee
Department of Chemistry
National Chung Hsing University

Title: Syntheses of thioethers, thiophosphates and thioesters

Date: August 24, 2017 (Thursday)

Time: 2:30 p.m.

Venue: L5, Science Centre

< Abstract >

Sulfur-containing molecules are important skeletons in pharmacetical industry, organic synthesis and materials science. We have developed transition-metal-catalyzed strategy for the synthesis of aryl- and vinyl thioethers by using iron, manganese, rhodium and copper as the metal sources.[1,2] Thioesters are important building blocks for organic synthesis, and they have been utilized in acyl transfer reactions as the intermediates. Here we also report that the catalytic amount of CuCl is an active catalyst for the coupling of aldehydes with thiols in the presence of TBHP as an oxidant in water without any surfactant.[3] The synthesis of thiophosphates via *N*-chlorosuccinimide-promoted coupling of thiols and phosphonates is also reported.[4] Very recently, we discovered that the combination of CuI with oxalic diamide is a powerful catalyzed for the first cross-coupling of thiols with unactivated aryl chlorides.

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Chin-Fa Lee (李進發) National Taiwan University (Ph.D. 2002, with Prof. Luh, T.-Y.), Academia Sinica (Postdoctoral Researcher, 2002-2003, with Prof. Luh, T.-Y.). Yale University (Postdoctoral Associate, 2003-2004, with Prof. Hartwig, J. F.). Edinburgh University (Postdoctoral Fellow, 2004-2008, with Prof. Leigh, D. A.), National Chung Hsing University (assistant professor, 2008-2011; associate professor, 2011-2014; professor, 2014-present; Distinguished professor: 2016-present). Research interests: Transition-metal-catalyzed reactions, organic chemistry and supramolecular chemistry.

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Contact Person:
Prof. H.F. Chow

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

Speaker: Professor Wolfgang H. Binder
Chair of Macromolecular Chemistry
Martin-Luther University Halle-Wittenberg
Germany

Title: Self-healing polymers : introducing stress sensitivity and sensing in polymeric materials

Date: August 25, 2017 (Friday)

Time: 2:30 p.m.

Venue: L5
Science Centre

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Contact Person:
Prof. H.F. Chow

Self-healing polymers : introducing stress sensitivity and sensing in polymeric materials

*P. Michael, D. Döhler, R. Sravendra, A. Shaygan-Nia, Wolfgang H. Binder**

Faculty of Natural Science II, Chair of Macromolecular Chemistry, Martin-Luther University Halle-Wittenberg, von-Danckelmann-Platz 4, Halle (Saale) D-06120, Germany

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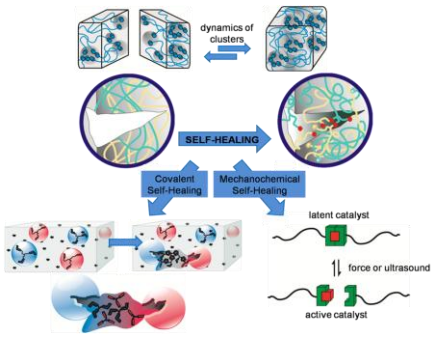
With the advent of self-healing (SH) materials a new vision of material science had been accomplished, together with the exploitation of specific chemical and physical principles.[1,2] Thus e.g. fast crosslinking and crack-repair after damage has been optimized via encapsulation and embedding of reactive components[3-7] the application of supramolecular bonds[8-11] has enabled multiple self-healing taking into account the relevant timescales of self-healing.[12] Especially the placement of reversible chemical elements enables to introduce designed dynamic properties in polymeric materials, in turn achieving self-healing properties as a new design-principle in material science.[10,13] Whereas dynamic effects can be well predicted in the presence of solvents or within gels, engineering such effects in solid polymer materials is considerably more difficult.[14-16]



The current presentation addresses principles of self-healing polymers taking place at the site of damage specifically via stress-induced chemical reactions, on the one hand via particular "click"-based chemistries to induce self-healing responses, on the other hand via supramolecular bonds, engineered to reversibly cluster/decluster generating transient networks in polymers, in turn achieving self-healing by dynamic reorganization of clustered chemical bonds[9]. A model is discussed, clearly presenting the mechanism of dynamics during the force-induced bond-rupture and reorganization[8,12].

A third healing principle is based upon metal-carbene complexes, where pressure is inducing rupture of metal-carbenes, which in turn can be used for an internal stress- and friction detection within a solid polymer[17]. The system is developed as a fluorescence-based stress detection system in polymers[18]. By introducing supramolecular healing principles mechanically stronger materials are obtained, displaying multiple healing-cycles together with eg. graphene-based nanofillers bearing attached catalytic systems.

Acknowledgements. Financial support from the DFG (project Bi 1337-1/8) within the framework of SPP 1568 (Design and Generic Principles of Self-Healing Polymers) and the EU-project IASS (within EU-FP7) are gratefully acknowledged.

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