For favour of posting

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

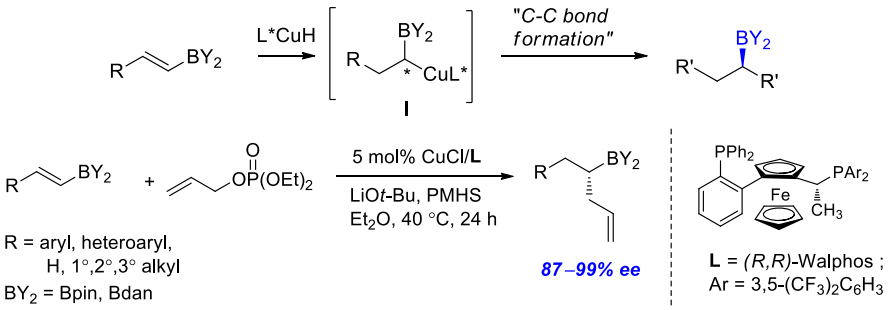
Speaker: Prof. Jaesook Yun
Department of Chemistry
Sungkyunkwan University

Title: Development of Copper-Catalyzed Asymmetric Additions: Asymmetric Hydroboration and its Application

<< Abstract >>

Organoboron compounds are versatile intermediates in synthetic organic chemistry. Transition-metal catalyzed additions of boron reagents to carbon–carbon multiple bonds have become important tools for the synthesis of organoboron derivatives. My research group has developed catalytic asymmetric reactions using copper catalysts with high levels of regio- and enantioselectivity. In this seminar, I will present the development of highly enantioselective copper(I)-catalyzed hydroboration of alkenes and synthesis of enantioenriched secondary borylalkanes through a copper-catalyzed tandem hydrocupration-allylation.

We recently proposed the formation of both racemic and enantioenriched boron(B)-α-chiral organocopper species (**I**) during our investigations of copper-catalyzed hydroboration of alkenylboron compounds and alkynes. Since a variety of B-α-chiral organocopper species can in principle be easily prepared with atom economy, we investigated their reactivity in tandem C–C bond formation reactions. We found that enantioenriched homoallylic borylalkanes could be prepared through a copper-catalyzed regio- and enantioselective hydroallylation of alkenyl boronates and boramides.



Date: June 2, 2017 (Friday)

Time: 4:30 p.m.

Venue: L1, Science Centre

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Contact Person:
Prof. Michael F.Y. Kwong

For favour of posting

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

Speaker: Professor Uwe H.F. Bunz
Lehrstuhl I, Institut für Organische Chemie
Ruprecht-Karls-Universität Heidelberg
Germany

Title: A Universal Sensor? The Optoelectronic Polymer Tongue

Date: June 5, 2017 (Monday)

Time: 10:30 a.m.

Venue: L3
Science Centre

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Contact Person:
Prof. Qian Miao

For favour of posting

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

Speaker: Professor Á ngela Sastre Santos
Instituto de Bioingeniería
Universidad Miguel Hernández
Spain

Title: Molecular materials for artificial photosynthesis and as components in solar cells devices

Date: June 5, 2017 (Monday)

Time: 2:30 p.m.

Venue: L3
Science Centre

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Contact Person:
Prof. Dennis K.P. Ng

For favour of posting

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

Speaker: Prof. Ulrich Hennecke
Organisch-Chemisches Institut
Westfälische Wilhelms-Universität Münster

Title: Asymmetric Halogenation of Alkenes, Alkynes and Allenes – from mechanistic concepts to new catalysts

Date: June 7, 2017 (Wednesday)

Time: 10:30 a.m.

Venue: L3, Science Centre

< Abstract >

The electrophilic addition of halogens or halogen derivatives to alkenes is one of the fundamental reactions of organic chemistry. However, reagent-controlled asymmetric variants of these reactions have been elusive for a long time. Only recently, enantioselective, electrophilic halofunctionalisation of alkenes has become an intensively investigated topic.[1],[2] A model reaction in this area is the halolactonisation of alkenoic acids and a range of new catalysts for enantioselective variants have been published.[1],[2] However, many current catalysts are limited to only one class of substrates and mechanistic understanding of the catalyst's function is missing.

Over the last years, we have developed new concepts to enable asymmetric halocyclizations of alkenes and other unsaturated carbon-carbon multiple bonds. We have introduced the concept of asymmetric opening of intermediate *meso*-halonium ions in the presence of a chiral counter anion.[3] This has led to highly enantioselective asymmetric cyclohaloetherifications of symmetrical and non-symmetrical alkenols. Furthermore we have shown that it is possible to extend asymmetric halocyclizations from alkenes to other unsaturated carbon-carbon bonds such as alkynes and allenes.[4] The desymmetrisation of dialkynoic acids is now possible with excellent enantioselectivities using cinchona alkaloid derivatives modified with a phthalazine group. Such catalysts including the commercially available (DHQD)2PHAL can be applied in a range of asymmetric halogenations including halolactonisations, halogen-induced semipinacol-type rearrangements and asymmetric dihalogenations.

[1] S. E. Denmark, W. E. Kuester, M. T. Burk, *Angew. Chem. Int. Ed.* **2012**, *51*, 10938. [2] C. Tan, Y.-Y. Yeung, *Chem. Commun*. **2013**, *49*, 7985-7996. [3] U. Hennecke, C. H. Müller, R. Fröhlich, *Org. Lett.* **2011**, *13*, 860; C. H. Müller, C. Rösner, U. Hennecke, *Chem. Asian J.* **2014**, *9*, 2162. [4] M. Wilking, C. Mück-Lichtenfeld, C. G. Daniliuc, U. Hennecke, *J. Am. Chem. Soc.* **2013**, *135*, 8133; M. Wilking, C. G. Daniliuc, U. Hennecke, *Synlett* **2014**, *25*, 1701; M. Wilking, C. G. Daniliuc, U. Hennecke, *Chem. Eur. J*. **2016**, *51*, 18601.

Ulrich Hennecke studied chemistry at the Universities of Marburg (Germany) and Cambridge (UK). For his PhD studies he joined the group of Prof. Dr. Thomas Carell and obtained his degree from the LMU Munich in 2007. After a postdoctoral stay at the University of Manchester with Prof. Dr. Jonathan Clayden supported by a DAAD fellowship (2007-2008), he returned to Germany to establish his own research group at the University of Münster. His research interests lie in the areas of organohalogen chemistry and asymmetric catalysis using nucleic acids. In 2014 he obtained his "*venia legendi*" in Organic Chemistry from the University of Münster. Currently, he is a project leader in the collaborative research center 858 and holds a "*Heisenberg fellowship*" awarded by the DFG in 2016.

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Contact Person:
Prof. Y.Y. Yeung

For favour of posting

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

Speaker: Prof. Seung Hwan Cho
Department of Chemistry
POSTECH, Korea

Title: 1,1-Bisborylalkanes: New Types of Organoboron Compounds for Chemo, Regio and Stereoselective Organic Transformations

Date: June 9, 2017 (Friday)

Time: 4:30 p.m.

Venue: L1, Science Centre

<< Abstract >>

1,1-Organodimetallic reagents are valuable starting materials for the construction of multifunctionalized molecules. Among them, 1,1-bisborylalkanes, which contain two boryl groups at the same carbon center, are particularly attractive due to their ease of handling, non-toxicity, stability, and propensity to undergo a variety of organic transformations. In this context, our lab is highly interested in the development of regio, chemo and stereoselective organic reactions using 1,1-diborylalkanes as new types of organodimetallic reagents.

In this seminar, the details about our recent findings using 1,1-bisborylalkanes in a range of organic transformations will be presented including 1) copper-catalyzed chemo-, diastereo- and enantioselective alkylation of 1,1-bisborylalkanes to imines, 2) an unprecedented transition-metal-free deborylative alkylation of *N*-heteroaromatic compounds using 1,1-bisborylalkanes as alkylation sources and 3) an unusual chemoselective coupling of 1,1-bisborylalkanes for the transition-metal-free borylation of aryl and vinyl halides.

References

(1) Kim, J.; Park, S.; Park, J.; Cho, S. H.* *Angew. Chem., Int. Ed.* **2016**, *55*, 1498.
(2) Park, J.; Lee, Y. Kim, J.; Cho, S. H.* *Org. Lett.* **2016**, *18*, 1210.
(3) Jo, W.; Kim, J.; Choi, S.; Cho, S. H.* *Angew. Chem., Int. Ed.* **2016**, *55*, 9690
(4) Lee, Y.; Baek, S.; Park, J.; Kim, S. T.; Tussupbayev, S.; Kim, J.; Baik, M. Cho, S. H.* *J. Am. Chem. Soc.* **2017**, *139*, 976.
(5) Kim, J.; Ko, K.; Cho, S. H.* *manuscript submitted*

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Contact Person:
Prof. Gavin C Tsui

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

Speaker: Prof. Gerhard Erker
Organisch-Chemisches Institut
Westfälische Wilhelms-Universität Münster
Germany

Title: Organometallic Frustrated Lewis Pairs

Date: June 12, 2017 (Monday)

Time: 10:30 a.m.

Venue: LT3
Lady Shaw Building

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Contact Person:
Prof. Zuowei Xie

For favour of posting

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

Speaker: Prof. Gerhard Erker
Organisch-Chemisches Institut
Westfälische Wilhelms-Universität Münster
Germany

Title: Frustrated Lewis Pair Chemistry: Principle and Some Recent Developments

Date: June 12, 2017 (Monday)

Time: 3:30 p.m.

Venue: L1
Science Centre

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Contact Person:
Prof. Zuowei Xie

For favour of posting

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

Speaker: Prof. Yufeng Wang
Department of Chemistry
The University of Hong Kong

Title: Colloids with valence: Fabrication and Directed Self-Assembly

Date: June 16, 2017 (Friday)

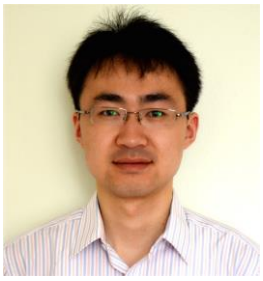
Time: 10:30 a.m.

Venue: L3, Science Centre

< Abstract >

Self-assembly of colloidal particles has emerged as a promising strategy to construct micrometer-scale 3D ordered composite materials such as photonic crystals. Meanwhile, colloidal particles can serve as model building blocks to study the self-assembling processes of molecular systems. However, the lack of directional interactions between the common isotropic particles has imposed much limitation on the study of colloidal self-assembly. In this talk, I will discuss strategies we developed that circumvent this issue by introducing several new colloidal systems including colloids with valence, 3D lock and key colloids, DNA coated colloids, etc. These colloids often possess reversible, specific, and directional interactions and well-defined geometries, the self-assembly of which results in a wide variety of colloidal architectures that mimics many natural molecular shapes as well as structures that find no analogy in nature. I will also briefly discuss the electric field-assisted dynamic self-assembly of colloids with tunable surface patches; they form colloidal crystals and helices. The new and complex colloidal materials we designed are potentially useful in a wide spectrum of applications including photonics, plasmonics, catalysis, drug delivery, biomedicine, modeling etc.

References:
Chem. Mater., *27*, 8337-8344, **2016**; Chem. Mater., *28*, 3984-3989, **2016**; Nature Communication, *6*, 7253, **2015**; J. Am. Chem. Soc., *137*, 3069-3075, **2015**; J. Am. Chem. Soc. *137*, 10760–10766, **2015**; J. Am. Chem. Soc., *136*, 6866-6869, **2014**; J. Am. Chem. Soc., *135*, 14064–14067, **2013**; Nature, *491*, 51-55, **2012**



Yufeng Wang received his BS in chemistry from Peking University in 2008, where he studied polymer chemistry under the guidance of Prof. Xinhua Wan. He then joined the group of Prof. Marcus Weck at New York University, department of chemistry, studying the fabrication and self-assembly of complex materials including colloids and polymers. Under the supervision of both Prof. Marcus Weck and Prof. David Pine, he obtained his Ph. D in materials chemistry in 2014. From 2014 to 2016, he did his postdoctoral research with Prof. Jeremiah Johnson at Massachusetts Institute of Technology working on creating dynamic yet robust polymer materials through molecular self-assembly. Dr. Wang joined the department of chemistry, the University of Hong Kong in Fall 2016 where he is currently an assistant professor.

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Contact Person:
Prof. To Ngai