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

Speaker: Professor Yoshitaka Hamashima
School of Pharmaceutical Sciences
University of Shizuoka

Title: Organofluorine chemistry: Synthetic methods and applications from a personal perspective

< Abstract >

Organofluorine compounds are important in the field of pharmaceutical, agrochemical, and material sciences. Because fluorine substitution often improves the biological activity and metabolic stability of the parent compounds, efficient methods to incorporate fluorine substituents are in great demand. Although fluorination chemistry has a long history, introduction of fluorine atom(s) and (per)fluoroalkane units needs much improvement to supply structurally sophisticated compounds. Reflecting the importance of oraganofluorine compounds in drug development, we have been investigating several fluoro-functionalizations including catalytic asymmetric fluorination and trifluoromethylation of unsaturated bonds. While alpha-fluorination of carbonyl compounds has been well documented, reactions of alkenes have been less well studied in contrast to rapid progress in asymmetric reactions with heavier halogen atoms. I will review fundamental properties of fluorine substitution and the history of stereoselective fluorination reactions briefly and share our basic idea to address the issue with the emphasis on the design of novel chiral catalysts.

Beside the synthetic methodology, we also have an interest in fluorine-modified functional molecules. We have investigated fluorine-containing di- and triamines conjugated with phospholipid and a radical trapping radioisotope tracer. The synthesis and preliminary evaluation studies of these molecules will be presented shortly.

Date: August 6, 2019 (Tuesday)

Time: 2:30 p.m.

Venue: G18, Basic Medical Science Building

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Contact Person:
Prof. Ying-Yeung Yeung

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

Speaker: Professor Yoshitaka Hamashima
School of Pharmaceutical Sciences
University of Shizuoka

Title: Halo-functionalizations of organic molecules enabled by unique oraganocatalysts

<< Abstract >>

Selective functionalization with heteroatoms is extremely important, because incorporation of such functional groups can enhance the value of compounds considerably. We are particularly interested in difunctionalization of alkenes via asymmetric bromination and fluorination reactions. Considering the intrinsic nature of each halogen atom, we have been working on the development of novel organocatalysts for halogenation.

Thus, we found that chiral bisphosphines such as BINAPs are effective catalysts for enantioselective bromocyclization of allylic amide derivatives. Careful examination of the reaction mechanism revealed a unique role of BINAP derivative, which is distinct from regular Lewis basic action and provide a new guide for further study.

For fluorination reaction, we have created two anionic phase transfer catalysts to make fluorination reactions with cationic Selectfluor enantioselective. Probably due to mismatched hard/soft character between fluorine and π-bonds, stereoselective fluorination of alkenes has been difficult to achieve. Using our designer catalysts, unprecedented asymmetric fluorination reactions of alkenes became feasible.

In this presentation, the details of these studies and further applications will be discussed. Additionally, our recent work on C(sp3)-H fluorofunctionalization is briefly presented as a related study.

Date: August 9, 2019 (Friday)

Time: 2:30 p.m.

Venue: Room 158, 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: Professor Hiroyuki Furuta
Department of Chemistry and Biochemistry
Graduate School of Engineering
Kyushu University

Title: N-Confused Hexaphyrins: Versatile NIR Ligands for Bis-Metal Coordination

Date: August 15, 2019 (Thursday)

Time: 10:00 a.m.

Venue: Room G04
Y.C. Liang Hall

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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: Professor Hiroyuki Furuta
Department of Chemistry and Biochemistry
Graduate School of Engineering
Kyushu University

Title: Creation from Confusion: A Journey of Porphyrin Mutant

Date: August 16, 2019 (Friday)

Time: 4:30 p.m.

Venue: LT2
Mong Man Wai Building

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Contact Person:
Prof. Dennis K.P. Ng