

Special Departmental Seminar

By

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Catalytic Applications of Boron and Aluminum Cations

Date:	12 June 2025 (Thursday)
Time:	11:00 am – 12:00 noon
Venue:	P4302 (Purple Zone, 4th Floor)
	Yeung Kin Man Academic Building
	City University of Hong Kong

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For abstract, please refer to the attached sheet.

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~ All Are Welcome ~



Group 13 complexes are prototypical Lewis acids with numerous applications in organic synthesis. As the catalytic applications of neutral group 13 catalysts continue to expand, the chemistry of cationic group 13 catalysts has also emerged in recent years. In the past few years, our group has reported that hypercoordinate boron cation ([Cp*B-R]+) is effective in catalyzing hydrosilylation and cyanosilylation of carbonyl derivatives. Kinetic studies on the related pyridine-coordinate borenium cations revealed that the reagent coordinated boron cation obtained from the reaction between TMSCN and [Cp*B-R]⁺ is much more efficient in promoting the transfer of TMS-CN to the substrate. Subsequently, we discovered that the Cp* substituent is not essential to realize a borinium catalyst. An aryl amino borinium ion, [TMP-B-Mes]⁺, can also catalyze the hydrosilylation of ketones and promote Si-H/Si-C cross metathesis at room temperature. In addition to achiral catalysts, chiral functionalities can be incorporated into the Cp*-stabilized boron cation system, leading to a series of chiral [B-CI-B]⁺ diboron cations and hypercoordinate boron cations. Furthermore, in addition to boron cations, we have prepared a series of prolinol-derived tetra-coordinate chiral aluminum cations, which exhibit considerably higher Lewis acidity compared to $B(C_6F_5)_3$. These aluminum cations are effective in catalyzing the C2-alkylation of indole through asymmetric Michael addition and the hydrophosphination of alkenes.

Biography

Ching-Wen Chiu is a Professor and the Deputy Chair of the Department of Chemistry at National Taiwan University. She also serves as the Chair of the Chemistry Promotion Center of Taiwan since 2023. She earned her Ph.D. in Chemistry from Texas A&M University in 2008 and conducted two years of postdoctoral research at the University of Wuerzburg. In 2010, she began her independent research position at National Taiwan University as an Assistant Professor and was promoted to Associate Professor in 2015 and full Professor in 2022. Since 2019, she has been serving as an Associate Editor for Organometallics. Professor Chiu's research focuses on synthesis and catalytic application of low-coordinate Group 13 and 14 complexes, p-block cationic complexes promoted asymmetric catalysis, and reactivity studies of p-block free radicals. In addition to her chemical research, she has made significant contributions to the chemistry community in Taiwan by launching a monthly Chinese Chemistry Newsletter in April 2021, establishing a three-year Read & Publish agreement (2024-2026) for 25 research institutions in Taiwan with ACS publications, and organizing the first chemistry job fair for chemistry-related fields in Taiwan in February 2024. Professor Chiu also chaired the 8th Asian Silicon Symposium in October 2022 and co-chaired the 8th Asian Conference on Coordination Chemistry in July 2022. Her contributions to the community have been recognized with several awards, including the Ta-You Wu Memorial Award and the Young Scholars' Creativity Award.