

A Strategy for Selective Catalytic B-H Functionalization of *o*-Carboranes

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Abstract:

Carboranes are a class of polyhedral boron hydride clusters in which one or more of the BH vertices are replaced by CH units. They constitute a class of structurally unique molecules with exceptionally thermal and chemical stabilities and the ability to hold various substituents. These properties have made them useful building blocks in supramolecular design, medicine, catalysts and materials. However, their unique structures make derivatization difficult, resulting in a limited application scope. Thus, it is important and necessary to develop new methodologies for selective functionalization of carboranes. In the past few years, we have developed a series of methodologies for controlled functionalization of carboranes via regio- and enantio-selective cage B-H activation, including cage B(3,6)-diborylation, cage B(4,5)-dialkenylation, B(4,5)-diarylation, B(4,5)-dihalogenation, B(3)-borylation, B(4)-alkenylation, B(4)-alkynylation, B(4)-amination, B(4)-hydroxylation, and B(8)-arylation. These results will be discussed in this lecture.¹⁻⁹

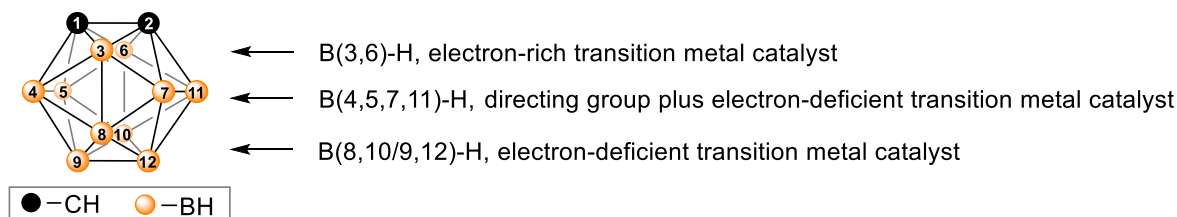


Fig 1. A Strategy for Cage B-H Functionalization

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Bio-Sketch of Speaker

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Prof. Zuowei Xie is a member of the Chinese Academy of Sciences and the Hong Kong Academy of Sciences as well as a Fellow of the Chinese Chemical Society and Royal Society of Chemistry. He is currently a Choh-Ming Li Professor of Chemistry in The Chinese University of Hong Kong. He received a BSc degree from Hangzhou University (now Zhejiang University) in 1983 and a MSc in 1983 from Shanghai Institute of Organic Chemistry, the Chinese Academy of Sciences. He earned his PhD in Chemistry in 1990, working in a joint PhD program offered by Shanghai Institute of Organic Chemistry and Technische Universität Berlin. He has been working in the Chemistry Department of The Chinese University of Hong Kong since 1995. Prof. Xie's main research interests center around the chemistry of (super)carboranes, metallocarboranes and low-valent main group elements, as well as catalytic B-H bond functionalization. He has published over 320 scientific papers and received numerous honors and awards including the Inaugural Hong Kong Research Grants Council Senior Research Fellowship (2020), Ministry of Education Higher Education Outstanding Scientific Research Output Awards in Natural Sciences (2019), the Chinese Chemical Society Yao-Zeng Huang Award in Organometallic Chemistry (2010), the prestigious State Natural Science Prize (2008), and The Croucher Award (2003).