

CHEMISTRY & BIOCHEMISTRY SEMINAR SERIES:

From Rhodium to Cobalt: Expanding Catalytic Double Hydroborations from Pyridines to α,β -Unsaturated Systems

Abstract:

In the first part of this seminar, we present our recent developments in transition metal (Rh, Co)-catalyzed (asymmetric) double hydroboration of quinolines and pyridines.¹⁻³ Particular emphasis is placed on highly challenging, unprecedented ligand-controlled regiodivergent double hydroboration of pyridines. As a catalytic platform, this methodology enables the selective synthesis of two pairs of multifunctionalized piperidine isomers.⁴ The origin of this regiodivergent ligand effect is elucidated through combined experimental and computational mechanistic studies. The second part of the presentation describes the extension of this substrate scope from pyridines to acyclic conjugated systems—including enals, enones, and enimes—by employing sustainable and straightforward Co-based catalytic systems.⁵ This unified catalytic approach establishes the first example of metal-catalyzed (regiodivergent) (asymmetric) double hydroelementation ($E \neq H$) of pyridines, as well as the first (asymmetric) double hydroelementation ($E \neq H$) of enones and enimes (Fig. 1).⁶



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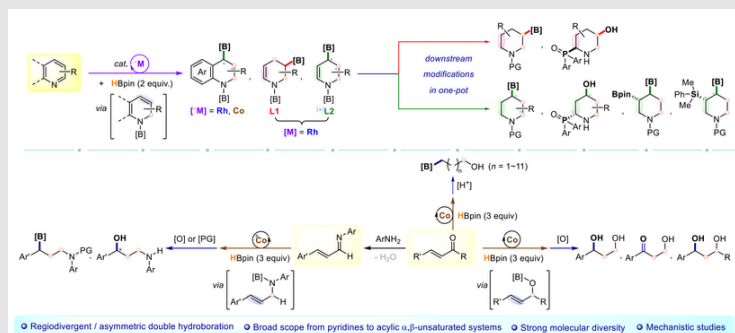


Figure 1. Transition metal-catalyzed double hydroboration of pyridines and α,β -unsaturated systems.

About the Speaker:

Sehoon Park earned his Ph.D. under the supervision of Profs. Kohtaro Osakada and Daisuke Takeuchi from the Tokyo Institute of Technology in 2008. He completed postdoctoral research under the supervision of Prof. Maurice Brookhart at the University of North Carolina at Chapel Hill before serving as a Senior Research Fellow under the mentorship of Prof. Sukbok Chang at the Institute for Basic Science from 2013 to 2019. He joined the Guangdong Technion-Israel Institute of Technology in 2019 as an Assistant Professor and became an Associate Professor in 2025. His research focuses on synthetic organometallic chemistry and mechanistic studies, specifically emphasizing new catalytic applications within the field.