

Enantioconvergent Functionalization of Alcohols via Borrowing Hydrogen Catalysis

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The development of economical and selective catalytic methods is of great importance for advancing sustainable chemical synthesis. My research group in NUS focuses on the discovery of catalytic enantioselective, redox-neutral transformations that enable the direct conversion of readily available feedstock materials into valuable chiral molecules with broad applications in organic synthesis. In particular, we have developed a series of direct, stereoconvergent functionalization of racemic alcohols through borrowing hydrogen catalysis, providing an efficient and economical approach to chiral amines, N-heterocycles, alcohols, ketones, and related compounds. In this talk, I will present our recent progress in identifying new catalytic processes along these lines.

Yu received his B.S. in Chemistry from Peking University in 2002 and his Ph.D. from Boston College in 2008 under the guidance of Prof. Marc L. Snapper and Prof. Amir H. Hoveyda. He subsequently carried out postdoctoral research with Nobel Laureate Prof. Richard R. Schrock at MIT. In 2011, he was awarded the prestigious NRF Fellowship in Singapore and joined the Department of Chemistry at the National University of Singapore (NUS) as an Assistant Professor. He was promoted to Associate Professor in July 2017 and to Full Professor in January 2024.

His research program at NUS focuses on the discovery and development of efficient catalytic methods to advance sustainable chemical synthesis, with applications in medicinal chemistry and materials science. In particular, his group is well known for developing green chemistry methodologies based on the borrowing hydrogen strategy, enabling practical and economical synthesis of fine chemicals and functional materials. In the past 15 years, his group has published > 90 peer-reviewed articles, most of which are in top chemistry journals such as Nat. Chem., Nat. Synth., Chem, J. Am. Chem. Soc. and Angew. Chem. Int. Ed. His research achievements have been recognized with multiple international awards, including the Thieme Chemistry Journal Award, eight Asian Core Program Lectureship Awards, and the Tokyo Chemical Industry–SNIC Industry Award in Synthetic Chemistry.

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