University of Minnesota
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Department of Chemistry

Special Seminar

4:15 p.m. Monday, February 28 • 331 Smith Hall

Assistant Professor

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Department of Chemistry
University of Florida

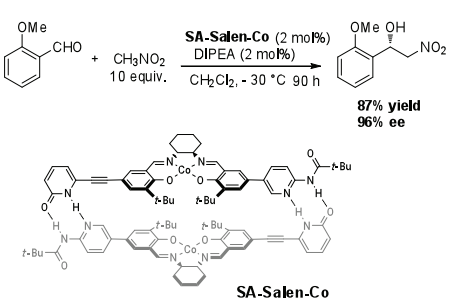
Exploring New Ligand Designs for Asymmetric Catalysis

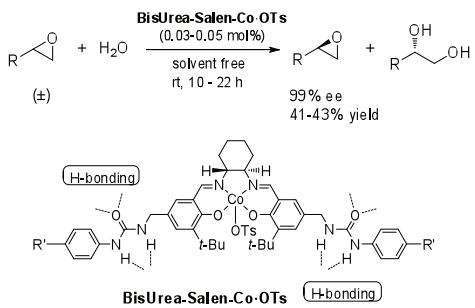
Research interests: Asymmetric catalysis for organic synthesis, including chiral diaminocarbene ligands and self-assembled dinuclear catalysts; development of small molecule anti-cancer agents; and total synthesis of complex molecules with interesting biological activities.

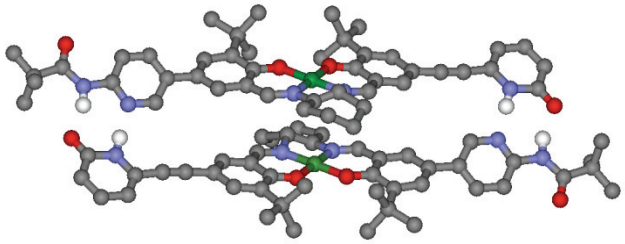
Website: http://www.chem.ufl.edu/~shong/group

Abstract

Novel chiral Co-salen catalysts capable of self-assembly through hydrogen bonding have been developed. First, a self-assembled dinuclear Co(II)-Salen catalyst featuring the pyridone/aminopyridine H-bonding pair results in significant rate acceleration (48 times faster rate) as well as excellent enantioselectivity (96% ee vs 55% ee) in nitro-aldol reaction, compared to the corresponding monomeric catalyst.[1] Second, bis-urea functionalized salen-Co(III) complexes have been designed to form self assembled structures in solution through self-complementary urea-urea hydrogen bonding interactions. Bis-urea functionalized salen-Co catalysts result in rate acceleration (up to 14 times) in hydrolytic kinetic resolution of terminal epoxides, compared to the corresponding monomeric catalyst.[2] Detailed kinetic and mechanistic study results will be discussed.







[1]Park, J.; Lang, K.; Abboud, K. A.; Hong, S. Self-Assembled Dinuclear Cobalt(II)-Salen Catalyst Through Hydrogen-Bonding and Its Application to Enantioselective Nitro-Aldol (Henry) Reaction. J. Am. Chem. Soc. 2008, 130, 16484-16485.
[2]Park, J.; Lang, K.; Abboud, K. A.; Hong, S. Self-Assembly Approach toward Chiral Bimetallic Catalyst: Bis-Urea Functionalized (Salen)Cobalt Complexes for the Hydrolytic Kinetic Resolution of Epoxides. Chem.-Eur. J. 2011, Early View (DOI: 10.1002/chem.201002600).

Host: Professor Thomas Hoye