

Materials Chemistry Seminar

Friday February 9, 2024
11:30 a.m. ~ BRWN 4102

***"Diastereoselective Hydrogenation of Arenes Over
Monometallic Heterogenous Catalyst Rh/C
Using Amines as Directing Group"***



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Abstract:

Heterogenous arene hydrogenation is an important tool within the catalysis community to generate 3d molecules from 2d rings. Previously reported literature has shown diastereoselective hydrogenation of arenes over Ru or Rh noble metal nanoparticles using steric control. However, the steric control is unpredictable and achieving the counter-steric product is still a challenging task. Using a directing group to achieve high counter-steric diastereoselectivity is a commonly reported technique for alkene hydrogenation in homogenous catalysis. However, most homogenous catalysts are unstable and get reduced to metal nanoparticles in high temperature and reducing environments required for arene hydrogenation. In this work, we are developing a methodology for amine directed hydrogenation of fused bicyclic scaffolds using Rh nanoparticle catalysts. We chose primary amines because of their common occurrence in biological compounds and their strong adsorption to the catalyst surface. Our studies revealed that heterogeneous hydrogenation results in all-cis hydrogen addition to the aromatic ring with >91:9 diastereomeric ratio across a broad range of substrates. A small quantity of trans product (< 5% Trans) shows that intermediate desorption does not occur in multi-step hydrogen addition. Ongoing work will focus on expanding the substrate scope and determining the stereochemical interplay between substrate steric bulk and amine adsorption over a monometallic heterogenous catalyst.

Bio:

Anish is a second-year grad student in Professor Christina Li's group. He earned his BS from Delhi University and MS from Central University of Haryana, India. Then, worked as a Research and Development assistant with Prof. Sebastian C. Peter on Thermochemical CO₂ reduction for two years at JNCASR, Bangalore. He joined the Li lab in Fall 2023. Currently, he is working on Directed Diastereoselective Hydrogenation of Arenes using Supported Metal Catalyst. In his spare time, he likes to play badminton or watch something.