Harnessing alcohols as renewable reagents for sustainable organic transformations

Debasis Banerjee
Associate Professor
Department of Chemistry, Laboratoty of Catalysis and Organic Synthesis
Indian Institute of Technology Roorkee, Roorkee-247667, India
e-Mail: debasis.banerjee@cy.iitr.ac.in; Homepage: *https://iitr.ac.in/dbiitrlab/*

Abstract:
Alcohol is ubiquitous with unparalleled structural diversity and thus has wide applications as a native functional group in organic synthesis. It is highly prevalent among biomolecules and offers promising opportunities for the development of chemical libraries. Over the last decade, alcohol has been extensively used as an environmentally friendly chemical for numerous organic transformations.[1] Direct application of renewable alcohols as electrophilic coupling partner represents a sustainable alternative, as they can be readily available in industrial scale production from lignocellulose biomass.
Recently, there is a potential drive to replace the precious noble-metal catalysts using earth abundant and inexpensive non-noble metals for sustainable organic transformations. We have studied a general and practical applications of various primary alcohols, including diols and amino alcohols for selective construction of C-C bonds or N-heterocycles using (de)hydrogenation strategies. A detailed mechanistic studies were also established for such transformations using Ni or Fe-based catalysts.[2-5]

References:

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Bio-Sketch:

Debasis Banerjee obtained Ph.D. in organic chemistry from Indian Institute of Technology Kanpur. Thereafter he moved to LIKAT, Germany for a postdoctoral position with Prof. Matthias Beller (2011-14) and subsequently held another postdoctoral position (2014-2015) at the Stockholm University, Sweden with Prof. Jan-Erling Bäckvall. Currently he is an Associate Professor at the Indian Institute of Technology Roorkee (Uttarakhand, India). He is a recipient of Early Career Research Award (ECR), DAE-Young Scientist Research Award, Thieme Chemistry Journals Award, and Chemical Research Society of India (CRSI) Bronze Medal of 2023. Recently he has been received Humboldt Research Fellowship for Experienced Researchers (Germany-2024). His research focus on non-precious metal catalysis for organic transformations, switchable catalysis, functionalization of small molecules, and application to industrial valuable products.