Naturally Derived Sugar-NHC Hybrid Ligands with Cost Effective and Earth Abundant Transition Metals: Synthesis and Studies on Sustainable Asymmetric Organic Transformations

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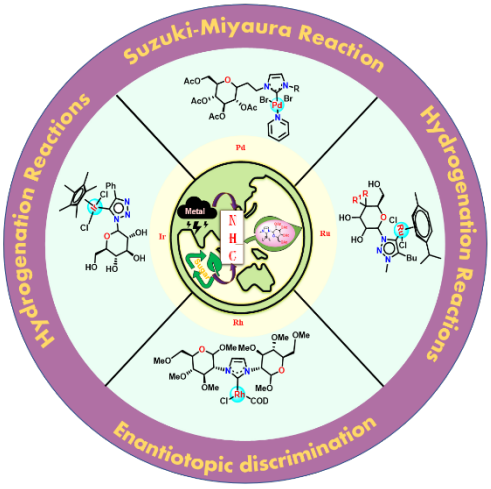
Graphical Abstract/ Layout



Project Description:

Over the last two decades, transition-metal catalysis based on palladium, rhodium, ruthenium, and iridium has been shown to be highly efficient for a wide range of organic transformations. Nevertheless, these metals have inherent drawbacks such as limited availability, higher cost, and toxicity. Environmentally friendly options are becoming more and more common. First-row transition metals with a high abundance on Earth, such as manganese, iron, cobalt, nickel, vanadium, and chromium, are crucial in this regard. Carbohydrates (Fructose, Glucose, Xylose, Ribose, etc.) are the most abundant bio-organic molecules in this regard, and they are classified as monosaccharides, disaccharides, and polysaccharides. In comparison to other natural chiral pools such as amino acids, the use of carbohydrate-derived chiral catalysts or chiral ionic salts in asymmetric synthesis has received little attention. In this perspective, the proposed work involves the development of monosaccharide derived carbohydrate based *N*-heterocyclic carbene ligands along with the earth abundant and cost effective transition metals for developing organic transformation via chemo, regio, enantio and diastereoselective reactions. Carbohydrate-based N-heterocyclic Carbene-Metal Complexes: A New Route to Sustainable Organic Transformations.

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3