**Escaping from Flatland: Streamlined Synthesis of C(sp3)-Rich Amines and *N*-Heterocycles**

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Constructing C(sp3)-rich densely functionalized amines and N-heterocycles with multiple stereocenters, especially when they are adjacent, is a challenging process that few procedures address, requiring the use of difficult-to-access reagents and chiral auxiliaries. Therefore, the general preparation of enantio- and diastereoselective C(sp3)-rich molecules with multiple stereocenters from readily accessible substrates remains an important challenge. In this presentation, I will discuss the use of low-cost copper catalysis for multiple carbon-carbon bond formation in biologically important 3-azabicyclo compounds and cyclopropanes, as well as the mechanistic insight into these processes. Additionally, I will present the use of low-cost copper catalysis for efficient three-component enantio- and diastereoselective coupling for high-value amine and N-heterocycle synthesis. Finally, I will discuss the synthesis and development of new iron and cobalt complexes, as well as their use in the biomimetic oxidation of amines and N-heterocycles using cobalt catalysts as electron transfer mediators.



**References:**

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