

Transition Metal Mediated Molecular Transformations via C-H activation.

The development of new catalytic methods for the transformation of C-H bonds into C-C and C-N bonds is constantly evolving. The use of transition metals like palladium, ruthenium and iridium has been explored, with most recent interest being on iron and nickel. In order to design an efficient catalyst, one has to understand the extensive mechanism behind the interaction of the substrate with the catalyst. The low toxicity and environmental impact of iron (Fe) catalysis, drove us to explore the use of this metal towards an array of substrates. This talk focuses on our findings on the mechanistic study for Fe-based direct arylation of an aryl imine and novel allylic alcohol rearrangement. The syntheses of Pd and Ir based catalysts will also be discussed. The Pd-based scaffold catalyst will be used for the conversion of primary alcohols into secondary alcohols in the presence of an aryl halide. This catalyst consists of a carbene which binds reversibly to an alcohol and orients the substrate for the catalysis. The Ir-based pseudo-pincer was used for the formation of cyclic amines from aryl azides. This catalyst is designed to form a pincer complex in situ, after the metal center binds to the nitrene derived from the azide substrate, orienting the tethered sp^3 hybridized C-H to be activated by the metal.