Ligand-Enabled Redox Gold Catalysis

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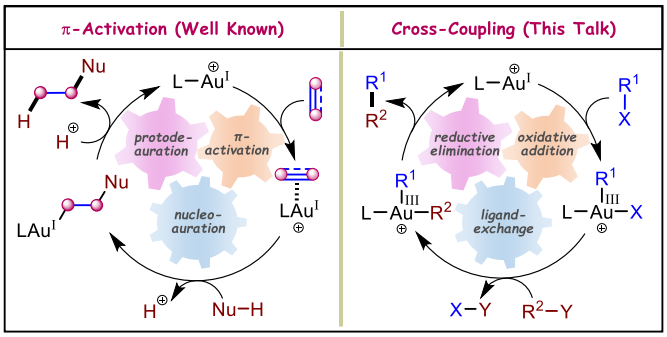
Abstract

Traditionally, gold complexes have been recognized as Lewis acid catalysts for the activation of C-C multiple bonds (Scheme, LHS). Over the years, there has been a considerable shift, and Au(I)/Au(III) redox catalysis is now recognized as an established technique for achieving cross-coupling reactivities (Scheme, RHS). The pioneering work by Zhang and Toste group revealed the role of external oxidants to overcome the high redox potential of Au(I)/Au(III) couple (E0 = +1.41 V) and to facilitate two-electron redox cycle in gold catalysis. Later, the Glorius group introduced the merged gold/photoredox strategy to circumvent the need for a stoichiometric oxidant in these processes. The Waser group showed that ethynylbenziodoxolones (EBXs) acts as both an oxidant and an alkyne surrogate, enabling redox gold catalysis.

All the above strategies were not amenable to the use of aryl halides, and thus their use in gold-catalyzed cross-coupling reactions remained forbidden. In recent years, ligand-enabled gold-catalyzed organic reactions have emerged as a valuable tool, allowing for the use of aryl halides as cross-coupling partners. In this talk, I will discuss our most recent work on alkene functionalization employing cross-coupling reactivities.



References

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