

Research Proposal Seminar

Amine Directed Transition Metal Catalyzed C–H Bond Activation and Functionalization

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(CY17D030)

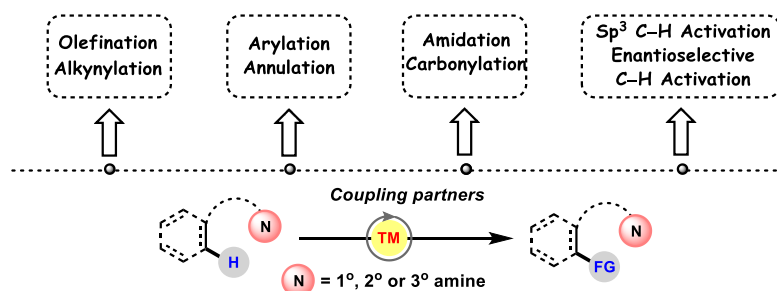
Guide: Dr. Md. Mahiuddin Baidya

Date:

Time: 3.00 pm

Abstract

Over the last two decades, transition metal catalysed C–H bond activation reactions have emerged as a vibrant area of research, allowing functionalization of otherwise unactivated C–H bonds and offering unconventional disconnection approach for the synthesis of complex molecules.¹ Directing group (DG) plays pivotal role in this strategy in controlling the regioselectivity. It coordinates with the metal catalyst to bring it in the close proximity of a desired C–H bond for functionalization, albeit a plethora of C–H bonds are present in organic molecules. Over the years, variety of DGs have been designed and employed for this purpose.^{1,2} These include strongly coordinating bidentate DGs as well as weakly coordinating monodentate DGs. However, the use of common organic functional groups as DGs obviates the problem of installation and removal of DGs, and thereby boosts up step economy and versatility of the reaction.^{1c} In this aspect, the use of amine functionality as a DG is advantageous.² Amines are major constituents of valuable building blocks and several complex natural products. Further, amine functionality can also be easily transformed into a variety of functionalities. Consideration of free amines as DGs also brings several problems, like formation of stable yet unreactive transition metal complexes, direct nucleophilic additions, as well as competing undesired side reactions like oxidative degradation, beta-hydride elimination. Nevertheless, with judicious tuning of reaction conditions, free amines have been successfully engaged as a DG in C–H activation reactions. In this presentation, the development and advancement of amine directed C–H bond functionalization strategies under transition metal catalysis will be presented along with the research proposal.



Scheme: Amine-directed aromatic and aliphatic C–H bond activation and functionalization.

References:

- (a) *Handbook of C–H Transformations: Applications in Organic Synthesis*, ed. G. Dyker, Wiley-VCH, Weinheim, **2005**; (b) *C–H Activation: Topics in Current Chemistry*, ed. J.-Q. Yu and Z. Shi, Springer, Berlin, vol. 292, **2010**. (c) Mandal, A.; Dana, S.; Chowdhury, D.; Baidya, M. *Chem. Asian. J.* **2019**, *14*, 4074.
- (a) Alberico, D.; Scott, M. E.; Lautens, M. *Chem. Rev.* **2007**, *107*, 174. (b) Arockiam, P. B.; Bruneau, C.; Dixneuf, P. H.; *Chem. Rev.* **2012**, *112*, 5879. (c) He, C.; Whitehurst, W.; Gaunt, M.J. *Chem.* **2019**, *5*, 1.

Signature of Guide

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