

Ph.D. Open Seminar

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Title of Seminar: *Weakly Coordinating Directing Groups in Transition Metal Catalyzed C-H Functionalization*

Date: 1st September 2017

Time: 10:00 AM

Venue: AB-II-401

Abstract

The C-H bond can be viewed as a ubiquitous functional group in organic molecules. The conversion of unactivated C-H bonds into carbon-carbon or carbon-heteroatom bonds is the most significant conclusion of the transition metal catalyzed C-H activation process.¹ In this scenario, employment of Lewis-basic directing groups has opened up new avenues to achieve site-selectivity in transition metal catalyzed C-H functionalization.² In the work carried out in this Thesis, we successfully developed a new class of Weinreb amides as directing groups in ruthenium-catalyzed site-selective C-H olefinations, wherein we were able to circumvent the reductive-destruction of the Weinreb amide framework, thereby retaining its synthetic utility.^{3a-b} Benzyl nitriles, Weinreb amides and anilides were developed as weakly-coordinating directing groups in palladium-catalyzed proximal C-H halogenations. Mechanistic investigations brought out interesting aspects with regard to the mode of C-H functionalization. This work also led to a rapid assembly of the phenanthridone skeleton.^{3c} In a work pertaining to site-selective C-H olefination of π -deficient heterocycles, switching site-selectivity within a single substrate was successfully achieved, indirectly proving the two different pathways operating in the palladium and ruthenium catalyzed reactions. Here too, studies related to the mechanistic aspects brought out the difference in the mode of C-H metallation of quinolines and isoquinolines.^{3d-e}

References:

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2. For reviews on this topic see: (a) Zhang, M.; Zhang, Y.; Jie, X.; Zhao, H.; Li, G.; Su, W. *Org. Chem. Front.* **2014**, *1*, 483. (b) Das, R.; Kumar, G. S.; Kapur, M. *Eur. J. Org. Chem.* **2017**, *2017*, 0000 (DOI: 10.1002/ejoc.201700546).
3. (a) Das, R.; Kapur, M. *Chem. –Asian J.* **2015**, *10*, 1505. (b) Das, R.; Kapur, M. *Chem. –Eur. J.* **2016**, *22*, 16986. (c) Das, R.; Kapur, M. *J. Org. Chem.* **2017**, *82*, 1114. (d) Tiwari, V. K.; Kamal, N.; Kapur, M. *Org. Lett.* **2017**, *19*, 262. (e) Das, R.; Khot, N. P.; Kapur, M. (Manuscript under preparation).