

Ph.D. Open Seminar
Department of Chemistry

Title of Seminar: Transition Metal-Catalyzed Directed C-H Functionalization of Heterocycles in C-C and C-X bond formation.

Speaker: **Paridhi Saxena**

Date: **March 29, 2019**

Time: **5:00 PM**

Roll No.: **1320209**

Venue: **AB-II-401**

Abstract

The transition metal-catalyzed direct C–H bond functionalization has emerged as a unique synthetic approach for the construction of carbon-carbon and carbon-heteroatom bonds from simple starting materials thereby improving the overall efficiency of the desired transformation.¹ However, it remains a challenge to develop highly efficient strategies to enhance the reactivity for the cleavage of the strong C–H bond and the control of site-selectivity. One of the incipient methods to meet these challenges is the utilization of a directing group (DG) that brings the targeted C–H bond in greater proximity to the transition metal center so that it can activate the C–H bond and form the reactive organometallic intermediate.²

In the work carried out for this dissertation, we have successfully explored efficient catalytic approaches to achieve the site-selective formation of C-C and C-X bond *via* directed C-H functionalization. Towards this endeavour, we have developed a simple and efficient cobalt-catalyzed C-H nitration of indoles wherein the directing group is removable, thereby improving its synthetic utility.³ In another work, transition metal-catalyzed site-selective arylation of fused heterocycles was explored which unveiled a completely different mode of action of dioxazolones as a masked ester surrogate.³ In addition, a new approach for the site-selective C-H alkylations of π -deficient heterocycles has been developed, thereby overcoming a long-standing problem of regioselective alkylation of aza-heterocycles.³

References:

- 1) (a) Shilov, A. E.; Shul'pin, G. B. *Chem. Rev.* **1997**, *97*, 2879. (b) Z. Chen, B. Wang, J. Zhang, W. Yu, Z. Liu, Y. Zhang, *Org. Chem. Front.* **2015**, *2*, 1107.
- 2) (a) Murakami, K.; Yamada, S.; Kaneda, T.; Itami, K. *Chem. Rev.* **2017**, *117*, 9302. (b) Das, R.; Kumar, G. S.; Kapur, M. *Eur. J. Org. Chem.* **2017**, 5439. (c) Das, R.; Kapur, M. *Asian J. Org. Chem.* **2018**, *7*, 1217.
- 3) (a) Saxena, P.; Kapur, M. *Chem. -Asian J.* **2018**, *13*, 861. (b) Saxena, P.; Maida, N.; Kapur, M. (*Manuscript submitted*). (c) Saxena, P.; Jha, N.; Kapur, M. (*Manuscript under preparation*).