

Ph. D. Open Seminar

Department of Chemistry, IISER Bhopal

Topic of Seminar: Iodine and Organoselenium Assisted Intramolecular Cyclization Reactions: Synthesis of Normal and Medium-Sized Heterocycles

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Roll No.: 1210202

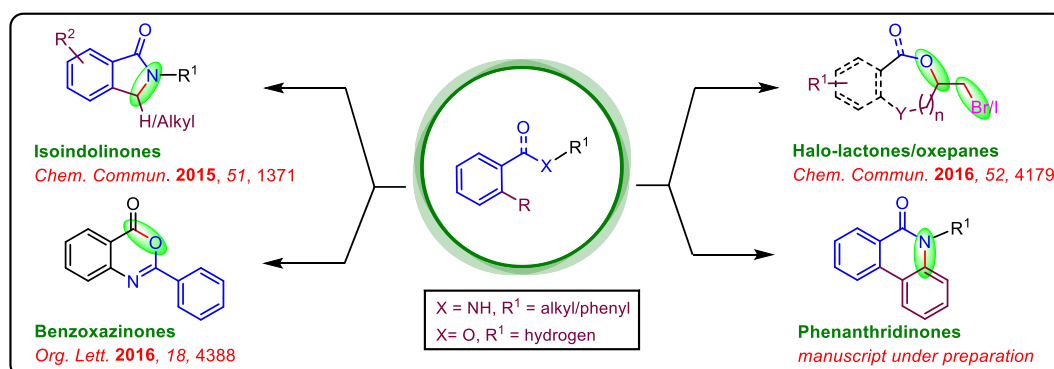
Date: February 17, 2017

Time: 2:30 PM

Venue: AB-II, Room No. 401

Abstract

Development of environmentally benign, operationally simple, and efficient strategies for the construction of privileged molecular skeletons paves considerable attention of researchers.¹ In this direction, transition metal(TM)-free methodologies have been developed, which avoid costly metals having limited feedstock and ligands that are even more expensive.^{1b} Organoseleniums used as efficient catalysts for the oxidation, and electrophilic halogenation reactions of alkenes; as selenium enhances the electrophilic nature of halogen.^{2a} Notably, halogen-mediated coupling reactions have emerged as an alternative to transition metal approaches for the C–H functionalization.^{2b-c} However, selective C–H functionalization in these reactions brings a new challenge in the present era.³



During my doctoral studies, efforts are made to find a suitable iodine reagent, radical initiator with the combination of appropriate base and solvent to address the challenges associated with selective functionalization of C(sp³)–H and C(sp²)–H bonds.^{4,5} In this seminar, at first, the properties of iodine and their applications in various organic transformations will be explained. Afterwards, the synthesis and mechanistic understanding of normal sized (5-6 membered) *N*- and *O*-heterocycles under iodine and peroxide mediated conditions will be discussed.⁴ Finally, regioselective synthesis of medium-sized (7-11 membered) halolactones and bromooxepanes from alkenoic acids utilizing a co-catalytic system of organoselenium and 4-(dimethylamino)pyridine will be presented.⁵

References:

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2. (a) Balkrishna S. J.; Prasad, C. D.; Panini, P.; Detty, M. R.; Chopra D.; Kumar, S. *J. Org. Chem.*, **2012**, *77*, 9541. (b) Wirth, T. *Angew. Chem., Int. Ed.* **2005**, *44*, 3656. (c) Narayan, R.; Matcha, K.; Antonchick, A. P. *Chem. Eur. J.* **2015**, *21*, 14678.
3. Hartwig, J. F.; Larsen, M. A. *ACS Cent. Sci.* **2016**, *2*, 281.
4. (a) Verma, A.; Kumar S. *Org. Lett.* **2016**, *18*, 4388. (b) Verma, A.; Patel, S.; Meenakshi; Kumar, A.; Yadav, A.; Kumar, S.; Jana, S.; Sharma, S.; Prasad, C. D.; Kumar, S. *Chem. Commun.* **2015**, *51*, 1371. (c) Verma, A.; Kumar S. *manuscript under preparation*.
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