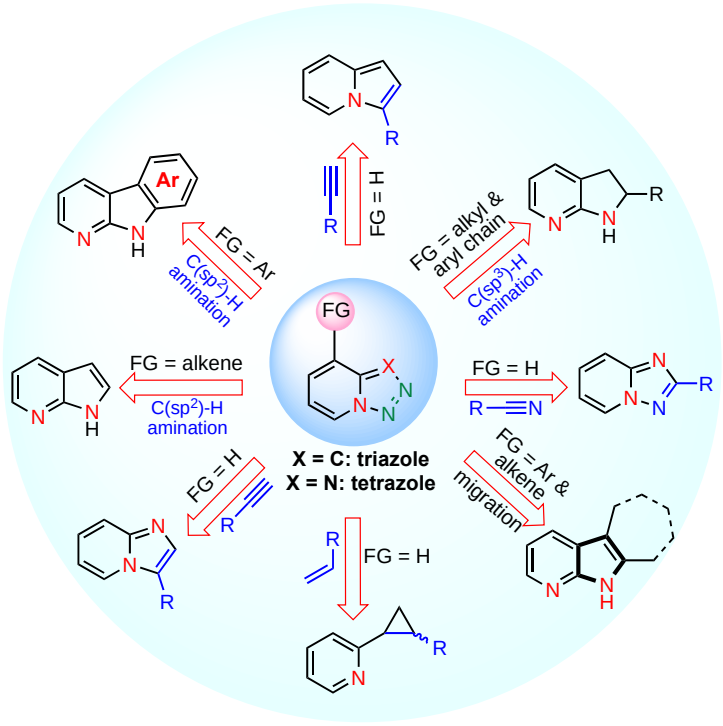
Metalloradical Activation for Denitrogenative Annulation

Author(s) name: Buddhadeb Chattopadhyay*
Division of Molecular Synthesis & Drug Discovery
Centre of Biomedical Research (CBMR), Lucknow
(Email: buddhadeb.c@cbmr.res.in)

Abstract : The pursuit for the discovery of new and powerful synthetic methods to access high-valued *N*-heterocycles has been at the forefront of organic chemistry research for more than a century. Considering the importance of *N*-scaffolds in modern science, over the past few decades great research efforts have been made to develop efficient synthetic methods for the construction of nitrogen rich molecules. Among many efforts, metalloradical activation of triazoles and tetrazoles via denitrogenative annulation reaction has emerged as a cornerstone due to its innate versatility and wider scope of application. The denitrogenative annulation approach offers clear preferences over many existing methods, as it enables effective, single-step interconversion of easily available feedstocks into a variety of other important *N*-containing heterocyclic frameworks. In this talk, we would like to show some of the recent discoveries from our laboratories for the metalloradical activation of triazoles and tetrazoles via denitrogenative annulation reaction to prepare high-valued *N*-heterocycles.

Figure/Scheme:



References and Notes:

1. Roy, S.; Das, K. S.; Chattopadhyay, B.; *Angew. Chem. Int. Ed.* **2018**, *57*, 2238.
2. Das, S. K.; Roy, S.; Khatua, H.; Chattopadhyay, B. *J. Am. Chem. Soc.* **2018**, *140*, 8429.
3. Roy, S.; Khatua, H.; Das, S. K.; Chattopadhyay, B. *Angew. Chem., Int. Ed.* **2019**, *58*, 11439.
4. Das, S. K. ; Roy, S. ; Khatua, H.; Chattopadhyay, B. *J. Am. Chem. Soc.* **2020**, *142*, 16211.
5. Khatua, H.; Das, S. K.; Roy, S.; Chattopadhyay, B. *Angew. Chem. Int. Ed.* **2021**, *60*, 304.
6. Roy, S.; Das, S. K.; Khatua, H.; Das, S.; Singh, K. N.; Chattopadhyay, B. *Angew. Chem. Int. Ed.* **2021**, *60*, 8772.

Bio-Sketch of Speaker

Dr. Buddhadeb Chattopadhyay
Assistant Professor
Division of Molecular Synthesis & Drug Discovery
Centre of Biomedical Research (CBMR), Lucknow
Contact Number: 9005853385
e-Mail: buddhadeb.c@cbmr.res.in
Homepage: http://www.buddhacbmr.org/

Buddhadeb graduated (2003) with M.Sc. in Organic Chemistry from Visva-Bharati University (Santiniketan) and earned Ph.D. degree in Synthetic Organic Chemistry from the University of Kalyani (2009), West Bengal. In 2009, he accepted a postdoctoral research associateship from the University of Illinois at Chicago, USA in the group of Professor Vladimir Gevorgyan. Spending two years at Chicago, he then moved to the Michigan State University, Michigan, USA for his next postdoctoral research program in the laboratories of Professor Milton R. Smith III. Group (2011-July 2014). In August 2014, he moved to the Centre of Biomedical Research (CBMR) Lucknow, India as a Ramanujan Fellow and since November 2016, he is working as an Assistant Professor. His research interest includes design and synthesis of new catalytic systems employing various noncovalent interactions for the C–H bond activation/borylation/silylation chemistry and synthesis of medicinally important heterocyclic molecules via metal-nitrene/carbene chemistry. Buddhadeb is a recipient of Thieme Chemistry Journal Award (2017), DST-Young Scientist Award (2015), Ramanujan Fellowship (2014) and SERB-STAR Award (2019).

Selected Publications:

Formal Ir-Catalyzed Ligand-Enabled Ortho- and Meta-Borylation of Aromatic Aldehydes via in Situ Generated Imines. Bisht, R.; Chattopadhyay, B. *J. Am. Chem. Soc.* 2016, *138*, 84-87.

Non-Covalent Interactions in Ir-Catalyzed C–H Activation: L-Shaped Ligand for Para-Selective Borylation of Aromatic Esters. Hoque, E.; Bisht, R.; Haldar, C.; Chattopadhyay, B. *J. Am. Chem. Soc.* 2017, *139*, 7745-7748.

Ir-Catalyzed Intramolecular Transannulation/C(sp^2)–H Amination of 1,2,3,4-Tetrazoles by Electrocyclization. Das, S. K.; Roy, S.; Khatua, H.; Chattopadhyay, B. *J. Am. Chem. Soc.* 2018, *140*, 8429-8433.

Remarkably Efficient Iridium Catalysts for Directed C(sp2)−H and C(sp3)−H Borylation of Diverse Classes of Substrates. Hoque, E.; Hassan, M. M. M.; Chattopadhyay, B. *J. Am. Chem. Soc.* 2021, *143*, 5022–5037.

Meta Selective C–H Borylation of Sterically Biased and Unbiased Substrates Directed by Electrostatic Interaction. Chaturvedi, J.; Haldar, C.; Bisht, R.; Pandey, G.; Chattopadhyay, B. *J. Am. Chem. Soc.* 2021, *143*, 7604-7611.