**Halogen–Bonding Catalysis for Organic Synthesis**

Prof. Sekar Govindasamy

Department of Chemistry, IIT Madras, INDIA

*gsekar@iitm.ac.in*

In recent years, halogen bond donor organocatalysts have been employed to activate the Lewis basic functional groups.1 The halogen–bonding (XB) interaction between the Lewis bases and the halogen(I) reagents or halonium ions intermediates are shown to enhance the reactivity and selectivity of organic reactions.1b Recently, our research group has developed new iodine(I) and iodine(IIII) halogen bond donor catalysts for organic reactions (Figure 1).2,3 For example, NBS and *in situ*–generated acetyl hypoiodite (CH3COOI) have been employed for selective oxidation of hetero benzylic C(sp3)–H bond to C(sp2)–O and C(sp3)–O bonds *via* activation of the heterocyclic ring. The halogen–bonded iodonium ions have been utilized as stable and key oxidants to develop domino oxidation of benzylic secondary alcohols to synthesize α–hydroxy ketones. Also, several organic reactions have been developed using XB catalysts along with visible light.



***References***

[1] (a) G. Cavallo, P. Metrangolo, R. Milani, T. Pilati, A. Priimagi, G. Resnati, G. Terraneo, *Chem. Rev.* **2016**, *116*, 2478. (b) S. Guha, I. Kazi, A. Nandy, G. Sekar, *Eur. J. Org. Chem.* **2017**, *23*, 5497*.* (c)R. L. Sutar, S. M. Huber, *ACS Catal.* **2019***, 9*, 9622.

[2] (a) I. Kazi, S. Guha, G. Sekar, *Org. Lett.* **2017**, *19*, 1244. (b) S. Guha, I. Kazi, P. Mukherjee, G. Sekar, *Chem. Commun.,* **2017**, *53*, 10942. (c) S. Guha, G. Sekar, *Chem. Eur. J.* **2018**, *24*, 14171.

[4] (a) S. Guha, I. Kazi, G. Sathish, G. Sekar, J. Org. Chem. **2022**, 87, 5424. (b). G. Sekar, N. Anuradha, Indian Patent No. 408736 (30/12/2021) and 406714 (02.12.2021).