

*Crystal engineering of functional materials via halogen bonding*

Anindita Goswami<sup>1</sup>, Kumar Biradha<sup>1</sup>

<sup>1</sup>Department Of Chemistry, IIT Kharagpur, Kharagpur, India

E-mail: anindita.goswami2309@gmail.com

Solid state [2+2] reactions are important for the synthesis of complex molecules and functional materials in high yields with regio-/stereospecificity. The alignment of a pair of olefin moieties in parallel has been accomplished by non-covalent interactions and metal coordination bonds. Several olefin derivatives containing bis-amidopyridine units as appendages as well as their Ag(I)-CPs were shown by us to undergo [2+2] photo dimerization/polymerization reactions in SCSC manner. The salient feature of this work is the well defined amide-to-amide hydrogen bonding or Ag...Ag interactions that templates and help the reaction to proceed under SCSC manner. Similar to hydrogen bonding, halogen bonds can be introduced to direct self-assembly of molecules in liquid crystals, influence structural and physical properties, to control solid state reactivity that has potential to develop useful functional materials. The energy and geometrical features of halogen bonds depend on atomic character of halogen atoms as it functions as electrophilic species. The dihalogen molecules can be useful to form strong halogen bonds due to their polarization effect. Herein, the co-crystals of olefins containing bis-amidopyridine ligands with I<sub>2</sub>/Br<sub>2</sub>, have been explored towards the templation of solid state [2+2] reactions. Some of these results will be presented in detail with respect to their hydrogen bonds, halogen bonds, the reactive alignments of olefins and their photo chemical reactivities.

[1] Schmidt, G. J. M. et. al. (1971) Pure Appl. Chem. 27, 647-678.

[2] Ramamurthy, V. & Sivaguru, J. (2016) Chem. Rev. 116, 9914-9993.

[3] Sonoda, Y. et. al. (2011) Molecules 16, 119-148.

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