

Ph.D. Open Seminar

Speaker: Sajal Khatua (Advisor: Dr. Sanjit Konar)

Title: Porous Organic Inorganic Hybrid Materials for Selective and Reversible Detection of Small Molecules, Guest Dependent Luminescent Behavior, Guest Induced Proton Conduction

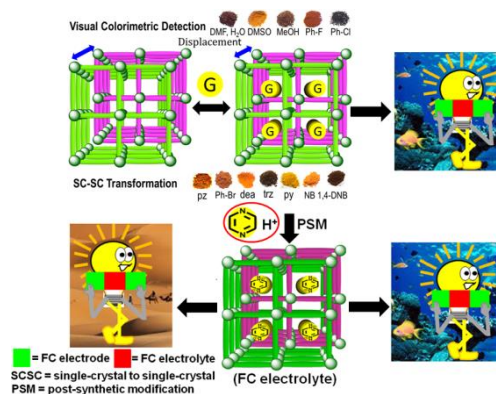
Date: 11/03/2016

Time: 5.00PM

Venue: AB-II-401

Abstract

The reliable and accurate separation and visual detection of health hazardous and explosive materials is a prime issue for homeland security, and environmental cleaning. In this regards, metal-organic frameworks (MOFs) have received considerable scientific attention for their potential applications in sensing, gas storage and separation, proton conduction, magnetism, and catalysis, etc.¹ In the MOF-based sensor the signal transductions employed luminescence quenching or enhancement after incorporating certain analytes in the pores. One of the simplest, and most powerful, means of signal transduction is a visible change in a material's color upon incorporation of different class of guests with certain shift of optical absorption bands. But for developing proton conducting materials, carrier molecules should be well connected in the channel.²



In this seminar, a novel 2D Cu(I)-MOF which acts as a visual recognition of hazardous and explosive materials as well as proton conductivity in the presence of these materials will be discussed. It reversibly encapsulates solvents, toxic monohalobenzenes, N-heterocycles, amine, and explosive nitroaromatics in vapor phase under ambient conditions through Single Crystal to Single Crystal (SCSC) fashion without loss of framework integrity.² Moreover it shows excellent guest dependent luminescence behaviour and guest induced amphibious super protonic conductivity through post synthetic modification.³ Thus, to clean environment and clean energy, both happening in a single framework is very rare.

References

1. (a) Kreno, L. E.; Leong, K.; Farha, O. K.; Allendorf, M.; Van Duyne, R. P.; Hupp, J. T. *Chem. Rev.* **2012**, *112*, 1105. (b) Ramaswamy, P.; Wong, N. E.; Gelfand, B. S.; Shimizu, G. K. **2014**, *43*, 5913.
2. **Khatua, S.**; Goswami, S.; Biswas, S.; Tomar, K.; Jena H. S.; Konar, S. *Chem. Mater.*, **2015**, *27*, 5349.
3. (a) Neutral guest induced conductivity of Cu(I)-MOF, **Khatua, S.**; Bar, A. K.; Konar, S. Manuscript Communicated. (b) Acid induced conductivity of Cu(I)-MOF, **Khatua, S.**; Bar, A. K.; Konar, S. Manuscript Communicated.