MS101.O01

Metal-organic Frameworks (MOFs) for Sensing Applications

Sujit K. Ghosh[1]
[1]*Dept. Of Chemistry, IISER Pune, Pune, India*
E-mail: sghosh@iiserpune.ac.in

Selective sensing of chemically and biologically relevant species hold the key to develop sensors based on molecular recognition and is an active field of research in supramolecular chemistry. Metal-organic Frameworks (MOFs) have emerged as a promising class of materials in the regime of sensory materials mostly due to the rational designing based on the ligand and metal ions/clusters, tuneable architectures and suitable host-guest interactions in such open frameworks. The wide choice of metal ions and ligands used in the synthesis of MOFs bestow ample opportunities to modulate the opto-electronic properties of such porous networked structures. Especially fluorescent MOFs as sensory material offers several advantages like molecular sieving effect, pre-concentration of analytes, optical band gap tuning with respect to target analyte and guest accessible pendant groups allow selective interaction. MOFs decorated with specific recognition sites can be utilized to design a chemical sensor which identifies a target analyte molecule, selectively. Also, the chemical stability of MOFs allows the scope of reusability of the material and a possibility of being fabricated into devices for real time applications. Taking the advantages from the aforementioned perspectives, suitable chemical sensors based on such MOFs have been designed which has shown to found potential utility for environmental and biomedical applications. The design and synthesis of fluorescent MOFs for selective sensing of nitro explosives, biologically important H2S gas and neurotransmitter like NO and other toxic anionic species will be demonstrated in this talk.[1-3]

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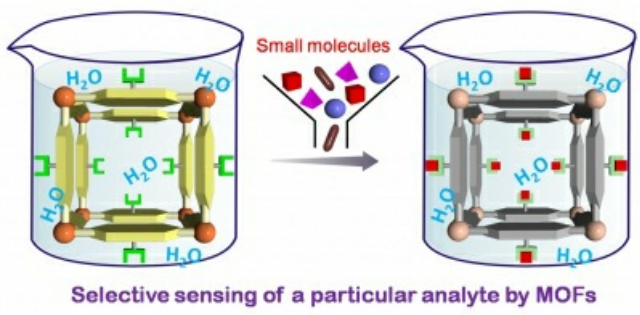

Keywords: MOF, Sensing, Fluorescent