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Selective Gas Sorption and Proton Conduction by MOFs

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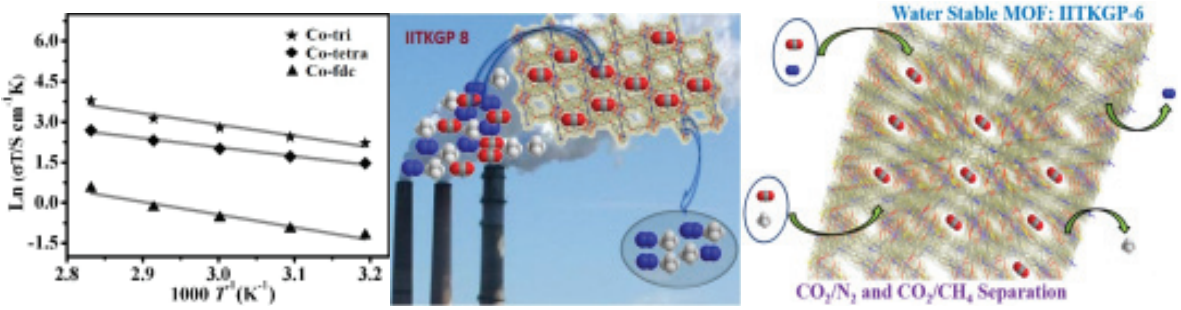
Self-assembly of bent dicarboxylate linkers and flexible N,N-donor spacers with transition metals forms interpenetrated/non-interpenetrated 2D/3D MOFs (IITKGP) networks of versatile topology 1-6. The frameworks are microporous with considerable solvent accessible volume and form 1D channels along particular directions with the dimensions ranging from <3-7 Å2. As the stability of MOFs in presence of water and/or moisture is a topic of significant importance while considering them for practical applications, these frameworks revealed high stability towards moisture and water as well. The desolvated framework showed modest uptake of CO_2 and considerably low amount of CO_2 and N_2 uptake at ambient conditions. IAST calculations showed high selectivity values of CO_2/N_2 (15:85) and CO_2/CH_4 (50:50) at ambient conditions. The high CO_2 separation selectivity over N_2 and CH_4 along with its moisture/water stability makes these MOFs potential candidate for CO_2 separation from flue gas mixture and land fill gas mixture as well. Unexplored powerful template assisted strategy to obtain superprotonic solid state MOF proton conductors will also be discussed.



Biography:

Madhab C. Das received his Ph.D. in supramolecular chemistry under in 2009 from Indian Institute of Technology (IIT) Kanpur. He did his postdoctoral works at University of Texas at San Antonio (2009-2011), University of Calgary (2011-12) and Kyoto University (2012-2013) as JSPS fellow. Then, he joined at IIT Kharagpur (India) as an assistant professor in December 2013. His research group is focused on design and synthesis of Metal Organic Frameworks (MOFs), Covalent Organic Frameworks (COFs) and Porous Hydrogen-Bonded Frameworks (HOFs) for their potential applications in gas storage, gas separation, proton conduction, small molecule sensing and heterogeneous catalysis.