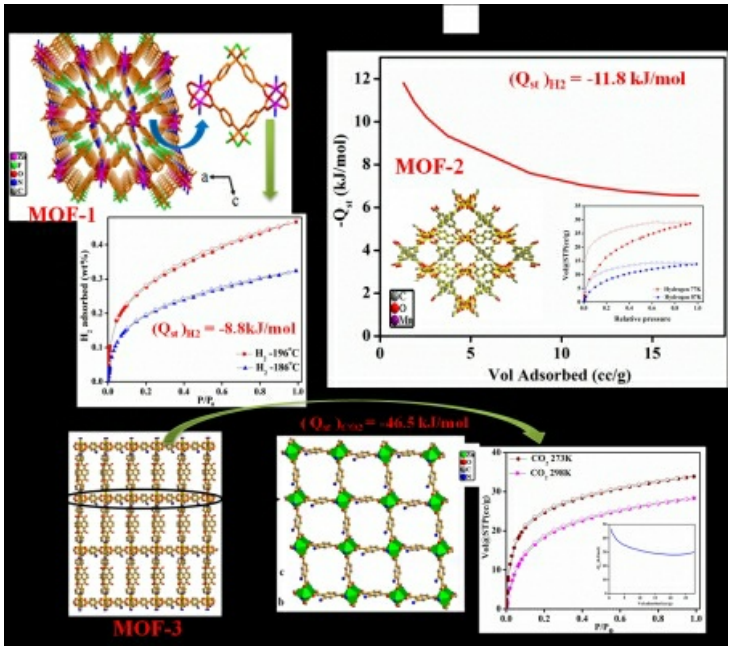
MS029.O06

Design of Porous MOFs for gas storage applications

Sandeep Singh Dhankhar[1], C. M. Nagaraja[1]
[1]*Department Of Chemistry, I.I.T. Ropar, Rupnagar, India*
E-mail: sandeepsingh@iitrpr.ac.in

Metal-organic frameworks (MOFs) are a new class of crystalline solids which are attracting growing interest not only due to their fascinating capability to form diverse structural architectures but also for their potential applications.[1] Owing to their high surface areas and tailored pore size and functionality, MOFs are gaining considerable attention as prospective candidates for hydrogen storage and selective carbon dioxide capture applications.[2] Since, H2 has been considered as an eco-friendly alternative to fossil fuels and several MOFs exhibiting very high H2 uptake properties at low temperatures (77 K) have been reported. However, the maximum uptake achieved at ambient conditions is still close to 2-3% due to weak interaction of H2 (Qst < 10kJ/mol) with the framework. To enhance the enthalpy of H2 adsorption (Qst) with MOFs several strategies have been investigated. In this context, we developed few MOFs with pores functionalized with polar groups such as, F-, -NH2 to induce selective adsorption properties to the framework.[3] Further, MOFs composed of unsaturated metal ions exhibiting high enthalpy of H2 adsorption (Qst = 11.8kJ/mol) have also been developed using green synthetic techniques such as, mechanochemical and sonochemical routes, these results will be presented.

[1] Cui Y. et al. (2016). Acc. Chem. Res., 49, 483-493.
[2] Ugale B. et al. (2016) Inorg. Chem., 55, 9757- 9766.
[3] Dhankhar S. S. et al. (2015). Eur. J. Inorg. Chem., 34, 5669-5676.



Keywords: Porous MOFs, Green synthesis, Selective gas adsorption