Abstract:

In this research project, sonochemically assisted synthesis of 2D Copper-formate metal-organic framework was executed. The Copper-formate metal-organic framework was synthesized by self-assembly of Cu^{2+} with formic acid that was generated by the hydrolysis of *N, N*-Dimethyl Formamide (DMF) under a sonochemical milieu. The structure and porous nature of the MOF were confirmed by Single Crystal XRD analysis. This 2D MOF was used as the host material for the incorporation of luminescent active guest (dye) molecules to generate Dye@MOF composite materials. *In-situ* and *ex-situ* methods were used to synthesize Rhodamine B@MOF composite and Methylene Blue@MOF composite. The Dye@MOF composites were later confirmed by UV-Visible spectroscopy, FT-IR spectroscopy, Photoluminescence spectroscopy, and the change in physical properties. Later these Dye@MOF composites were explored against Chemosensing applications. Applications of MOF@dye composites as chemosensing agents against various analytes were also studied. The analytes were consist of nitro-aromatics and heavy metal ions.