

ABSTRACT

In this research work, copper MOFs and its encapsulated composite were synthesized and analyzed for fluorescence and electrochemical applications. Complex 01 was synthesized by copper chloride dihydrate ($\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$), ligand 5-sulfoisophthalic acid sodium salt (SIP) and co-ligand 4,4-bipyridine through sonochemical method. Encapsulation of lithium hydroxide mono hydrate was done in precursor Cu-MOF. Complex 02 was prepared by copper sulfate pentahydrate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$), 5-sulfoisophthalic acid sodium salt and pyridine 2,6-di carboxylic acid by sonication synthesis technique. Complex 01 and 02 were analyzed by various characterization techniques such as, melting point, FTIR spectroscopy and thermogravimetric analysis (TGA) for confirmation of complexes. Fluorescence is utilized for chemical sensing of hazardous nitro aromatic materials. Electrochemical analysis was done by cyclic voltammetry (CV), Galvanostatic charge/discharge (GCD) and electrochemical impedance spectroscopy (EIS). CV determines the redox potential of complexes. GCD explains the specific capacitance of the complex while EIS depicts the resistance in charge transfer and solution.