Abstract

Metal-organic frameworks (MOFs) are non-conventional porous materials having a broad spectrum of applications. The catalytic use of MOF-based materials is cutting-edge in the field of scientific and technological developments. Carbon dioxide is an abundant, cheap, and safe C1 building block in the organic synthesis. However, due to its inert nature, efficient catalytic systems for its chemical fixation remains a challenging task. Catalytic transformation of CO_2 into useful organic compounds has attracted much attention due to its economic and environmental benefits as well. Recently, Cu-based MOFs are being investigated as promising catalysts for the synthesis of the industrially important cyclic carbonates under different reaction conditions. Wide variety of terminal and internal substrates are converted efficiently with high selectivity. MOFs as heterogeneous catalysts are remarkably stable and have structural rigidity, hence recycled for subsequent use with almost same activity. Therefore, MOF-catalysts are highly effiecients for the cycloaddition of CO_2 to epoxides into cyclic carbonates. A two dimensional (2D) metal-carboxylate framework was synthesised by solvothermal method. At 75 °C benzene dicarboxylic ligand was reacted with copper (II) and the crystals of suitable quality were obtained and subjected to single crystal x-ray diffraction studies. These MOF crystals were used for the analysis and further catalytic studies.