

Heterometallic CPM-200 metal-organic framework: A promising candidate for CO₂ fixation reaction

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Recently many heterogeneous catalysts based on metal-organic frameworks (MOFs) have been researched for the conversion of CO₂ to cyclic carbonates. Cyclic carbonates can be used as solvents, electrolytes in lithium-ion batteries, and as intermediates in the synthesis of ethylene glycol, acyclic carbonates, polymers, and pharmaceuticals. Herein, CPM-200-In and CPM-200-In/Mg MOFs were synthesized by a solvothermal method and were characterized by using various Physico-chemical analysis methods. They were used as heterogeneous catalysts for the cycloaddition of CO₂ with epoxides and found to be highly efficient toward the cycloaddition reaction at moderate reaction conditions, with >99% selectivity toward cyclic carbonates under solvent-less conditions. In addition, a plausible reaction mechanism for cycloaddition reaction is proposed based on the experimental results and our previously reported DFT studies.