

Mixed ligand Metal–Organic Frameworks for the Synthesis of Cyclic Carbonates from Epoxides and CO₂

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Metal organic frameworks (MOFs), discovered in 1990's are a new class of porous organic–inorganic hybrid compound consisting of metal ions/clusters coordinated to organic linkers to form one-, two- or three dimensional structures. Utilization of CO₂ as a C1 feedstock could serve a positive role on global carbon management. Synthesis of cyclic carbonates from CO₂ and epoxides is 100% atom economical and is the most promising pathway since it excludes the use of toxic raw materials such as phosgene or isocyanates. A series of novel Indium based mixed ligand MOFs were synthesized and characterized for its crystallinity and textural properties using various physicochemical techniques. A systematic investigation on the structural features, acid–base characteristics and physical properties were carried out. The catalyst was separable by simple filtration, and heterogeneous nature of the catalyst was investigated. A plausible mechanism was suggested based on literature and experimental inferences. Effects of various reaction parameters like catalyst–cocatalyst ratio, reaction time and reaction temperature has been investigated.