

Synthesis of Cyclic carbonate from Epoxide and CO₂ using Cu(II)Tryptophan MOF catalyst

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Carbon dioxide is an abundant, non-toxic and thermodynamically stable C1 feedstock. Engaging them for the synthesis of five-membered cyclic carbonates represent an attractive means of CO₂ utilization while viewing from an atom-economic perspective and also for its splendid applications such as solvents, precursors for synthesis of polycarbonates, and intermediates in organic material synthesis. Especially, MOFs made from natural/biological units (amino acids) are prospective candidates in CO₂ chemistry owing to their natural origin, rich Lewis acid/base sites and functional groups. Herein, we report the Cu based amino acid catalyst designated as CuTrp (Trp=L-Tryptophan). CuTrp was synthesized by direct mixing in room temperature. CuTrp was used as catalyst in the synthesis of cyclic carbonate from epoxide and CO₂, which operates in synergistic manner with the TBAB as co-catalyst under ambient and solvent-free conditions. Study of several reaction parameters were performed to examine optimum reaction conditions and a reaction mechanism was suggested on the basis of experimental evidences and previous literature.