

Amino Acid Imidazolate MOF Catalysts for the Transformation of CO₂ and Epoxides to Cyclic Carbonates

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Metal Organic Frameworks (MOFs) are porous materials that are highly efficient in the capture of gases for energy needs and greenhouse gas entrapment including carbon dioxide. However, the captured CO₂ could not be evaluated viable until an efficient means of its transformation to value added products is extensively commercialized. Surprisingly, MOFs themselves are potential catalysts in cyclic carbonate synthesis by cycloaddition. Porous di/tri-carboxylate bridged MOFs, zeolitic imidazolate MOFs (ZIFs) etc. have been recently employed as catalysts for epoxide-CO₂ cycloadditions. We predicted that, in comparison to primitive MOFs, those with the formula [M(AA)Im] amino acids will stand as replacements for synthetic dicarboxylates and flexible imidazolate linker will ensure the potentials of ZIFs. Herein, such a framework {[Cu(L-Asp)(1,4-Bix)_{0.5}].3H₂O}_n (CuAspBix), was employed as a catalyst for cyclic carbonate synthesis from epoxides and CO₂ in association with quaternary ammonium halide ionic liquid co-catalyst.