3-D ins Copper-Amino Acid Framework as Catalyst for Cyclic Carbonate Synthesis from Epoxide and CO_2

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The non-toxicity and easy availability makes CO_2 a potential C1 source for producing variety of compounds including five membered cyclic carbonate (from epoxide and CO_2). Among the various catalysts for this process, Metal-organic frameworks (MOFs), the porous frameworks made of metal and organic linkers are an outstanding class. Bio-metal organic frameworks (Bio-MOFs), the MOFs constituted with basic organic biomolecules of natural origin (such as amino acids) are attractive catalysts due to their Lewis acid/base sites in their frameworks, remarkably high CO_2 adsorption capacity, robustness and chemical stability. Herein, a 3D MOF with ins topology, made from copper, L-aspartic acid (Proteinogenic amino acid) and exo-dentate 4,4'-dipyridyl was synthesized by solvothermal and microwave methods and characterized in detail. The material, designated as CuAspBpy, was employed as catalyst along with tetrabutyl ammonium bromide for the synthesis of cyclic carbonate from epoxide and carbon dioxide at moderate conditions. A plausible mechanism was suggested for the transformation.