

Zeolitic Imidazolate Frameworks (ZIF-95) for the Solventless Synthesis of Cyclic Carbonates from Epoxides and CO₂

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Metal-organic frameworks (MOFs) are new emerging porous materials comprising metal centers connected by various organic linkers to create porous structures with tunable pore volumes, surface areas, and chemical properties. Zeolitic imidazolate frameworks (ZIFs) are porous crystalline materials with tetrahedral networks that resemble those of zeolites: transition metals (Zn, Co) replace tetrahedrally coordinated atoms and imidazolate links replace oxygen bridges. CO₂ being one of the major contributor among the greenhouse gases, its capture and conversion chemistry has attracted much attention from the scientific community. Among the many reactions involving CO₂, synthesis of cyclic carbonates using epoxide under catalytic conditions has drawn much attention because of its 100% atom economy. We have prepared highly porous ZIF-95 crystals and employed it as a catalyst for the epoxide-CO₂ cycloaddition. Synthesized ZIF-95 was characterized by various physicochemical methods. Different epoxide substrates were subjected to the cycloaddition using ZIF-95 catalyst.