

Synthesis of Cyclic Carbonate from CO₂ and Epoxide using Zeolitic Imidazolate Framework ZIF-23

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Even though carbon dioxide is abundant, non-toxic, cheap and non-flammable, its chemical inertness poses challenges for its application as an attractive C1 feedstock for the synthesis of the chemicals. By envisaging an efficient catalyst and reactive substrate, CO₂ could be successfully transformed into useful chemicals. The reactions of carbon dioxide with oxiranes leading to the formation of five-membered cyclic carbonates are well-known examples of the chemical fixation of carbon dioxide, since the cyclic carbonates can be used for various purposes, such as for aprotic polar solvents, electrolytes for batteries, and starting materials for reactive polymer synthesis. ZIF-23 containing pyridine group, one of MOFs, has recently received much attention because of its high temperature and chemical stability and large surface area. In this study, ZIF-23 was prepared and used as catalyst for synthesis of cyclic carbonate from CO₂ and epoxides with ionic liquid as cocatalyst. ZIF-23 was characterized by various physicochemical techniques such as XRD, FT-IR, BET, TGA, and SEM. The effects of reaction parameters such as temperature, reaction time, CO₂ pressure, and catalyst amount on the reactivity of catalysts were also investigated.