

Catalytic Performance of Zeolitic Imidazolate Framework ZIF-23 for Cycloaddition of Epoxide with CO₂

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Even though carbon dioxide is abundant, non-toxic, cheap and non-flammable, poses challenges in its serving as an attractive C1 feedstock owing to its inertness towards many 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. In this study, ZIF-23 containing pyridine ring in the framework 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 and the effects of reaction parameters such as temperature, reaction time, CO₂ pressure, and catalyst amount on the reactivity of catalysts were investigated.