

Room Temperature Synthesizable ZIF-71 Catalyst for the Solvent Free Synthesis of Cyclic Carbonates from Epoxides and CO₂

Robin Babu, Jintu Francis K, 김현준, 최각규, 박대원†

부산대학교

(dwpark@pusan.ac.kr†)

Development of heterogeneous catalyst systems capable of materializing the CO₂ - epoxide cycloaddition reactions under mild reaction conditions is highly desirable. Synthesis of cyclic carbonates from CO₂ and epoxides is 100% atom economical and is the most promising pathway since it avoids the use of toxic raw materials such as phosgene or isocyanates. While CO₂ is considered to be a thermodynamically and chemically stable molecule under standard conditions, the inertness of CO₂ has to be breakdown via catalysis. Zeolitic imidazolate frameworks (ZIF's) are a subclass of metal organic frameworks (MOFs) generally made from imidazolate linkers and tetrahedrally coordinated metal atoms such as Co and Zn. In this work, ZIF-71 was synthesized under room temperature conditions instantly and was characterized using various physicochemical properties. The cycloaddition reactions were performed by using different epoxides under room temperature conditions. The effect of various reaction parameters such as the temperature, catalyst loading, CO₂ pressure, and time were evaluated. A plausible reaction mechanism also was also proposed.