

Solventless Synthesis of Propylene Carbonate using ZIF-95 as a Catalyst

박대원[†], 최각규, 김설희, 빈경미, Robin Babu

부산대학교

(dwpark@pusan.ac.kr[†])

Zeolitic imidazolate frameworks (ZIFs) are a large emerging class of porous crystalline MOFs with tetrahedral networks that resemble those of zeolites: transition metals (Zn, Co) replace tetrahedrally coordinated atoms (for example, Si), and imidazolate links replace oxygen bridges. The synthesis of cyclic carbonates from epoxides and CO₂ under mild conditions have drawn much attention because of its 100 % atom economicity. ZIF-95 being a microporous material shows high affinity & capacity for CO₂ adsorption. Here, in the present work 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. Cycloaddition reactions carried out by using propylene oxide as substrate with TBAB as co-catalysts showed very high PO conversion with almost 100% selectivity. The effects of different reaction parameters like catalyst amount, reaction time, reaction temperature, and CO₂ pressure have been also investigated. Possible mechanism was proposed based on the experimental inferences.