

Aluminium based CAU metal organic framework for the synthesis of cyclic carbonate from epoxides and CO₂

김가형, Francis Kurisingal Jintu, 박대원[†]
부산대학교
(dwpark@pusan.ac.kr[†])

Metal Organic Frameworks, which consist of metal ions or clusters bridged by organic ligands, have proven their utility in carbon dioxide capture and utilization. MOFs have been found to be highly efficient in catalyzing the epoxide-CO₂ transformation in the presence of nucleophilic co-catalysts. In this work, we report the catalytic efficiency of aluminium based MOFs, denoted as [Al(OH)(H₂DPSTC)]0.5H₂O(CAU-11-COOH). Aluminium is nontoxic, inexpensive, and these compounds are interesting for industrial applications. The CAU-11-COOH catalyst was synthesized using V-shaped linker 3,3',4,4'-diphenylsulfonetetracarboxylic dianhydride to form a 2D highly porous framework. The catalyst was characterized using various techniques, including XRD, FT-IR, TGA, FE-SEM, and BET analysis. The catalytic activity was assessed in the synthesis of epichlorohydrin carbonates and was found that the catalyst operated in synergy with co-catalyst(TBAB) under solvent free condition. The role of parameter studies such as temperature, pressure, time were performed. Recyclability studies were carried out to prove the heterogeneous nature of the catalysts and a plausible reaction mechanism was suggested.