

## Effect of cluster in indium-based metal-organic frameworks for the cycloaddition of epoxides and CO<sub>2</sub>

구윤장, Jintu Francis K, Yadagiri Rachuri, 최영선, 박대원<sup>†</sup>  
부산대학교

CO<sub>2</sub> is an advantageous C1 feedstock as it is abundant, inexpensive and common industrial waste. One useful method to add value to CO<sub>2</sub> is by its ring-opening with epoxides to synthesize cyclic carbonates. Cycloaddition is attractive in terms of CO<sub>2</sub> utilization as it is catalytic, yields valuable products already used and sold, and results in significant carbon dioxide uptake. Metal-organic frameworks (MOFs) are versatile material formed from organic linker which connect metal. MOFs are prospective candidates in CO<sub>2</sub> conversion catalyst owing to their rich Lewis acid/base sited and functional group. We report the catalytic efficiency of indium based MOF, denoted as CPM-200. The catalysts was characterized using a various physicochemical analysis, including XRD, XPS, ICP-OES, EA, FE-SEM, TGA, FT-IR, and BET. The catalytic activity of CPM-200 was analyzed in the synthesis of cyclic carbonate from epoxide and CO<sub>2</sub>, and it was shown that CPM-200 operated in synergy effect with co-catalyst tetrabutylammonium bromide (TBAB) under solvent-free conditions. Several reaction parameter studies were carried out to find the optimal condition. Finally, a plausible reaction mechanism was suggested.