Synthesis of Mesoporous MgO via Chemical Combustion and its Application to CO_2 Sorption at Elevated Temperature

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Mesoporous MgO nanoparticles have been synthesized via chemical combustion route by using different fuels and different fuel to oxidizer (F/O) ratios. As synthesized MgO nanoparticles are evaluated as potential candidates for high temperature CO_2 sorption. The effects of types of fuel, F/O ratio, crystalline structure, morphology, and nature of dispersion on the CO_2 sorption performance were extensively investigated. It was deduced that complexation of MgO precursor with the fuel is critical in determining the surface characteristics and CO_2 sorption properties of mesoporous MgO nanoparticles. The highest CO_2 sorption was obtained for MgO-2.0(G) using glycine as the fuel, corresponding to 1.2 mmol-CO_2/g at 200 °C. This work was supported by the National Research Foundation of Korea (NRF) funded by the Ministry of Education (Grant number: NRF-2013R1A1A2060638).