

Magnesia nanoparticles confined in ordered mesoporous alumina for temperature swing CO₂ adsorption-desorption

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A series of magnesium oxide confined in the mesoporous alumina are synthesized via evaporation induced-self assembly method for temperature swing CO₂ adsorption-desorption. The developed adsorbents are designated as Mg/Al-X (X=0-3). The material characterization was carried out by using BET, XRD, TEM, CO₂-TPD, and CO₂-TGA. The effect of adsorption temperature, the optimum Mg/Al molar ratio to retain the mesopore structure and the effective regenerability during the high temperature CO₂ adsorption-desorption were investigated in detail. It was observed that with increasing molar ratio the medium basic sites are increased for room temperature CO₂ adsorption. Moreover, due to the confinement effects, the strong resistance towards the aggregation was exhibited. This work was supported by KCRC through the NRF funded by Ministry of Science, ICT, and Future Planning (NRF-2014M1A8A1049258).