Mesoporous $MgO-TiO_2$ Adsorbents for CO_2 Capture

Hiremath Vishwanath, 서정길†
명지대학교
(jgseo@mju.ac.kr†)

MgO has been extensively reported as an efficient solid CO_2 sorbent. However, it is still challenge to make MgO stable under TSA (Thermal-Swing Adsorption) operation because high temperature is required for regeneration of $MgCO_3$ to MgO. In this work, TiO_2 stabilized MgO sorbents were investigated as candidate for CO_2 capture. Compositional modifications are carried out to enhance the CO_2 sorption performance of $MgO-TiO_2$ sorbents. It was observed that the phase was transformed in the sequence of $MgTiO_3$ (Mg/Ti=0.5-2.0) → $MgO-MgTi_2O_4$ (Mg/Ti=3.0-4.0) → $MgO-Mg_2TiO_4$ (Mg/Ti=5.0), and the CO_2 adsorption increased in the order $MgTiO_3$ < $MgO-Mg_2TiO_4$ < $MgO-MgTi_2O_4$. High surface area (111.4 m^2/g), large pore volume (0.45 cm^3/g), and appropriate basic sites of $MgO-MgTi_2O_4$ were beneficial for CO_2 adsorption. This work was supported by the National Research Foundation of Korea (NRF) funded by the Ministry of Education (Grant number: NRF-2013R1A1A2060638).