Effects of calcination atmosphere and temperature on CO₂ capture properties of MgO -based sorbents promoted with Na₂CO₃ and NaNO₃

To investigate effects of calcination atmosphere and temperature on $\rm CO_2$ capture properties of MgO sorbents, new MgO-based sorbents were prepared by impregnation of MgO with $\rm Na_2CO_3$ (30 wt%) and $\rm NaNO_3$ (10 wt%). The $\rm CO_2$ capture capacities of the MgO-based sorbents were investigated in the fixed-bed reactor during multiple cycles at warm temperatures (capture at 300 and regeneration at 450). The $\rm CO_2$ capture capacities of the MgO-based sorbents calcined under nitrogen atmosphere were maintained about 90~100 mg $\rm CO_2/g$ sorbent regardless of calcination temperature. However, the $\rm CO_2$ capture capacities of the MgO-based sorbents calcined under air atmosphere decreased with increasing calcination temperature. We will discuss characteristics and mechanism of MgO-based sorbents promoted with $\rm Na_2CO_3$ and $\rm NaNO_3$ using XRD, TPD and TG in detail.