

Comparison of CO₂ capture capacity for sodium-based sorbent at low temperature

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Sodium-based sorbents were prepared by the impregnation method with sodium carbonate (Na₂CO₃) on supports used such as Al₂CO₃, ZrO₂, MgO various supports. The sorbents calcined in a furnace under a N₂ flow (100ml/min) for 5 h at 500°C. The CO₂ absorption and regeneration properties were measured in a fixed bed reactor at various temperature and H₂O concentration condition (CO₂ absorption 30~60°C and regeneration 200°C, water vapor 4~12 vol. %). The CO₂ capture capacity of the sodium carbonate on supports Al₂CO₃, MgO sorbents were 214.8 mg CO₂/g sorbent and 244.6 mg CO₂/g sorbent, respectively (CO₂ absorption at 50°C with water vapor 12 vol. %). However, the CO₂ capture capacity of the sodium carbonate on supports Al₂CO₃, MgO sorbents dramatically decreased after 2 cycle, which were not completely regenerated. It is discussed by analysis of sodium-based sorbents character and cause using XRD and TG.