

Carbon dioxide adsorption and desorption study using bimetallic calcium oxide impregnated on iron (III) oxide

ABSTRACT

Bimetal adsorbent system of calcium oxide impregnated on iron (III) oxide were evaluated as a potential source of basic sites for CO₂ capture. The adsorbents were prepared by impregnation method were calcined at 200 until 600 °C. Several characterizations were carried out using XRD, BET and CO₂-TPD analysis. The CaO loading increased the basicity of the adsorbent significantly enhance the CO₂ chemisorption. Furthermore, it drastically reduced the desorption temperature to 310-490 °C, which is important in chemisorption aspect. The CaO/Fe₂O₃200 which calcined at 200 °C was found to be most efficient. The CO₂ chemisorption (81.29 mg CO₂/g adsorbent) was contributed most compared to physisorption (4.64 mg CO₂/g adsorbent).

Keyword: Adsorption; Calcium oxide; CO₂ capture; Desorption; Iron oxide