

Development of new regenerable potassium-based α -alumina sorbent for post-combustion CO₂ capture

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A new regenerable potassium-based sorbent, which was prepared by impregnation of α -Al₂O₃ with 30 wt% K₂CO₃, was developed for CO₂ sorption and regeneration at low temperature (50~130°C). This sorbent showed high CO₂ sorption capacity and excellent regeneration properties during multiple tests, unlike the potassium-based γ -Al₂O₃ sorbent which was deactivated by the formation of by-product, KAl(CO₃)(OH)₂, during CO₂ sorption. The excellent regeneration properties of the new regenerable sorbent are due to the formation of a KHCO₃ phase without by-products during CO₂ sorption, resulting from the structure effect of alumina. From these results, it is concluded that α -Al₂O₃ is one of the most useful materials for designing the ideal potassium-based sorbent for CO₂ sorption and regeneration in the temperature range between 50°C and 130°C.