

Novel regenerable potassium-based dry sorbents for CO₂ capture at low temperatures

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A potassium-based dry sorbent (KZrI) was developed for CO₂ capture at a low temperature range between 50°C and 200°C. Absorption and regeneration properties of this novel regenerable potassium-based dry sorbent were measured in a fixed-bed reactor during multiple absorption/regeneration at 130–200°C). The total CO₂ capture capacity absorption (91.6mg CO₂/g sorbent) of the KZrI sorbent was maintained during the multiple CO₂ absorption/regeneration cycles. The XRD patterns and FT-IR analyses of the sorbent after CO₂ absorption showed the KHCO₃ phase only except for the ZrO₂ phase during regeneration, even at a low temperature (130°C). The KZrI sorbent developed in this study showed excellent characteristics in CO₂ absorption and regeneration in that it satisfies the requirement of a large amount of CO₂ absorption (91.6mg CO₂/g sorbent) and the complete regeneration at a low temperature condition (1atm, 150°C) without deactivation.