

CO₂ Capture Using Dry Regenerable Sorbents in a Bubbling Fluidized Bed Reactor

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A bubbling bed reactor was used to study CO₂ capture from flue gas using sodium-based dry regenerable sorbents, sorb NX101 which were manufactured by Korea Electric Power Research Institute. A dry sorbent, sorb NX101, is consists of Na₂CO₃ for absorption and supporter for mechanical strength. CO₂ capture was effective in the lower temperature range of 50–60 °C, while regeneration occurred in the range of 120–300 °C. To increase initial CO₂ removal, some amount of steam was absorbed in the sorbents before injecting simulated flue gas. CO₂ capture of as much as 100 % was possible for 3–4 min at reaction temperature of 50 °C with steam pretreatment. Little or no reduction in initial reaction rate and capture capacity was observed in multicycle tests. The carbonated and regenerated sorbents were analyzed by NMR to confirm the extent of reaction. The results obtained in this study can be used as basic data for the design of a CO₂ capture process of a large scale with two-fluidized bed reactors.