

Sorption Kinetics of Carbon Dioxide onto Rubidium Carbonate

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Rubidium carbonate was used as an adsorbent to capture carbon dioxide from gaseous stream of carbon dioxide, nitrogen, and moisture in a fixed-bed to obtain the breakthrough data of CO₂. Experiments were carried out at flow rates of carbon dioxide and nitrogen ($5-35 \times 10^{-6}$ m³/min), moisture ($0.5-3 \times 10^{-6}$ m³/h), amount of adsorbent ($0.5-1.8 \times 10^{-3}$ kg), mole fraction of carbon dioxide (0.03-0.22), and different sorption temperatures (323-353 K), at atmospheric pressure. The deactivation model in the non-catalytic heterogeneous reaction systems was used to analyze the sorption kinetics among carbon dioxide, carbonate, and moisture, employing the experimental breakthrough data that fit the deactivation model better than the adsorption isotherm models in the literature.