# Calcination effects of potassium-based solid sorbents for $CO_2$ capture

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To investigate calcination effects of potassium-based sorbents using $ZrO_2$ or $TiO_2$ as a support, the sorbents were prepared by calcining at various temperatures from 300 °C to 700 °C under $N_2$ or air. The $CO_2$ capture capacity of the potassium-based $TiO_2$ sorbent depended on the calcination temperature and atmosphere, resulting from the formation of inactive K-Ti alloy structures, such as $K_2Ti_2O_5$, $K_2Ti_6O_{13}$ and $K_2Ti_4O_9$, during calcination at temperatures over 500 °C. On the other hands, the potassium-based $ZrO_2$ sorbents (KZrI30) showed excellent $CO_2$ capture capacity regardless of the calcination temperature and atmosphere. This result is because the KZrI30 sorbents show separated $K_2CO_3$ and $ZrO_2$ phases without any new structures throughout the calcination of the sorbent at high temperatures over 500 °C under $N_2$ or air.