

CO₂ capture properties of M₂CO₃
(M=Na, K)-promoted MgO

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Among the various absorbents, MgO is a candidate of intermediate-temperature CO₂ absorbent because the decomposition temperature (400 °C) of its carbonate form is fitted with intermediate-temperature range. But it shows low reactivity with CO₂ because of its high lattice energy. In order to enhance the reactivity of MgO with CO₂, MgO promoted by alkali metal nitrates has been studied by some researchers. However, these absorbents show bad CO₂ absorption and desorption cycle durability. So, the absorbent that has high cycle durability is needed to be investigated. Here, Na₂CO₃ or K₂CO₃ promoted MgO was studied. Na₂CO₃-promoted MgO shows stable CO₂ absorption and desorption cycle durability. But this absorbent shows low CO₂ desorption kinetics. On the contrary, K₂CO₃-promoted MgO shows bad cycle durability. But CO₂ absorption and desorption kinetics of this absorbent are faster than that of Na₂CO₃-promoted MgO. In order to improve CO₂ absorption and desorption properties of the absorbents, Na_{2-x}K_xCO₃-promoted MgO with variation of the x-values is synthesized and its cycle durability was estimated. As a result, this absorbent shows good CO₂ absorption and desorption cycle durability and kinetics.