

Predictive guide to enhance CO₂ sorption performance of NaNO₃-promoted MgO sorbents under diluted conditions

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Promoter-based systems for high temperature are of great interest due to high CO₂ sorption capacity and fast kinetics. The studies report the CO₂ sorption under concentrated conditions which are not desirable for realistic large scale applications. In a modified approach herein we report utilization of irreversible MgCO₃ formed during partial desorption as a promoter together with molten NaNO₃ to enhance the CO₂ sorption of the system under the diluted conditions. Results shows that at an optimum temperature of 300 oC, the MgO-NaNO₃ shows CO₂ sorption performance corresponding to 26.9 wt.% under 15% CO₂. The increased sorption under diluted conditions indicates the CO₂ carrier ability of precipitated irreversible MgCO₃. The modified approach shows the fast kinetics of CO₂ adsorption and desorption implying the promising method for large scale applications. "This work was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (NRF 2017R1D1A1B03036324)".