

Degradation of linear diaminosilane-grafted silica adsorbents for CO₂ capture

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The increasing amount of CO₂ in the atmosphere has become a global concern due to its impact on climate change. CCS has been regarded as a reliable technology that allows continuous utilization of fossil fuel sources while mitigating CO₂ emissions. Among the technologies of CCS is adsorption of CO₂ in amine-functionalized silica, in which the principle of capture is via the acid-base interaction of CO₂ and amine. Here, adsorbents were prepared via grafting of different linear diaminosilanes to nanoporous silica. Diaminosilanes with two amine groups per silane molecule are expected to demonstrate higher capacity due to their high nitrogen content. However, aside from CO₂ sorption capacity, stability should also be assessed. Moreover, the extent of degradation of the diaminosilanes was evaluated via TG analysis and FT-IR spectroscopy.