

## Adsorption of Carbon Dioxide on Mesoporous Alumina

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The regenerable solid sorbents is a potential alternative for carbon dioxide adsorbent. In this work, we have successfully synthesized mesoporous alumina in the presence of a cationic surfactant under hydrothermal condition. The prepared carbon dioxide adsorbent contains a wormhole-like mesopore structure and exhibits high surface area of ca. 480 m<sup>2</sup>/g and pore volume of 0.82 cm<sup>3</sup>/g. The adsorption capacity of mesoporous alumina on carbon dioxide was measured by using thermal gravimetric analysis (TGA). Mesoporous alumina adsorbent showed substantially improved carbon dioxide adsorption capacity (220 mg/g sorbent) compare to the commercial activated alumina (100 mg/g sorbent). More importantly, the 91% of carbon dioxide adsorption performance on mesoporous alumina was maintained after one adsorption-desorption cycle. This result indicate that on the mesoporous alumina the adsorption-desorption process of carbon dioxide is thermally reversible and the 9% of adsorption capacity decrease is believed to be a consequence of strong chemical interaction between carbon dioxide and the strongly basic active sites within the mesoporous alumina framework.