

Preparation and CO₂ adsorption characteristics of aminosilane-modified SBA-15

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Highly-ordered aminosilane-modified SBA-15 materials were prepared by grafting or coating 3-aminopropyltriethoxysilane onto the surface of mesoporous silica SBA-15. X-ray powder diffraction, scanning and transmission electron microscopies, Fourier transform infrared spectroscopy, physical adsorption of nitrogen, elemental analysis as well as CO₂ adsorption/desorption characteristics were performed to evaluate their physico-chemical properties of aminosilane-modified SBA-15 materials. The modified SBA-15 materials still possessed well-ordered hexagonal mesoporous structure and high surface area and pore volume. The aminosilane-modified SBA-15 adsorbents exhibited high CO₂ adsorption capacities. The adsorption of CO₂ on such adsorbents was reversible; therefore, the saturated adsorbent could be regenerated completely under mild conditions such as those used in pressure swing or temperature swing adsorption processes.