

Gas separation characteristics of carbon molecular sieve/alumina composite membrane for CO₂ separation

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Carbon molecular sieve (CMS)/alumina composite membrane module was manufactured using siloxane-containing polyimide precursors. Commercial α -alumina substrates were treated with γ -boehmite sol, and calcinated into surface-modified alumina supports. Poly (imide siloxane) and Matrimid 5218 were used as polymeric precursors, dip-coated onto alumina supports, and pyrolyzed at 600°C. Gas permeation characteristics of the 330cm² area of membrane module were measured using pressure gauges, mass flow controllers and gas chromatograph (GC) instrument. In single gas permeation test, the module exhibited high fluxes and selectivities to N₂ gas. In mixed gas separation experiment, the selectivities were 7 and 29 for O₂/N₂ and CO₂/N₂ mixtures at room temperature.