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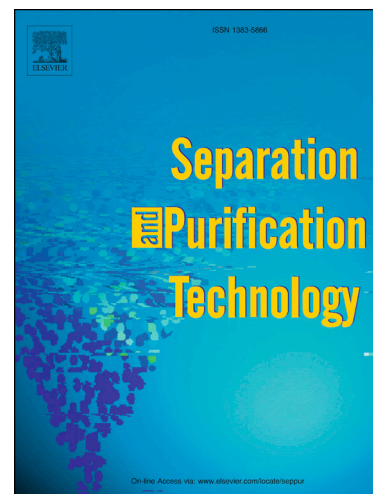
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Diethylenedioxane-bridged microporous organosilica membrane for gas and water separation

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Abstract

A new dioxane-bridged alkoxysilane, 2,5-bis[2-(triethoxysilyl)ethyl]-1,4-dioxane (**BTES-ED**), was synthesized as a precursor of organically bridged silica membrane to investigate the effects of the 1,4-dioxane ring as a rigid and polar spacer. The monomer was polymerized by the sol-gel process to give the gels in film, powder, and membrane forms. Nitrogen adsorption measurement of the gel powder showed the type-I adsorption/desorption isotherm, suggesting that the gel possessed a microporous structure with pore size distribution ranging from approximately 0.8 to 1.6 nm. Reflecting microporosity, the membrane exhibited selective gas permeation properties (H_2/SF_6 permeance ratio = ca. 1900) based on molecular sieving effects. Reverse osmosis experiments were conducted using a 2000 ppm NaCl aqueous solution at an operation pressure of 1.0 MPa, revealing

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