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Preparation and gas permeation properties on pure silica CHA-type zeolite membranes

Koji Kida^a, Yasushi Maeta^b, Katsunori Yogo^{a,b}*

^aResearch Institute of Innovative Technology for the Earth (RITE), 9-2 Kizugawadai, Kizugawa, Kyoto 619-0292, Japan

^bNara Institute of Science and Technology (NAIST), 8916-5 Takayama-cho, Ikoma, Nara 630-0192, Japan

*Corresponding author: Tel.: +81 774 75 2305; fax: +81 774 75-2318. yogo@rite.or.jp

Abstract

Pure silica CHA-type zeolite (Si-CHA) membranes were synthesized by a hydrothermal secondary growth method on porous α -alumina supports. Using Si-CHA seed crystals as a crystalline nuclei allowed the formation of a dense Si-CHA layer. The Si-CHA membranes prepared in this study showed excellent gas permeance derived from their large pore volume and effective molecular sieve performance for gas separation. The Si-CHA membranes exhibited excellent H₂ and CO₂ permeance of 1.1×10^{-6} and 1.7×10^{-6} mol/m²sPa, respectively. The permeance ratio of H₂/CH₄ and CO₂/CH₄ were 34 and 54, respectively. The stability test in the presence of water vapor

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