407a Fabrication of a-Oriented Mfi Zeolite Membrane by Secondary Growth

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Up to now c-, h0h-, and b-oriented MFI membranes have been fabricated by secondary growth [1-7]. While c- and h0h-oriented MFI membranes were achieved by hydrothermal growth of randomly oriented MFI seeds [3-7], the b-oriented MFI membrane was fabricated after secondary growth of a b-oriented mono-layer of MFI seeds [1, 2].

We report here an extension of the process that resulted in b-oriented MFI membrane [1, 2] to fabricate thin a-oriented MFI membranes. The process includes a-oriented seed deposition and secondary growth. The characteristic shape of MFI zeolite crystal using as structure directing agent (SDA) trimer-TPA3+3I- (bis-N,N-(tripropylammoniumhexamethylene) di-N,N-propylammonium triiodide) is the b-elongated leaf-shaped crystal with Lc>Lb>La, where Li indicates crystal length along the i-axis [8, 9]. During seed deposition, the extended basal bc-plane and the small thickness along a-axis facilitate the attachment of zeolite seeds with a-out-of-plane orientation. As a result a uniform mono-layer of a-oriented seeds was formed on an á-alumina substrate. After seed deposition hydrothermal growth conditions were identified that resulted in well intergrown a-oriented MFI membranes. We will present detail microstructural characterization of these films along with permeation measurements.

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