Metal-Organic Framework (MOF)-Based gas separation membrane

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Metal-organic frameworks (MOFs) have been recognized as a new candidate for gas and vapor separation. Among several varieties of MOFs, ZIF-8 is now recognized as one of the most promising materials for propylene/propane separation. In this study, we developed uniquely micro-structured ZIF-8 molecular sieve membranes by a counter-diffusion method using porous α-alumina hollow substrate. The characteristic layer of ZIF-8 was successfully prepared within the pore of the outermost part of the α-alumina hollow substrate. Permeation properties were studied using the single-component and binary gas permeation properties. We clarified the effect of the preparation conditions such as solution composition and temperature etc. on the membrane structure and permeation properties. The preparation, structural characteristics, and gas permeation properties of the ZIF-8 membranes prepared by the counter-diffusion method are thoroughly discussed.