Highly permeable asymmetric polybenzoxazole membranes using phase separation phenomena

김준성[1], 김승주[1], 한상훈[1], 이영무[1,2,*]
[1]한양대학교 화학공학과; [2]한양대학교 에너지공학과
(ymlee@hanyang.ac.kr*)

Development of asymmetric membranes by Loeb and Sourirajan in the early 1960's has enabled to apply polymer materials to membrane separation due to its thin effective thickness and the resulting high flux. The high performances of asymmetric membranes are based on the membrane structure consisted of a very thin and selective skin layer as well as porous and permeable supporting layers. The layers are formed in an in-situ process where a meta-stable polymer/solvent/non-solvent system provokes phase separation of the dope solution. Controlling the dope composition and phase separation phenomena are the critical factors to obtain high gas selectivity of a membrane material and also high gas permeance from one material. In this study, poly(amic acid) containing hydroxyl group (HPAA) was used to induce polybenzoxazole membranes reported to exhibit extraordinary gas permeation characteristics. HPAA/NMP/non-solvent dope solutions undergo phase inversion, and thermally treated to obtain asymmetric TR membranes. Gas separation performances of the TR asymmetric membranes were characterized and analyzed using microscope images of TR membranes.