

Methanol Permeability in Sulfonated Polyimides/PEGDA based Semi-IPN Membranes

최익수, 이석규, 최승혁, 조성민, 한학수*
연세대학교 화학공학과
(hshan@yonsei.ac.kr*)

For direct methanol fuel cell, two types of sulfonated co-polyimides were prepared from 1,4,5,8-naphthalenetetracarboxylic dianhydride (NTDA), 4,4'-diaminobiphenyl 2,2'-disulfonic acid (BDSA), 2-bis [4-(4-aminophenoxy)phenyl] hexafluoropropane (HFBAPP) and another non sulfonated diamine, 1,10-decamethylenediamine (DMD). These sulfonated polyimides were blended with the PEGDA having ethylene oxide group in the main chain. Various sulfonated polyimides/PEGDA semi-IPN having different molar ratio of sulfonic acid group and ethylene oxide group are synthesized and successfully characterized for ion exchange capacity (IEC), methanol sorption behavior, proton conductivity and methanol permeability. From these proton conductivity and methanol permeability, the membrane selectivity was obtained. Even though the proton conductivities of the semi-IPN membranes were lower than the series of Nafion, but the values of the membrane selectivity were higher than them due to the low methanol permeability. Through these evaluations, we found that these sulfonated polyimides/PEGDA semi-IPN membranes could be one of good candidates for the direct methanol fuel cell.