

Characterization and Performance of Direct Methanol Fuel Cell with Radiation-Grafted Membranes

강세구^{1,2}, 백동현^{1,*}, 김상경¹, 임성엽¹, 정두환¹, 신준화³,
강필현³, 설용건²
¹한국에너지기술연구원; ²연세대학교; ³방사선과학연구소
(dhpeck@kier.re.kr*)

Proton exchange membrane property is key determinants of the performance of the membrane-electrode assembly in direct methanol fuel cell. To develop a highly chemically stable membrane for application in a DMFC, styrene monomer were graft copolymerized into fluorinated ethylene propylene (FEP) and poly(tetrafluoroethylene perfluoropropyl vinyl ether) (PEA) films followed by sulfonation. The graft copolymerization was prepared by the γ -ray radiation grafting technique. Sulfonation of the radiation-grafted films was carried out in a chlorosulfonic acid solution. The effects of the reaction parameters on the content of PS grafted in the FEP and PEA films were investigated. The chemical property of the membranes in comparison with commercialized Nafion 112 was studied by Fourier transform infrared spectroscopy and thermogravimetric analysis. The transport properties of membranes such as ionic conductivity were evaluated. The cell performance of membranes using radiation grafted method was measured by single cell test and the cell resistance was measured by an impedance analyzer.