

A study on the effect of ionic liquids as a proton carrying solvent in sulfonated polymers on membrane properties

조은경^{1,2}, 박진수^{2,*}, 이원용², 김창수², 박승빈¹

¹KAIST; ²한국에너지기술연구원

(park@kier.re.kr*)

Composite membranes consisting of ionic liquid and sulfonated polymers were prepared and their physical and electrochemical properties were measured under unhumidified conditions for their application to the high temperature fuel cells (PEFCs). The various mole fractions of ionic liquid embedding in sulfonated polymer with different ion-exchange capacity (IEC) were employed to investigate the effect of sulfonic group in composite membrane. The thermal properties and ionic conductivities were explored by thermogravimetric analyzer (TGA), differential scanning calorimetry (DSC), and impedance spectroscopy. For various mole fraction of ionic liquid, the proton conductivity was found to increase with increasing ionic liquid contents, and the proton conductivity of composite membrane increases with elevating temperature. These ionic liquid-based membranes are proposed as new polymer electrolytes for high temperature PEFCs.