

Preparation of Ionic Liquid Based Membranes in the Presence of Acid for Anhydrous and High Temperature Fuel Cells

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Composite electrolyte membranes embedding ionic liquid in hydrocarbon polymers were prepared for anhydrous and high temperature polymer electrolyte fuel cells (HT-PEFCs). Proton can be transported through the membranes at a high temperature and anhydrous condition because ionic liquids behaved like water in the composite membrane. Ionic liquids have low ionic conductivity in the composite membranes due to high viscosity and low mobility. To increase the ionic conductivity, the acid containing common anion of the ionic liquid was added to the membranes with low content. The electrochemical properties of composite membranes were investigated using thermogravimetric analyzer (TGA), differential scanning calorimetry (DSC) and impedance spectroscopy under anhydrous condition. Consequently the composite membranes containing the common anion showed higher ionic conductivity than those containing no common anion. Thus, the ionic conductivity increased with ascending the content of acid.