

Preparation and characterization of Nafion/Zr-msPPA composite membrane for DMFC application

황명섭, 김덕준*
성균관대학교 화학공학과
(djkim@skku.edu*)

The most significant feature of PFSA (perfluorosulfonic acid) membrane is its high proton conductivity. This property comes from the unique structure of PFSA membrane. As water is absorbed in membrane, its hydrophilic domain size becomes bigger. Water and methanol can penetrate membrane through water channel and it can also provide the passage of proton. Nafion is one of the PFSA membrane. We make use of Nafion 117 membrane, zirconyl oxychlorid in hydrochloric(1M 200ml), m-sulfophenyl phosphoric acid (3M 11.3g) and HF (0.6M 0.14g) for composite membrane. We modified Nafion, using Zr-msPPA. Nafion/inorganic material composite membranes decreased the size of hydrated cluster.

Proton conductivity of the membrane was measured using an impedance spectroscopy. Methanol permeability was measured using a diffusion cell with a refractive index (RI) detector to monitor the variation of methanol concentration in the permeated compartment. Both proton conductivity and methanol permeability decreased with increasing the concentration of Zr-msPPA.