

Nafion-impregnated electrospun polyethersulfone composite membrane for high temperature fuel cells

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In this study, we manufactured the membrane using the Polyethersulfone(PES) by electrospinning method. Electrospun membrane is prior to have homogeneous structure compared to the conventional membrane prepared by casting. Moreover, it has relatively high porosity and surface area to control the high proton conductivity. The composite membrane has been prepared by impregnating of Nafion into the pores of electrospun PES membrane. PES has excellent electrical property as well as thermal stability. Furthermore polymer composed membrane with proton conducting materials such as Nafion shows not only good proton conductivity but also fine mechanical property. We confirmed that electrospun PES membrane had higher thermal stability than Nafion 212 membrane by thermogravimetric analysis. The cell performance and conductivity of composite membranes consisted of PES and Nafion were measured at different temperatures. The AC impedance data shows the hydrogen ionic conductivity of 10^{-2} S/cm below 100°C. At the temperature of 100°C, Nafion impregnated electrospun PES membrane has the cell performance of 544mA / cm² at 0.6V.