

Performance Evaluation of of Sulfonated Poly (ether ether ketone) with Charged Surface modifying Macromolecule Membrane in Direct Methanol Fuel Cell

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Abstract

This study focuses on the modification of sulfonated poly(ether ether ketone) (SPEEK) membrane for direct methanol fuel cell application. The modification of SPEEK membrane was attempted by blending charged surface modifying macromolecule (cSMM). The modified membrane was compared with commercial membrane for direct methanol fuel cell (DMFC) application. Thermal and mechanical stability of the blended membrane were slightly reduced from the SPEEK membrane but still higher than the Nafion 112 membrane. The blend membrane was found to be promising for DMFC applications because of its lower methanol diffusivity ($2.75 \times 10^{-7} \text{ cm}^2 \text{ s}^{-1}$) and higher proton conductivity ($6.4 \times 10^{-3} \text{ S cm}^{-1}$), than the SPEEK membrane. The DMFC application testing results was also exhibited that during charging process, the SPEEK membrane could produced the voltage similar with the Nafion membrane.

Keywords: Fuel cell membrane, Nafion Membrane, Direct methanol fuel cell; Proton exchange membrane; Sulfonated poly(ether ether ketone)