Preparation of Modified Sulfonated Poly(styrene divinylbenzene) with Polyaniline as a New Polymer Electrolyte Membrane for Direct Methanol Fuel Cell

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A new modified proton exchange membrane (PEM) has been prepared with polyaniline (PANI)-sulfonated poly(styrene divinylbenzene) resin (SPSD)-polyethylene (PE). The proposed polymer electrolyte membranes (PEM), PANI-SPSD-PE were prepared by blending different ratios of PANI (1-5%) with SPSP-PE and characterized with FT-IR, TGA/DSC and SEM. Different properties of PMEs such as; water uptake, resistance and, conductivity as well as methanol permeability were measured to evaluate its performance in a direct methanol fuel cell (DMFC). The on-set degradation temperature of the SPSP is above 120°C. The ionic conductivity and permeability of the membrane for methanol were increased with increasing of PANI (%) in the membrane and temperature without an extra humidity supply. Finally, a DMFC was designed and assembled with the suggested PANI-SPSD-PE membrane.

Keywords: Polyaniline, Sulfonated poly(styrene divinylbenzene), PEM, DMFC, Polymer composites.

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