

A study on aromatic cross-linked polymer electrolyte composite membrane for polymer electrolyte fuel cells

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In order to enhance mechanical and chemical properties of the membrane for polymer electrolyte fuel cell application, novel pore filling membranes filled with highly cross-linked aromatic polymer electrolytes in a micro-porous substrate were developed. In this study, micro-porous polyethylene substrates were employed with the various pore size, porosity, pore volume, and film thickness to control the polymer electrolyte swelling during evaluating membrane durability. Low molecular weight poly ether sulfone, branched with cross-linkable functional groups, was used as the electrolyte. It was estimated that pore filling membranes prepared in this research are applicable to polymer electrolyte fuel cells. The fuel cell performance can be improved on if the factors influencing the membrane are optimized, e.g., the chemical structure of the polymer backbone and the composition of the used monomer/cross-linkable functional group mixture.