

Preparation of polymer electrolyte membranes by pore-filling method based on electrospun nanofiber porous substrates (NFPSs) for fuel cell applications

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Fuel cells have recently attracted considerable attractions as environmentally friend energy resources and many polymer electrolye membranes have been developed. The polymer electrolytes membranes need water to migrate proton through the electrolyte, however membrane swelling induced by high water uptake causes high fuel permeation and structural breaking during fuel cell operation. In order to overcome both high water uptake and membrane swelling, several reinforcing membranes have been developed such as pore-filling method. In this study, polymer electrolyte membranes with pore-filling structure were studied for a new application of nanofiber porous substrates (NFPSs) prepared by electrospinnig deposition system. The prepared pore-filling membranes were characterized with physicochemical and electrochemical properties and the values were compared with those of a commercial polymer electrolyte membrane including fuel cell performance.