

Optimization of binder ratio in catalyst layer to various kinds of hydrocarbon membranes for high electrochemical performances of PEMFC

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Polymer electrolyte ionomers in proton exchange membrane fuel cell (PEMFC) play a role to deliver the proton occurred at the surface of catalysts to polymer electrolyte membrane (PEM), binding catalyst particles onto membrane as a binder between catalyst layer and membrane in MEA. Control of the ratio of electrolyte ionomers to catalyst can modify the structures and morphology of catalyst layers, influencing their electrochemical performances and adhesion of catalyst layers to membranes which lowers interfacial resistances. In this study, the effect of changing the ratio of ionomers in catalyst layers on electrochemical performances is investigated when it is applied to fabrication of MEA with various types of hydrocarbon electrolyte membranes such as sulfonated poly(arylene ether sulfone) and sulfonated poly(phenylene sulfide sulfide nitrile), comparing Nafion® membrane by using electrochemical analysis such as I-V curves and EIS (Electrochemical Impedance Spectroscopy).