

ABSTRACT

Proton Exchange Membrane Fuel Cell (PEMFC) is also known by the name of Electrolyte Polymer Membrane Fuel Cell is one type of fuel cell that uses a polymer-based electrolyte. PEMFC are now starting to receive attention as a renewable energy source because it has several advantages, such as high efficiency (> 50%) can even reach 80%, and have a range of energies from milliwatts to megawatts.

Apart from these advantages, there are some problems in the PEMFC. PEMFC contamination sensitive to foreign substances, especially CO (CO-poisoning) which can deactivate the catalyst in the fuel cell, a low kinetic, and the need for humidity settings. Therefore, to overcome some of the problems above required fuel cell with high temperature (high temperature PEMFC). This calls for a new membrane design. Polymers used in this study is based polymers sulfonated polystyrene (SPS) with the addition of polyethylene-grafted-Maleic Anhydride (PE-g-MAH) and added with phosphoric acid (H₃PO₄) and supramolekular solution.

Membrane will be characterized by *SEM-EDS (Scanning Electron Microscope-Energy Dispersive Spectroscopy)*, *FTIR (Fourier Transform Infrared)*, *EIS (Electrochemical Impedance Spectroscopy)*, and *Cyclic Voltammetry*.

Key words : *fuel cell*, PEMFC, catalyst, phosphoric acid (H₃PO₄), supramolekular, sulfonated polystyrene (sPS), PE-g-MAH, *SEM-EDS*, *FTIR*, *EIS*, *Cyclic Voltammetry*.