Characterization of Electrolyte Membrane for Polymer Electrolyte Fuel Cell by Humidity Control Thermal Analysis

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ABSTRACT

The perfluorocarbon ion-exchange membrane is used for the electrode membrane of Polymer Electrolyte Fuel Cell, PEFC, for improving the heat resistance property, dimensional stability, and mechanical strength of the operating environment. The electrolyte membrane in PEFC is in humidified environment for obtaining hydrogen ion conductivity. The thermal analysis measurements under the humidity control as well as temperature in the property evaluation test are also required.

The dimension change, the moisture adsorption characteristics, and the viscoelastic properties of the electrolyte membrane of humidity dependence are observed using TMA, TGA, and DMA which enables the humidity control. As a result, under the simulated temperature and humidity environment, the dependency of the humidity of dimensional stability, moisture adsorption characteristics, and mechanical property etc. are observed.