ABSTRACT

This paper describes the preparation and characterization of blend sulfonated polystyrene (SPS)-poly(vinyl chloride) (PVC) membrane for polymer electrolyte membrane fuel cell (PEMFC). The SPS-PVC membranes were prepared by mixing two polymer in various composition using Tetrahydofuran (THF) as a solvent. FTIR observations confirmed the chemical structure of SPS-PVC. SEM observations showed morphology of SPS-SPS which exhibit two phases. SPS is immiscible with PVC. TGA results showed that SPS-PVC membranes exhibit low thermal stability. The addition of PVC were increasing IEC and proton conductivity values. SPS-PVC membranes have higher IEC values than Nafion membranes. SPS-PVC membranes have lower proton conductivity values than Nafion membrane. Sulfonation process increases water uptake of PS. The addition low content of PVC in SPS increases water uptake of membranes. Sulfonate functional groups in SPS have ability to attract water molecules. SEM images show porosities of PS-PVC, SPS and SPS-PVC morphology. The porosities increase water uptake of membrane. SPS-PVC shows high potential for membrane of PEMFC.

Keywords: Polystyrene, polyvinylchloride, THF, IEC, strength, modulus young, proton conductivity.
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