

Fabrication of Nanocomposite Membranes Based on Graft Polymerization and Sol-gel Process for Polymer Electrolyte Membrane Fuel Cells

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Proton conducting nanocomposite membranes consisting of poly(vinylidene fluoride-co-chlorotrifluoroethylene)-graft-poly(styrene sulfonic acid), i.e., P(VDF-co-CTFE)-g-PSSA graft copolymer and sulfonated silica and were prepared using a sol-gel reaction and subsequent oxidation of a silica precursor, i.e., (3-mercaptopropyl) trimethoxysilane (MPTMS). As a result, both proton conductivity (0.12 S/cm at 25 °C) and single cell performance (1.0 W/cm² at 75 °C) were maximal at 5 wt% MPTMS.