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Physicochemical Characterization of Low Sulfonated Polyether Ether Ketone/ Layered Double Hydroxide/Sepiolite Hybrid to Improve the Performance of Sulfonated Poly Ether Ether Ketone Composite Membranes for Proton Exchange Membrane Fuel Cells

Authors : Zakaria Ahmed, Khaled Charradi, Sherif M. A. S. Keshk, Radhouane Chtourou

Abstract : Sulfonated poly ether ether ketone (SPEEK) with a low sulfonation degree was blended using nanofiller Layered Double Hydroxide (LDH, Mg2AlCl) /sepiolite nanostructured material as additive to use as an electrolyte membrane for fuel cell application. Characterization assessments, i.e., mechanical stability, thermal gravimetric analysis, ion exchange capability, swelling properties, water uptake capacities, electrochemical impedance spectroscopy analysis, and Fourier transform infrared spectroscopy (FTIR) of the composite membranes were conducted. The presence of LDH/sepiolite nanoarchitecture material within SPEEK was found to have the highest water retention and proton conductivity value at high temperature rather than LDH/SPEEK and pristine SPEEK membranes.

Keywords : SPEEK, sepiolite clay, LDH clay, proton exchange membrane
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