

## Preparation of Organic/Inorganic Hybrid Materials using Amphiphilic Poly(vinylidene fluoride-co-chlorotrifluoroethylene) Graft Copolymer for Fuel Cell Application

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A novel brush-type amphiphilic copolymer of P(VDF-co-CTFE)-g-P(SSA-co-TMSPMA) was synthesized via ATRP technique. Successful synthesis and a microphase-separated structure of the copolymer were confirmed by  $^1\text{H-NMR}$ , FT-IR spectroscopy, and TEM. This graft copolymer was combined with tetraethoxysilane at an acidic condition to produce organic-inorganic hybrid membranes through sol-gel reaction between TEOS and PTMSPMA. Upon introduction of  $\text{SiO}_2$ , the proton conductivity of membranes was slightly decreased but methanol permeability was significantly decreased. The resultant nanocomposite hybrid membranes were characterized by XRD, UTM and TGA. Thermal and mechanical properties of the membranes were also slightly enhanced by the incorporation of  $\text{SiO}_2$  nanoparticles.

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