

Sulfonated poly(arylene ether ketone) at the pendant site and organosiloxane-based hybrid network for proton exchange membrane

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A series of poly(arylene ether ketone) is successfully synthesized possess carboxylic groups at the pendant site which can further form amide linkage with 3,3-diphenylpropylamine-disulfonic acid to graft the conducting groups into the polymer chain (SPAEK). The organosiloxane network is synthesized from 3-glycidyloxypropyltrimethoxysilane and 1-hydroxyethane-1,1-diphosphonic acid, and is applied to the SPAEK system to enhance the proton conduction and flexibility for the membrane. Proton conductivity, water uptake, thermal stability, mechanical properties were investigated to evaluate the properties of the SPAEK-Siloxane membranes compared to the pristine SPAEK membranes for fuel cell application.