Electrochemical Properties of SPEEK/Epoxy Semi-interpenetrating Network Composites as Proton Exchange Membrane

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The DS 68% SPEEK composite membranes with were prepared by post-sulfonation. Using diethylenetriamine as the epoxy cross-linking agent, which is uniformly distributed in SPEEK, to form SPEEK/epoxy semi-interpenetrating network structure and explore the impact of semi-interpenetrating network on the performances as proton exchange membrane. The contents of epoxy resin are 10 wt.%, 15 wt.% and 20 wt.%, respectively. The thermal properties of the proton exchange membranes are increases with the increase of crosslinking structure of epoxy resin. But the conductivity proton performances are slightly declined with the increase of semi-interpenetrating network. Crosslinking increased the density of proton exchange membrane, improved the anti-water swelling property and avoided the proton conductivity rising slowly at high temperature. With the increases of epoxy resin, the methanol permeability coefficient decreases.

Keywords: Electrochemical properties, SPEEK, epoxy resin, semi-interpenetrating network

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