

Preparation of pore-filling composite membranes by thermal polymerization for polymer electrolyte fuel cells

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The sulfonated poly(styrene-co-vinyl pyrrolidone)/PE composite membrane have been prepared. The monomer solution composed N-vinyl-2-pyrrolidone(VP), styrene and di-vinylbenzene(DVB) was introduced into the porous PE film used as substrate. The thermal polymerization was carried out in the convection oven using 2,2'-azobis(isobutyronitlie) as a initiator. The prepared membranes were sulfonated in the chlorosulfonic acid and 1,2-dichloroethane mixture. The effect of the degree of sulfonation and degree of cross-linked density on membrane property was investigated. The composite membranes were characterized in terms of their morphological, chemical and thermal properties. FT-IR spectra and SEM images showed successful polymerization and preparation of composite membranes. The newly obtained membranes containing VP showed higher oxidative stability than the styrene/DVB composite membranes. The VP affected the proton conductivity of the membrane.