

Preparation of Grafted/Crosslinked Amphiphilic graft copolymer for fuel cell electrolyte membrane

서진아, 노동규¹, 전하림¹, 김상진¹, 김종학^{1,*}
연세대학교; ¹연세대학교 화공생명공학과
(jonghak@yonsei.ac.kr*)

Poly(vinylidene fluoride-co-chlorotrifluoroethylene)-g-poly(glycidyl methacrylate) [P(VDF-co-CTFE)-g-PGMA] novel graft copolymer was synthesized through atom transfer radical polymerization (ATRP). A novel graft copolymer of P(VDF-co-CTFE)-g-PGMA was successfully synthesized, as confirmed by ¹H NMR, FT-IR spectroscopy. Microphase-separated structure of the polymer were confirmed by and TEM. As-synthesized P(VDF-co-CTFE)-g-PGMA copolymer was sulfonated, followed by thermal crosslinking with sulfosuccinic acid (SA) via the esterification to produce grafted/crosslinked polymer electrolyte membranes. The performance of electrolyte membrane was confirmed by measuring IEC, water uptake and proton conductivity. The grafted/crosslinked P(VDF-co-CTFE)-g-PGMA/SA membranes exhibited good mechanical properties (>400MPa of Young's modulus) and high thermal stability (up to 300 °C), as determined by a universal testing machine (UTM) and TGA, respectively.