

Solid Electrolyte Membrane Prepared from Poly(arylene ether sulfone)-g-Poly(ethylene glycol)-g-Ionic liquid (PAES-g-PEG-g-IL) for Lithium Secondary Battery

김수경, 김덕준[†]

성균관대학교

(djkim@skku.edu[†])

Poly(arylene ether sulfone) grafted with PEG and IL (PAES-g-PEG-g-IL) was synthesized to prepare the solid electrolyte membranes for lithium secondary battery. PAES is aromatic polymer with excellent thermal and mechanical properties and PEG was widely applied as the lithium ion conductive functional group. Also, 1-butyl-1-methylpyrrolidum bis(fluoromethane sulfonyl) (PYR14-TFSI) was synthesized to promote lithium ion conduction through the PEG chains. In this study, part of PAES was grafted with IL to enhance dielectric constant. To evaluate synthesized solid electrolyte membrane, ion conductivity and lithium ion transference number (t_{Li}^{+}) were measured along with other properties such as thermal and mechanical properties. The membrane containing PYR14-TFSI of 70wt% showed the highest ion conductivity of 7.2×10^{-4} S cm^{-1} and t_{Li}^{+} of 0.51 at room temperature. And PAES-g-PEG-g-IL membranes were thermally stable up to 200 °C and they maintained its shape up to 120 °C.