

Solid electrolyte fabricated from poly(arylene ether sulfone) grafted with end-group modified poly(ethylene glycol) for lithium-ion battery

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In this study, the solid-state polymer electrolyte membrane with high lithium-ion conductivity and lithium-ion transference number was prepared from poly(arylene ether sulfone) grafted with various end-group functionalized poly(ethylene glycol). PEG plays the role of lithium ion conductor by segmental motion, but the crystallinity of PEG disturbs the conduction of lithium-ion. In this report, the end group of PEG was modified to reduce the crystallinity and improved lithium salt solvation. So that the lithium-ion conductivity and transference number can be improved. Among the prepared membranes, the PAES-g-PEG with A-type end group showed the highest room-temperature lithium-ion conductivity of $8.97 \times 10^{-4} \text{ S cm}^{-1}$ and lithium-ion transference number of 0.4 resulting in the improvements in full solid-state lithium battery performance.