

Full Paper

Unprecedented Improvement of Single Li-Ion Conductive Solid Polymer Electrolyte Through Salt Additive

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Abstract

Solid-state lithium metal (Li^0) batteries (SSLMBs) are believed to be the most promising technologies to tackle the safety concerns and the insufficient energy density encountered in conventional Li-ion batteries. Solid polymer electrolytes (SPEs) inherently own good processability and flexibility, enabling large-scale preparation of SSLMBs. To minimize the growth of Li^0 dendrites and cell polarization in SPE-based SSLMBs, an additive-containing single Li-ion conductive SPE is reported. The characterization results show that a small dose of electrolyte additive (2 wt%) substantially increases the ionic conductivity of single Li-ion conductive SPEs as well as the interfacial compatibility between electrode and SPE, allowing the cycling of SPE-based cells with good electrochemical performance. This work may provide a paradigm shift on the design of highly cationic conductive electrolytes, which are essential for developing safe and high-performance rechargeable batteries.