

Preparation and Analysis of $\text{Li}_{1.5}\text{Al}_{0.5}\text{Ge}_{1.5}(\text{PO}_4)_3$ conducting Ceramic-Polymer Composite
Solid Electrolyte for High-Safety Lithium Ion Batteries

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Solid-state electrolytes have attracted attention as potential replacements for the commercially used organic liquid electrolyte in rechargeable lithium-ion batteries. Solid-state electrolytes are safer to use than organic liquid electrolytes. Among Solid-state electrolytes, $\text{Li}_{1.5}\text{Al}_{0.5}\text{Ge}_{1.5}(\text{PO}_4)_3$ -based ceramic solid electrolyte has a high ionic conductivity, is non-flammable, and has a high lithium transference number. However, the $\text{Li}_{1.5}\text{Al}_{0.5}\text{Ge}_{1.5}(\text{PO}_4)_3$ ceramic electrolyte is too hard and brittle for battery applications and has poor electrochemical properties due to high interfacial resistance of electrolyte/electrode. To improve of electrochemical properties, composites of ceramic electrolytes and polymer electrolytes have been considered. The present study demonstrates the synthesis and characterization of composite solid electrolytes the display enhanced safety and wide operating temperature range.