

Composite gel polymer electrolytes prepared with inorganic/polymer hybrid particles for lithium secondary batteries

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Safety issues of lithium-ion batteries still prevent full utilization of batteries. Therefore, the request for safer and more reliable electrolyte systems is urgent and polymer electrolytes are promising candidates in this regard.

In this study, we synthesized and modified inorganic particle containing vinyl group on their surface to progress co-polymerization with ionic conductive monomer. We could obtain inorganic/polymer hybrid particles in consequence of co-polymerization and used as additive in gel polymer electrolytes of lithium secondary batteries. The organic/polymer hybrid particles can promote not only mechanical properties but also electrochemical properties because hybrid particle can also function as charge carriers. We tested this composite polymer electrolyte in a lithium/LiCoO₂ half cell. The results reported in this work confirm the higher performance and stability of our composite gel electrolyte compared to conventional liquid electrolyte systems.