

Superiority of Gel Polymer Electrolytes as an Application in Lithium-Ion Batteries

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Abstract

In the era of technological development, electronic devices such as laptops, cameras, and electric vehicles have been significantly important for humans in their daily lives. Thus, a battery system with extremely high stability, long cycle life, high energy density and environmentally friendly is expected to be the main power supply. Lithium-ion batteries (LIBs), widely used in the market nowadays, have offered good electrical performances as required. Yet, the safety problems from the liquid electrolyte itself impede their applications whenever the batteries were subjected to thermal, mechanical or electrical abuse conditions. Hence, gel polymer electrolytes (GPEs) are being investigated as a viable alternative to replace the organic liquid electrolyte currently available for developing safer LIBs. This review paper discussed recent development in GPEs as an effort to develop a better performance of LIBs. Besides that, to fabricate a device with good physical and electrochemical behaviours, the GPEs need to be improved significantly in providing the solution for the growth of dendrites, unstable electrode-electrolyte contact and ion transports. Additionally, incorporating bio-based polymer in the GPEs with high capability was suggested to produce LIBs with promising energy and power density besides its eco-friendly behaviour.

Keyword: Gel polymer electrolyte; Lithium-ion battery.