

Porous membranes based on Poly (arylene ether ketone)/polylactide block copolymers for separator in rechargeable lithium-ion battery

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Poly (arylene ether ketone) (PAEK) porous membrane was fabricated by the selective removal of PLA molecules from the self-assembled copolymers in a variety of composition. The various pore size and porosity of the prepared porous membranes (PAEK) were obtained. The morphological structure of porous in this membrane was observed by scanning electron microscopy. A different characteristic of the porous membrane separators such as liquid electrolyte uptake and electrolyte contact angle, thermal and mechanical stability, and Lithium ion conductivity were investigated for rechargeable Lithium-ion battery application. In this study, the porous PAEK membrane with commercial Poly (propylene) (PP) separator has more excellent thermal dimensional stability and higher thermal degradation. Additionally, the PAEK with the smallest pore diameter of 50 nm showed the highest Lithium ion conductivity and higher than the ionic conductivity of commercial PP separator. More importantly, the prepared porous PAEK membranes with nano-size contributed to enhance the ability of holding liquid electrolyte in the membrane, extended the life cycle of Lithium ion battery.