Short Communication

A Nano-Based Multilayer Separator for Lithium Rechargeable Battery

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The aim of the investigation is to improve the thermal stability of separator for lithium rechargeable battery, a three-layer separator mixture including PET nonwoven, cellulose nanofibers and ceramic coated layer was studied in this paper. The average diameter of the cellulose nanofibers was about 330nm, and the ceramic powder particles size was 0.1-3 μ m. The nanofiber was combined with the PET nonwoven substrate by wet-laid method. The ceramic particles were coated on the nanofiber layer by vacuum filtration. The max pore size of the separator was 750 nm, and the average pore size could reach 140nm. The porosity of the separator was 52%. At the same time, the separator has high affinity with electrolyte, in which electrolyte retention could reach 324%. The shrinkage of the separator was less than 1% under the treatment at 160°C for 2 hours. The cell with the prepared multilayer separator exhibited excellent charge-discharge cycle performance.

Keywords: Lithium battery; Multilayer separator; Nano-based; Thermal stability

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