Short Communication

Effective Polysulfide Adsorption by Double Side Coated Separator in Lithium-Sulfur Batteries

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Lithium-sulfur batteries have attracted much attention because of their high specific capacity and energy density. However, the commercialization of lithium-sulfur batteries is limited by low utilization of active materials and excessive capacity decay which caused by the shuttle effect of polysulfide in the practical applications. In this article, effective polysulfide adsorption method was applied via using modified PP separator coated super P and Al₂O₃ on the two sides, respectively. As a result, this strategy solves the problems of polysulfide shuttle effect and poor sulfur conduction at the same time. The initial discharge specific capacity of lithium-sulfur batteries, which assembled with the super P + PP + Al₂O₃ separator, could reach 1247 mAh g⁻¹ at the current density of 0.1 C. After 60 discharge / charge cycles, the discharge capacity was still 987 mAh g⁻¹, with a capacity retention of 79%. This method of simultaneous modification on both sides of the separator provides a new idea for the modification of lithium-sulfur batteries.

Keywords: super P layer, PP separator, Al₂O₃ layer, shuttle effect, electrochemical performance

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