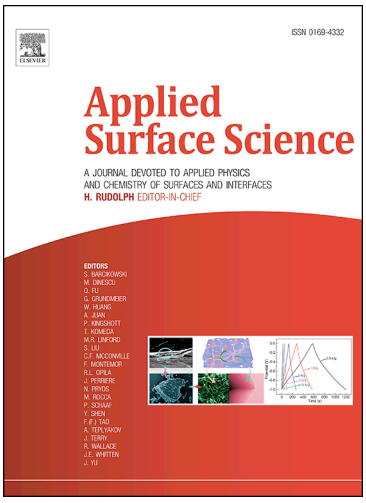

Full Length Article

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A novel CuS/graphene-coated separator for suppressing the shuttle effect of Lithium/sulfur batteries

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ABSTRACT

Herein, we demonstrate a facile synthesis process to fabricate and deposit flower-like CuS/graphene nanocomposite on a multi-functional separator for efficient immobilization of polysulfides of lithium/sulfur (Li/S) batteries. Admirablely, as-prepared CuS/graphene composite endows enriched oxygen-functional groups and excellent electrical conductivity for cathode area. The introduction of CuS/graphene-coated separator effectively reduced the dissolution of lithium polysulfides as well as enhanced the integrity of the sulfur cathode for Li/S batteries. The cell with these modified separator delivered an enviable discharge capacity of 1302 mAh g^{-1} at 0.2 C, as well as an excellent reversible capacity of 760 mAh g^{-1} after 100 cycles. Furthermore, an outstanding rate capability of 568 mAh g^{-1} at 3.0 C has been achieved in the cell with CuS/graphene-coated separator. The results reveal that CuS/graphene-coated separator shows an admirable potentiality to boost the performance of next-generation Li/S batteries.

Keywords: Lithium-sulfur batteries; Polysulfide immobilization; Multi-functional separator; CuS; Graphene.

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