Hollow Mesoporous MnO₂ Spheres as Sulfur Host Materials for High-Performance Lithium-Sulfur Batteries

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To improve the electrochemical performance of the lithium-sulfur batteries, many methods have been developed, including synthesizing advanced host materials, preparing new type electrolyte and protecting lithium anode. Among these strategies, synthesizing host materials for element sulfur is the most efficient method in improving the electrochemical performance of the lithium-sulfur batteries. In this work, we developed hollow mesoporous MnO₂ spheres as efficient host materials for the lithium-sulfur batteries. Due to the presence of the polar MnO₂, the shuttle effect of the soluble polysulfide can be greatly inhibited. As a result, the as-prepared HMOs/S composites exhibited superior cycle stability, demonstrating excellent electrochemical performance. Moreover, owing to the improved electronic conductivity, the HMOs/S composites showed much higher specific capacity than the pristine sulfur electrode.

Keywords: Li-S battery; Hollow spheres; Cycle stability; Capacity; Shuttle effect

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