Hollow NiCo₂O₄ Nanofibers as Sulphur Host Materials for High-Performance Lithium-Sulphur Batteries

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Cobaltate plays an important role in many applications, such as photocatalysis and water purification. However, few works have reported about the employment of cobaltate in energy storage systems. As we all know, the lithium-sulfur batteries suffer from severe capacity fade during the electrochemical cycles due to the shuttle effect of the polysulfide products. In our work, we design hollow NiCo₂O₄ nanofibers as host materials for elemental sulfur in lithium-sulfur batteries. The unique hollow nanofiber structure could provide sufficient space for the storage of the soluble polysulfide and inhibit the migration of the polysulfide products. Moreover, the chemical bond of Ni-S is proved to exist after electrochemical cycles, demonstrating chemical relationship between the NiCo₂O₄ and soluble polysulfide. As a result, the as-prepared hollow NiCo₂O₄-S composites exhibit high capacity and excellent cycling stability.

Keywords: Cobaltate, Polysulfide, Li-S battery, Migration, Capacity

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