A Simple Solution-Based Method to Prepare Honeycomb-Like Li₂S/Graphene Composite for Lithium-Sulfur Batteries

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In solution-based method, the nature of the solvent may play an important role to the nanostructure of Li₂S/graphene composite. In this paper, considering anhydrous N-methylpyrrolidone (NMP) has good wetting ability with graphene and its function groups has high binding energies with Li₂S, NMP was used as solvent to prepare Li₂S/graphene composite. The structure morphology and electrochemical performance of as-prepared Li₂S/graphene composite were investigated. Results show that numerous of nano-Li₂S affiliate on graphene surface homogeneously. The existence of these nano-Li₂S alleviate π - π interaction between graphene sheets, and Li₂S/graphene composite exhibits honeycomb-like structure with abundant micropores. Due to this special structure, without extra treatment, the as-prepared Li₂S/graphene composite exhibits improved electrochemical performance, such as high columbic efficiency, high energy capacity, a high rate capability, and a low potential barrier.

Keywords: Lithium-sulfur battery, Cathode, Lithium sulfide, Graphene

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