The Preparation and Electrochemical Performance of Nitrogen-doped Graphene/Co(OH)₂ Composite

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There are certain defects in the graphene prepared by redox method. These defects can cause a decrease in the electrochemical performance of the resulting graphene. The performance of chemically prepared graphene can be improved to some extent by the doping of heteroatoms. In this paper, the electrochemical performance of graphene-based composites is improved by doping with nitrogen. The results show that the electrochemical performance of the nitrogen-doped graphene-based composite as electrode material is better than that of the undoped graphene-based composite as electrode material. The Nitrogen doped graphene/Co(OH)₂ composite electrode material was prepared by one-step method. Urea played an important role in the synthesis process. During the reduction of graphene oxide, in-situ nitrogen doping happened simultaneously. The slow decomposition of urea provided the desired OH⁻ for the formation of Co(OH)₂ and regulated its growth rate. Meanwhile, the excess CO₂, OH⁻ and NH₃ acted as soft templating agents for Co(OH)₂ to control their growth to obtain morphology-specific composites.

Keywords: graphene based composites, electrode materials, supercapacitor, electrochemical performance, doped graphene

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