Bi₂O₃ with Reduced Graphene Oxide Composite as a Supercapacitor Electrode

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The bismuth oxide/reduced graphene oxide (Bi₂O₃/rGO) composite was synthesized by solvothermal method at different calcination temperatures. The morphology and phase structure of the Bi₂O₃/rGO composite was characterized using thermogravimetric analysis (TGA), X-ray diffraction (XRD), electron microscopy (SEM), and Brunauer-Emmett-Teller (BET). Meanwhile, the electrochemical performance of the Bi₂O₃/rGO was obtained on the electrochemical workstation. The calcination temperature directly influenced the transformation of the precursor and the morphology and structure of the material obtained after calcination, which further affected the electrochemical properties of the material. At a calcination temperature of 350°C, Bi₂O₃/rGO composite has a good crystallinity, uniform dispersion and excellent electrochemical performance. The composite specific capacitance is 617.1 F·g⁻¹ in 6 M KOH by chronopotentiometry at a specific current of 1 A·g⁻¹, and the composite also displays a low resistance. These results indicate that Bi₂O₃/rGO composite has great prospects for supercapacitor electrode materials.

Keywords: Bi₂O₃/rGO; Supercapacitor; Electrochemical properties

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