

Preparation and Electrochemical Properties of NiCo₂O₄/rGO Composites

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NiCo₂O₄/rGO as electrode materials for supercapacitor were prepared by a facile hydrothermal route and co-precipitation. XRD and SEM were used to determine the lattice characteristics and morphology of NiCo₂O₄/rGO nanocomposite. It was found that GO had a good lamellar layer structure, and the overall structure was a flower-like structure. NiCo₂O₄ in the two methods is uniformly attached to the surface of rGO. The shape of NiCo₂O₄/rGO nanocomposites prepared by solvothermal method (S-NiCo) after composite is similar to that of sea urchin, and the gap distribution between needles is reasonable. The NiCo₂O₄/rGO nanocomposites prepared by coprecipitation method (C-NiCo) have three-dimensional network structure, and the nanocomposites are oriented. Using calomel electrode as reference electrode, a three electrode system was constructed for electrochemical experiments. The specific capacitance of NiCo₂O₄/rGO prepared by coprecipitation method is 1063.5F/g, that of NiCo₂O₄/rGO prepared by solvothermal method is 935.6F·g⁻¹, and that of NiCo₂O₄ prepared by coprecipitation method is 913.4F·g⁻¹ by constant current charge discharge test at 2A·g⁻¹. The resistance measured by the AC impedance experiment is 1.13Ω, which is less than 1.35Ω of NiCo₂O₄/rGO electrode material prepared by solvothermal method.

Keywords: electrochemical, nanomaterials, supercapacitor, NiCo₂O₄/rGO material

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