Synthesis of MnCo₂O_{4.5}/graphene Composite as Electrode Material for Supercapacitors

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MnCo₂O_{4.5}/graphene composite is obtained by a simple hydrothermal method. The as-synthesized MnCo₂O_{4.5}/graphene composite is characterized by X-ray diffraction, and scanning electron microscopy. Electrochemical property of MnCo₂O_{4.5}/graphene composite is carried out by cyclic voltammetry, galvanostatic charge-discharge and electrochemical impedance spectroscopy. MnCo₂O_{4.5}/graphene composite exhibits good supercapacitive performance. The specific capacitances of MnCo₂O_{4.5}/graphene composite at 5 mV s⁻¹ and at 0.5 A g⁻¹ are 255.8 and 252.3 F g⁻¹, respectively. 88.7% of the specific capacitance is retained for a 16-time current density increase, indicating its superior rate capability. At the 1000th cycle, MnCo₂O_{4.5}/graphene composite shows a specific capacitance of 225.6 F g⁻¹ at 1.0 A g⁻¹, which is 92.6% of initial specific capacitance, demonstrating its excellent cycling stability. These characteristics illustrate that MnCo₂O_{4.5}/graphene composite is a promising electrode material in supercapacitors.

Keywords: Supercapacitors, MnCo₂O_{4.5}, Graphene, Hydrothermal method

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