Electrochemical Performance of Mn₃O₄/G/CB Composite Materials for Supercapacitors

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In this paper, a new type of supercapacitor electrode material is synthesized using graphene, carbon black and Mn₃O₄ (Mn₃O₄/G/CB). This composite material can make full use of the high conductivity of the graphene and the high specific surface area of the carbon black to improve the conductivity, specific capacitance and cycle stability of the Mn₃O₄. At 0.1A/g current density, the specific capacitance of the Mn₃O₄/G/CB composite is 661F/g, which is 4 times higher than that of Mn₃O₄ (165F/g) under the same current density. The CV curves of the Mn₃O₄/G/CB composite are maintained in the shape of an approximately rectangular shape, and have a fast current response rate. Under the high current density of 30A/g, after 5000 cycles of charge-discharge test, 69.2% of the initial specific capacitance is still retained for the Mn₃O₄/G/CB composite, while the specific capacitance of the Mn₃O₄ only remains 63.6%, after the same process. According to the EIS test, the charge transfer resistance and Warburg resistance of the Mn₃O₄/G/CB composites are all less than Mn₃O₄, which is attributed to the addition of the graphene and carbon black.

Keywords: Supercapacitor; Mn₃O₄; Carbon black; Graphene; Electrode Materials

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