

Incorporation of Zinc Oxide into Carbon nanotube/Graphite nanofiber as high performance supercapacitor electrode

ABSTRACT

An efficient and simple hydrothermal method has been developed to prepare Carbon nanotube/Graphite nanofiber/Zinc Oxide (CNT/GNF/ZnO) ternary composites which are employed as supercapacitor materials. The electrochemical measurements reveal that the introduction of ZnO into CNT/GNF can enhance the specific capacitance value up to 306 Fg^{-1} at 10 mVs^{-1} , with 99.4% capacity retention. Field-emission scanning electron microscopy (FESEM) and transmission electron microscopy (TEM) characterizations reveal that the combination of nanometer-sized CNT/GNF and random distribution of impregnated ZnO can form a highly conductive network. The improved supercapacitance property of CNT/GNF/ZnO can be ascribed to the synergistic effect between double layer capacitance of CNT/GNF and the pseudocapacitance of ZnO.

Keyword: CNT; GNF; Supercapacitors; Physicochemical; Electrochemical characterization