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High Performance Redox Supercapacitor Based on Chemically Prepared Hybrid Graphite oxide/Self-doped Polyaniline/MnO_2 nanocomposite

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Development of efficient high power and high energy storage systems for future energy supply and mobility is the objective of nanotechnology in this field [1-4]. Recently, nano-sized hybrid materials with different morphologies have attracted great attention on the supercapacitor field because of the nanostructures often exhibit novel physical and chemical properties [5, 6]. High power electrochemical supercapacitor has the potential to couple with a secondary battery because it acts as a buffer at high charging-discharging rates [7]. Herein, Graphite oxide/ self-doped polyaniline/Manganese dioxide (GO/SDPA/MnO_2) nanocomposite has been prepared via chemical oxidation of mixture of GO, aniline and m-aminobenzoic acid in H_2SO_4 medium using MnO_2 as an oxidant. FT-IR and XRD experiment results revealed that the GO/SDPA/MnO_2 nanocomposite was produced. The prepared composite was successfully employed as supercapacitor active material. Different electrochemical methods including cyclic voltammetry, galvanostatic charge-discharge and electrochemical impedance spectroscopy studies are carried out to characterize the supercapacitor performance. The galvanostatic charge-discharge results showed specific capacitance and specific energy of 318 F g^{-1} and 24 Wh kg^{-1}, respectively,at a current density of 5 mA cm^{-2} in 1 M Na_2SO_4 electrolyte.

Reference

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