

Synthesis and Characterization of Graphene/Polythiophene (GR/PT) Nanocomposites: Evaluation as High-Performance Supercapacitor Electrodes

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Composites of polythiophene (PT) and graphene (GR) with different mass proportions were studied for their application as supercapacitors. Fourier transform infrared spectroscopy (FTIR) along with High Resolution Scanning electron microscopy (HR-SEM) were employed in order to characterize the morphology and composition of the resulting composites. The electrochemical behaviour of these composites was studied by means of cyclic voltammetry and specific capacitance curves were derived from these measurements. The Faradaic impedance spectroscopy response of the different composites, along with that of GR, was also studied. From these measurements it was found that a 1:1 in mass composite of GR and PT showed a higher specific capacitance, even when compared with GR alone. The introduction of the GR in that proportion also showed an enhanced cyclic stability in comparison with the sole polymer. The high specific capacitance (365 F g^{-1} at 1 A g^{-1}) of this composite material indicates its potential for use as an electrode material for supercapacitors.

Keywords: Graphene, polythiophene, nanocomposites, supercapacitors

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