ABSTRACT

Nowadays, composites of transition metal oxides and carbon based materials have attracted the attention of researchers as electrode materials for supercapacitors. In the present work, Zirconium Cobaltite ($ZrCo_2O_4$) and Zirconium Cobaltite with rGO ($ZrCo_2O_4$-rGO) were synthesized by co-precipitation method. Morphology of the prepared composites were observed by Scanning Electron Microscope (SEM). Fourier Transform Infrared spectroscopy (FTIR) revealed the functional groups present in the material. Electrochemical properties have been investigated by Cyclic Voltammetry (CV) and Galvanostatic Charging Discharging (GCD). $ZrCo_2O_4$ exhibited specific capacitance 443.8 Fg^{-1} at current density 1 Ag^{-1}. Addition of rGO appreciably enhanced the electrochemical performance $ZrCo_2O_4$-rGO. $ZrCo_2O_4$-rGO demonstrated specific capacitance of 864.4 Fg^{-1} at 1 Ag^{-1} which is much higher as compared to specific capacitance of $ZrCo_2O_4$. The energy density of $ZrCo_2O_4$-rGO reached 30.01 $Whkg^{-1}$ at a power density of 250 WKg^{-1} highlighting its importance to be utilized as electrode material for supercapacitor application