Abstract

Considering the upsurged demand of energy nowadays and the intermittent nature of energy resources, the development of replenishable energy storage devices is the vital demand of the time. In this regard, this work presents the nanocomposites of silver to be used as active electrode materials for super capacitive applications. Hydrothermal method was used to synthesize four nanocomposites Ag-Mn, Ag-Mn-Co, Ag-Mn-Co-NGO, Ag-Mn-Co-NGO-PVP. X-ray diffraction (XRD) analysis showed peaks corresponding to Mn, Ag and Co and a diffused peak at $2\theta = 26.18°$ due to the graphene oxide in NGO indicating its full incorporation in the nanocomposite. Morphological analysis showed the dispersion of particles on the plate-like forms in case of Ag-Mn-Co-NGO-PVP. Apart from this, all other characterization techniques also confirmed the successful fabrication of the nanocomposites. The electrochemical behavior was examined through Cyclic voltammetry, Galvanostatic charge–discharge analysis and Electrochemical impedance spectroscopy revealed that Ag-Mn-Co-NGO-PVP has superior capacitance of 2384.2 Fg^{-1} at current density of $1Ag^{-1}$ in comparison to Ag-Mn (1010.4 Fg^{-1}), Ag-Mn-Co (1640.2 Fg^{-1}) and Ag-Mn-Co-NGO (1975.6 Fg^{-1}). The above features predict Ag-Mn-Co-NGO-PVP to be an exceptional nanocomposite electrode material to be employed in high energy storage applications.