Abstract

Copper-chromium oxide coatings were deposited on the glass substrates as well as nickel foam with varying deposition temperatures ranging from 280 °C to 380 °C. X-ray diffraction (XRD) and scanning electron microscopy (SEM) were employed to perform structural and morphological analysis of the synthesized thin films. The XRD pattern reveal that all samples fabricated at different deposition temperatures exhibited an amorphous structure. SEM micrographs revealed that the fabricated samples exhibit cuboid structure. Raman spectroscopy confirmed the presence of vibrational modes associated with copper and chromium oxides. Energy dispersive X-ray (EDX) analysis was used to examine the elemental composition of the fabricated samples. All the fabricated samples were deposited on the nickel foam to evaluate their electrochemical properties. The electrochemical performance of each sample assessed using cyclic voltammetry (CV) and galvanostatic chrage-discharge (GCD) methods, using a 3 M KOH electrolyte solution. The findings reveal that the electrode fabricated at 320 °C attained the highest specific capacitance of 1454 Fg^{-1} at a current density of 1 Ag^{-1}. The outstanding electrochemical properties demonstrated by the copper-chromium oxide composites suggest their potential use as electrode materials in energy storage applications such as supercapacitor.