ABSTRACT

The present work used spray pyrolytic technique to form thin films of Co-Zn binary metallic oxide on nickel foam and glass slides substrate by varying concentration of cobalt and zinc. The created slides were subjected to structural examination using X-ray diffraction (XRD). Pure zinc and cobalt oxide were shown to have crystalline structures by XRD, but the remaining samples showed amorphous structures. Cyclic voltammetry (CV), galvanostatic charge-discharge (GCD), and electrochemical impedance spectroscopy (EIS) methods were used to examine the electrochemical characteristics of all electrodes using a 3M KOH electrolytic solution. The electrochemical study led to the discovery of pseudo-capacitive characteristics. According to the findings, the cobalt zinc binary metallic oxide electrode with equal concentration (1:1) attained a highest specific capacitance of 1452 F g^{-1} at 1 Ag^{-1}. Electrochemical impedance spectroscopy was used for this research during the whole frequency range, from 0.1 to 1000 Hz. The results of this work indicate that Co-Zn oxide composites have a great deal of unrealized potential for application in the construction of useful supercapacitors due to their exceptional electrochemical capabilities.