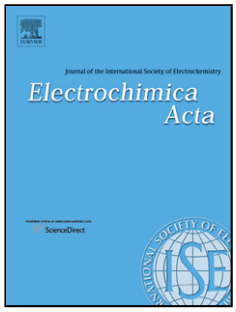

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Synthesisand Characterizations of Electroless Oil Palm Shell Based-Activated Carbon/Nickel Oxide Nanocomposite Electrodes for Supercapacitor Applications

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Abstract

Activated carbon (AC) prepared by two-stage microwave-induced physical activation of oil palm shell have been coated using electroless plating technique to form nanocomposite material. The composite materials were calcinated at different temperature of 300, 400 and 500 ^{o}C for one hour. The nanocomposite materials were evaluatedas potential electrodes for supercapacitors. Using the composite electrodes in a two-electrode symmetrical capacitor, the properties of the composite electrodes were investigated by cyclic voltammetry (CV), galvanostatic charge-discharge (GCD) and electrochemical impedance spectroscopy (EIS). Results from electrochemical measurements show that the nanocomposite electrodes exhibit superior capacitive performance compared with the AC electrode. The specific capacitance have been found to increase by 85-205% with respect to the AC electrode. In addition, the specific capacitance as well as the energy density were found to reduce with the incrementof the