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High Capacitive behaviour of nanostructured manganese oxide filmsprepared by galvanostatic electrodeposition

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Abstract : The manganese dioxide thin films nanostructured MnO2 was successfully electrodeposited onto graphite electrode in a bath containing [Mn(CH3COO)2 4H2O] aqueous solutions. The MnO2 thin films were studied by X-ray diffraction analysis (XRD), followed the observations by the scanning electron microscope (SEM) and atomic force microscope (AFM), with a crystalline structures andmany small nanowires. The electrochemical characterization was performed using cyclic voltammetry CV), showing capacitive behavior in the voltage 1.4 V/SCE in 0.5 M Na2SO4 electrolyte solution. The supercapacitance obtained is 136 F.g-1. In addition, the electrochemical process, such as ion transfer and surface capacitance, was also investigated with electrochemical impedance spectroscopy. The long cycle-life and stability of the MnO2 coatings on graphite via the presented electrodeposition were also demonstrated.

Keywords : galvanostatic deposition, MnO2 thin film, supercapacitors