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Electrochemically deposited layered MnO₂ films for improved supercapacitor

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Abstract

Electrochemically deposited manganese dioxide films have shown excellent supercapacitor properties when deposited over stainless steel substrates. Deposited films are characterized using X-ray diffraction and microscopic techniques. Effect of annealing on the supercapacitor properties of the films has been evaluated. Manganese dioxide films of different thicknesses are produced by varying the deposition time in electrochemical deposition process. Specific capacitance was higher in thinner films. Specific capacitance of 615 Fg⁻¹ is obtained from the cyclic voltammetry (CV) measurements at 20 mVs⁻¹ scan rates. Electrochemical properties of the films are investigated with many other electrochemical test procedures. Electrochemical property of the films is mapped using scanning electrochemical microscope (SECM).

Keywords: Manganese dioxide; Cathodic deposition; Supercapacitor; Electrochemical quartz crystal microbalance; scanning electrochemical microscopy.

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