

Synthesis and Electrochemical Investigation of Manganese Oxide Electrode Fabricated by ESD Technique for Supercapacitor Application

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Electrochemical capacitor (EC) has achieved much attention recently due to its high power density and excellent reversibility and long cycle life. Recently, manganese oxide is being considered as one of the promising potential electrode materials for an EC due to its low cost and environmental compatibility. Pang et al. reported that the electrochemical properties of sol-gel derived and electrodeposited manganese oxide films.^{1, 2} They showed that the dip-coated sol-gel derived films indicated better capacitive behavior and gave specific capacitance values as high as ~690F/g which is 50 to 70% greater than that of the electrodeposited films. However, the sol-gel technique used by Pang et al. could not provide uniform coatings and controllable thickness of films and required additives(methylcellulose) to improve its adherence to the supporting substrate.³

As for the formation of manganese oxide materials for ECs, the electrostatic spray deposition (ESD) technique offers many interesting advantages over the sol-gel methods such as simple set-up, a good adherence to the substrate, a good control of the thickness and morphology of the deposited layers and an excellent control of stoichiometry.

In this study, we reported the synthesis of thin films of amorphous manganese oxide materials for supercapacitor applications by ESD technique. Effects of deposition conditions like deposition temperature, deposition time, solvent composition and heat treatment temperature on electrochemical properties of the films were investigated. Detailed results and discussion on the electrochemical properties of amorphous manganese oxide thin films prepared by ESD technique will be presented in the meeting.

References

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