Synthesis of Manganese Oxide/ Acetylene Black Nanocomposite for Supercapacitor Application

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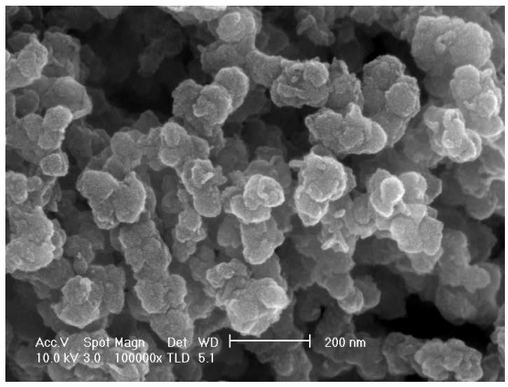
Much attention is now focused on the oxides of manganese, nickel, cobalt, and vanadium as candidate electrode materials for supercapacitor application. Recently, a number of studies about manganese oxides were reported on their synthesis and electrochemical properties in non aqueous as well as aqueous solutions. MnO_x materials can be prepared either by the oxidation of Mn^{2+} in a basic solution, by reduction of MnO_4^- in an acidic solution, or by redox reaction between Mn^{2+} and MnO_4^-.

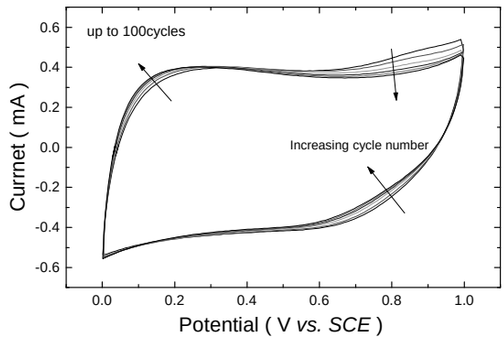
Our previous study revealed that the charge storage reaction of nickel and manganese oxides confined mainly to their surface layer. In order to enhance the specific capacitance and rate capability, the surface area of the metal oxides should be increased for a given mass of material. Hence, mass-normalized energy and power density can be optimized when the metal oxides is prepared in nanostructured, highly porous forms.

In this study, we synthesized MnO_x /acetylene black nanocomposites by solution based method without the use of surfactant. After complete reaction, the suspension was filtered and washed several times using distilled water, and then dried. And their electrochemical properties were investigated in Na_2SO_4 solution.

Detailed results and discussion about the synthesis mechanism and electrode properties will be presented in the meeting.



(a)



(b)

Fig. 1 (a) SEM images and (b) Cyclic Voltammogram of MnO_x /acetylene black nanocomposites prepared by solution based method.