Formation and Electrochemical Behavior of Iron Oxides as Supercapacitor material

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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, several transition metal oxides such as manganese oxide, nickel oxide and cobalt oxide are being considered as one of the promising potential electrode materials for an EC due to its low cost and environmental compatibility[1,2]. However, iron oxide, one of the cheapest and most abundant transition metal, has not been investigated as a candidate for an EC. In this study, Electrochemical behavior of iron oxides/hydroxides-thin film such as FeOOH, Fe_3O_4 and Fe_2O_3 has been investigated.

Fig. 1 shows cyclic voltammogram of Fe_3O_4-thin film in 1M Na_2SO_4. Fe_3O_4 shows ideal capacitive behavior. Crystal structure, surface morphology, electrochemical properties such as CV, and rate capability of Fe oxides/hydroxides were studied carefully. The charge storage mechanism of Fe oxides/hydroxides also was studied using electrochemical quartz crystal microbalance (EQCM).

Detailed results will be discussed in the meeting.

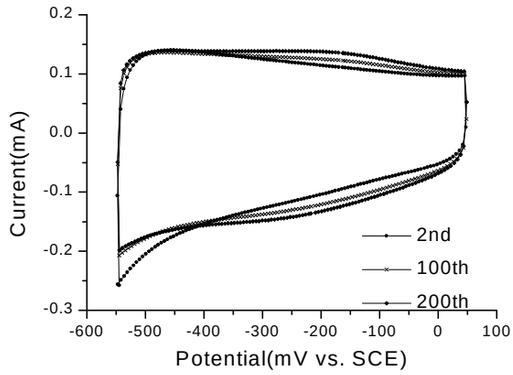

Fig. 1. Cyclic voltammogram of Fe_3O_4 in 1M Na_2SO_4 ;scan rate=30mV/s

References

1. S. F. Chin, S. C. Pang and A. Anderson, *J. Electrochem. Soc.*, **149**, A379 (2002).

2. K. W. Nam and K. B. Kim, Electrochemistry, **69**, 467 (2001)