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Electrochemical and SEM Study of Conductive Polymer Electrode Contained Carbon Nanofiber for Supercapacitor System

Soo-Gil Park, Wonkyung Choi, S. Kamei*, T. Momma** and T. Ohsaka**
Chungbuk University, *Shizuki Electric Co., **Waseda university

Electrochemical capacitor has received considerable amount of attention over the last few years because of their use in high power energy storage devices. There is a continuing interest in supercapacitors as energy storage devices , such as load levelling in the capacitor battery hybrid systems for the electric vehicle(EV) propulsion where high energy and power densities are required.

The tantalum oxide or aluminum oxide cathode electrode in an electrolytic capacitor was replaced by a ruthenium oxide (RuO2) electrode for improving the energy density. Also in contrast to electrochemical capacitors, where cell voltage is limited to the stable potential window of the electrolyte, the hybrid capacitor cell voltage depends on the B.D. voltage of the anode dielectric, which is orders-of-magnitude higher than that of electrochemical capacitors.

In this work, we have studied on possibility of hybrid capacitor constructed of Aluminum oxide and carbon nanofiber(st. & sp. type) contained in electro synthesized conducting polymer electrode or Metal oxide cathode. SEM study was focused on the distribution of those home synthesized carbon nano fiber as straight type and spyroll type in electrolysis polymerization as conducting polymers(PAN,PPy,PTh). From those results of various collectors and anodizing time, they could not influence the capacitive performance of metal oxide electrodes and finally carbon nano fiber(st., sp.type) confirmed conducting polymer and RuO_2 electrode shows the better capacity than other metal oxide electrodes.