

### Electrochemical Characteristics of Cylindrical Hybrid Capacitor using Various Structure of the Cathode Active Materials

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Electric double layer capacitors base on charge storage at the interface between a high surface area activated carbon electrode and an electrolyte solution are characterized by their long cycle life and high power density in comparison with batteries. However, energy density of electric double-layer capacitors obtained at present is smaller as compared with that of batteries and limits the wide spread use of the capacitors. To obtain the new device that shows large energy density, high power density and stable performance, a new hybrid capacitor is developed. This new capacitor comprises of an organic electrolyte containing Li salt, an activated carbon cathode and a carbonaceous anode that can intercalate and de-intercalate Li ion. In particular, hybrid capacitor using  $\text{LiMn}_2\text{O}_4$  as the cathode electrode has been commercially. But  $\text{Mn}^{2+}$  ion eluted from  $\text{LiMn}_2\text{O}_4$  at high temperature due to  $\text{Mn}^{2+}$  ion dissolution reaction and deterioration of capacity. In this study we fabricated cylindrical hybrid capacitor using various structure of metal oxide such as olivine, spinel layer structure as cathode and their analyzed electrochemical behavior.