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The Distribution Effects with PVA on Cobalt Oxide Electrode for Supercapacitor

수퍼커패시터용 산화코발트 전극에 대한 PVA 분산효과

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Many transition-metal oxides have been shown to be excellent electrode materials for supercapacitors with their charge-storage mechanisms based predominantly on pseudocapacitance. Generally super-fine cobalt oxide xerogel powders were prepared by using a unique solution chemistry associated with the sol-gel process. The main effect of thermal treatment on the crystalinity, particle structure, and corresponding electrochemical properties were discussed of the resulting xerogel remained amorphous as $Co(OH)_2$ up to 160 ℃. With an increase in the temperature above 200 ℃, both the surface area and pore volume decreased sharply, because the amorphous $Co(OH)_2$ decomposed to form CoO that was subsequently oxidized to form crystalline Co_3O_4. In addition, the changes in the crystallinity, and particle structure all had significant but coupled effects on the electrochemical properties of the xerogels. A maximum capacitance of 192 F/g was obtained for an electrode prepared with the CoO_x Xerogel calcined at 150 ℃, which was consistent with the maxima exhibited in both the surface area and pore volume. This capacitance was attributed solely to a surface redox mechanism.

For improving of capacitance on supercapacitor, we added PVA chemicals as dispenser. It is 30% better in terms of capacitance, and then it was carried out capacitance changes of CoO_x to acquire stability in cycle tester during 1000 cycle, it shows extremelyt 450 F/g large capacitance. At present, we have to discuss further for this supercapacitor.