

Life Prediction of Supercapacitor of Hydrous Ruthenium Oxide Mixed with Carbon Nanotube Additive during 100000 Times Charge-discharge Processes

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Abstract

In this study, the applicability of supercapacitor of the hydrous ruthenium oxide with or without carbon nanotube additive was examined. The cathodic deposition was used which was fast and easy to prepare the electrode of supercapacitor. The electrical capacity characteristics were investigated by cyclic voltammetry. The specimen was measured at 1 V/s in 0.5M H₂SO₄ through 100000 times charge-discharge cycles. It was found that the specimen of hydrous ruthenium oxide without carbon nanotube oxide additive was performed more uniformly during the 100000 times charge-discharge processes. While the capacitance dropped by 58% on specimen with carbon nanotube additive after 100000 times charge-discharge cycles. The coating layer of hydrous ruthenium oxide on the carbon nanotube surface was found extremely thin, although carbon nanotube supplied huge coating area. The capacitance of the specimen without carbon nanotube additive was lower than the specimen with carbon nanotube additive, however the capacitance of specimen without carbon nanotube additive did not decay after 100000 times charge-discharge cycles.

Keyword : Carbon Nanotube, charge-discharge cycles, Supercapacitor, Hydrous Ruthenium Oxide