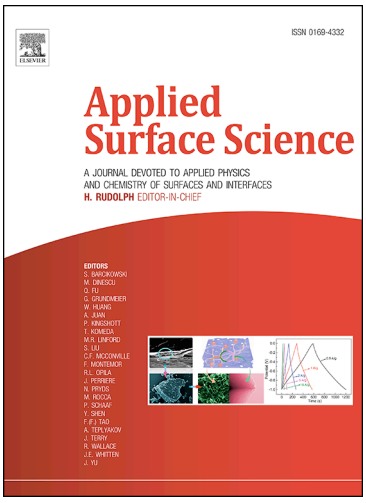

Full Length Article

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Advanced Li-ion Hybrid Capacitors Based on the Nanostructured Ruthenium Oxide on MWCNTs

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Highlights

The RuO_2/MWCNT showed high specific capacity, outstanding rate performance and long cycling stability under a Li-ion organic electrolyte.

Advanced Li-ion hybrid capacitors (LIHCs) were successfully constructed with RuO_2/MWCNT anode and activated ployaniline derived carbon (APDC) cathode under a Li-ion organic electrolyte.

The LIHCs exhibited a highest energy density of 146 Wh kg^{-1} and a highest power densities of 33 kW kg^{-1}, with excellent cyclic stability (~100 % at 2.0 A g^{-1} after 15000 cycles), which exhibited better performance than other LIHCs systems.

Abstract

Here, the porous ruthenium oxide/multi-walled carbon nanocomposite (RuO_2/MWCNT) was prepared using a facile precipitation method. The RuO_2/MWCNT showed high specific capacity, outstanding rate performance and long cycling stability under a Li-ion organic electrolyte. Thus, advanced Li-ion hybrid capacitors (LIHCs) were successfully constructed with RuO_2/MWCNT anode and activated ployaniline derived carbon (APDC) cathode under a Li-ion organic electrolyte. The LIHCs exhibited a highest energy density of 146 Wh kg^{-1} and a highest power densities of 33 kW kg^{-1}, with excellent cyclic stability (~100 % at 2.0 A g^{-1} after 15000 cycles), which exhibited better performance than other LIHCs systems.

Keywords: Li-ion hybrid capacitors; Ruthenium oxide/multi-walled carbon; Energy density; Power density

1. Introduction

In recent years, with the rapid development of clean renewable energy, multi-function portable electronic equipment and large energy storage system has been proposed higher requirements for energy storage devices, such as fast charge capacity, long cycling life and high energy density [1]. Li-ion hybrid capacitors (LIHCs) which can unite the merits of supercapacitors and Li-ion batteries emerge to