

## Accepted Manuscript

Title: Studies on the equivalent serial resistance of carbon supercapacitor

Author: Kai-Bing Li Da-Wei Shi Zhi-Yong Cai Guo-Liang  
Zhang Qiu-An Huang Di Liu Chang-Ping Yang

PII: S0013-4686(15)01365-1  
DOI: <http://dx.doi.org/doi:10.1016/j.electacta.2015.06.008>  
Reference: EA 25133

To appear in: *Electrochimica Acta*

Received date: 8-4-2015  
Revised date: 21-5-2015  
Accepted date: 2-6-2015

Please cite this article as: Kai-Bing Li, Da-Wei Shi, Zhi-Yong Cai, Guo-Liang Zhang, Qiu-An Huang, Di Liu, Chang-Ping Yang, Studies on the equivalent serial resistance of carbon supercapacitor, *Electrochimica Acta* <http://dx.doi.org/10.1016/j.electacta.2015.06.008>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Studies on the equivalent serial resistance of carbon supercapacitor

Li Kai-Bing<sup>a</sup>, Shi Da-Wei<sup>a</sup>, Cai Zhi-Yong<sup>a</sup>, Zhang Guo-Liang<sup>a</sup>, Qiu-An Huang<sup>b</sup>, Liu Di<sup>a</sup>, Yang

Chang-Ping<sup>a\*</sup>

<sup>a</sup> *The Hubei Collaborative Innovation Center for Advanced Organic Chemical Materials, Faculty of Physics and Electronic Science, Hubei University, Wuhan 430062, China*

<sup>b</sup> *Faculty of Computer Science and Information Engineering, Hubei University, Wuhan, Hubei 430062, PR China*

<sup>\*</sup>*Corresponding author. E-mail: cpyang@hubu.edu.cn*

## Abstract

Equivalent serial resistance (ESR) is a crucial factor to effect on the density of power and energy for supercapacitor. In this work, we studied the influence of internal and external factors, including mechanical pressure, temperature, electrolyte concentration and loaded voltage on the performance parameters, especially on the ESR and specific capacitance for carbon supercapacitor. The results indicate that the ESR is mainly contributed from the interface between electrolyte and electrode. In addition, we found that the ESR can be significantly lowered by mechanical pressures from 11ohm at 0 N to 1 ohm at 800 N by decreasing 90%, and in consequence, the specific capacitance of supercapacitor can be improved dramatically from 19.34 F/g to 44.87F/g by increasing 128%. Basing on the model of interface with a diffusion layer, we put forward a reasonable explanation for the variation of ESR and specific capacitance with the four factors of pressure, temperature, electrolyte concentration and loaded voltage.

**Keywords:** Supercapacitors, Energy storage, Carbon electrode material, Equivalent serial

Download English Version:

<https://daneshyari.com/en/article/6611237>

Download Persian Version:

<https://daneshyari.com/article/6611237>

[Daneshyari.com](https://daneshyari.com)