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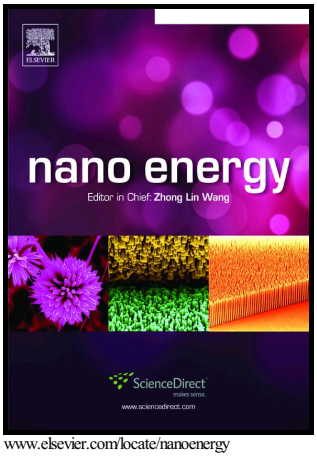

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Optimized Mesopores Enabling Enhanced Rate Performance in Novel Ultrahigh Surface Area Meso-/microporous Carbon for Supercapacitors

Jie Yang‡, Haolin Wu‡, Min Zhu, Wenju Ren, Yuan Lin, Haibiao Chen, and Feng Pan**

School of Advanced Materials, Peking University, Shenzhen Graduate School, Shenzhen 518055, People's Republic of China

***Corresponding authors**

Email addresses: chenhb@pkusz.edu.cn (H. Chen), panfeng@pkusz.edu.cn (F. Pan).

‡These authors contributed equally to this work.

Abstract

Increasing both the energy density and the power density of supercapacitors is an important but challenging research subject. Porous carbon with extremely high surface, such as activated carbon, is a key engineering material for current supercapacitor technology. Here we report optimized mesopores enabling significantly enhanced rate performance in hierarchically meso-/microporous carbon with a ultrahigh surface area for supercapacitors, which is prepared by a new *in-situ* template method to exhibit a high mesopore volume proportion (66.0%), as well as a large pore volume up to 2.47 $cm^3 g^{-1}$, and an ultrahigh specific surface area of 3122 $m^2 g^{-1}$. Polysiloxane was used as a precursor to produce nonporous SiOC, and sequentially NaOH was used to activate SiOC to produce highly porous carbon by removing silica and activating carbon. Hierarchically porous carbon C800 exhibited a high energy density up to 42 Wh kg^{-1} at a power density of 374 W kg^{-1}, and still retained an energy density of 21 Wh kg^{-1} at a high power density of 30 kW kg^{-1}. The superior