



## 论文摘要

中南大学学报(自然科学版)

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Vol.40 No.3 Jun.2009

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文章编号: 1672-7207(2009)03-0601-07

## 中孔炭的制备及其在超级电容器中的应用

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**摘要:** 以中孔硅分子筛SBA-15为模板, 蔗糖为炭源, 炭化温度为700 °C制备中孔炭材料, 利用透射电镜(TEM)和N<sub>2</sub>吸附脱附等温线表征该材料的结构与形貌。以中孔炭材料为超级电容器的电极材料, 组装成扣式电容器进行循环伏安、恒流充放电、交流阻抗、漏电流、自放电、循环寿命等电化学测试。结果表明: 样品孔结构呈二维六角有序分布; 该样品的孔体积为1.88 cm<sup>3</sup>/g, 比表面积为1 394 m<sup>2</sup>/g, 具有典型的中孔结构和集中的中孔分布, 它的最可几孔径为3.4 nm; 制备的中孔炭作电极材料组装的超级电容器有良好的电化学性能, 在500 mA/g的充放电电流密度下, 循环10 000次的平均比电容高达95 F/g, 比容量波动范围仅为-4%~4%。

**关键字:** 中孔炭; 电极材料; 超级电容器; 比电容

## Template synthesis of mesoporous carbon and its application in supercapacitors

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**Abstract:** The templated mesoporous carbon(TMC) was prepared using SBA-15 as a template and sucrose as a carbon source at 700 °C carbonized temperature. The structure and morphology of mesoporous carbon were characterized by transmission electron microscopy (TEM) and N<sub>2</sub> adsorption-desorption isotherm. The electrochemical properties of mesoporous carbon which was used as the active material of coin supercapacitor were studied by cyclic voltammery, constant current charge-discharge, electrochemical impedance spectroscopy, leakage current, self-discharge, and cycle life measurements. The results show that the sample possesses two-dimensional (2-D) hexagonally ordered mesoporous structure, and the pore volume of the sample is 1.88 cm<sup>3</sup>/g, the specific surface area is 1 394 m<sup>2</sup>/g; it possesses mesoporous structure and narrow pore size distribution, the average pore size is 3.4 nm. The supercapacitor has good electrochemical performance, the specific capacitance is 95 F/g at a charge/discharge current density of 500 mA/g after 10 000 cycles, and specific capacitance fluctuates between -4% and 4%.

**Key words:** mesoporous carbon; active material; supercapacitor; specific capacitance

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