



## 论文摘要

中南大学学报(自然科学版)

ZHONGNAN DAXUE XUEBAO(ZIRAN KEXUE BAN)

Vol.41 No.1 Feb.2010

[PDF全文下载] [全文在线阅读]

文章编号: 1672-7207(2010)01-0050-05

## 化学活化和化学-物理联合活化制备石油焦基活性炭

孙晓峰, 王新宇, 赖延清, 张治安, 夏阳

(中南大学 冶金科学与工程学院, 湖南 长沙, 410083)

**摘要:** 以石油焦为原料, 采用化学活化和化学-物理联合活化2种活化工艺分别制备超级电容器用活性炭材料 $C_A$ 和 $C_B$ 。采用 $N_2$ 吸附法表征活性炭材料的BET比表面积及孔隙结构; 通过恒电流充放电、循环伏安、交流阻抗等电化学测试方法, 对2种活性炭在有机电解液中的电化学特性进行研究。研究表明,  $C_A$ 具有较高的收率、振实密度以及BET比表面积, 分别可达61.28%, 0.35 g/cm<sup>3</sup>和2 760 m<sup>2</sup>/g;  $C_B$ 具有较高的中孔率和平均孔径, 分别为24.1%和2.3 nm; 在充放电电流密度为1 A/g时,  $C_A$ 的质量比电容量为137.8 F/g; 而 $C_B$ 表现出较好的功率特性, 在20 A/g时, 质量比容量仅比1 A/g时的质量比容量衰减4.7%。

**关键字:** 石油焦; 化学活化; 化学-物理联合活化; 活性炭; 超级电容器

## Petroleum coke based activated carbon prepared from chemical activation and chemical-physical activation

SUN Xiao-feng, WANG Xin-yu, LAI Yan-qing, ZHANG Zhi-an, XIA Yang

(School of Metallurgical Science and Engineering, Central South University, Changsha 410083, China)

**Abstract:** Taking petroleum cokes as raw material, activated carbons  $C_A$  and  $C_B$  were prepared by chemical activation and chemical-physical activation. The BET specific surface area and the pore structure of activated carbons were analyzed by  $N_2$  adsorption method. Electrochemical properties of both samples, such as constant-current charge-discharge measurement, cyclic voltammogram, and electrochemical impedance spectroscopy were investigated in non-aqueous electrolytes. It can be found that  $C_A$  shows higher yield, tap density and BET specific surface area, which are 61.28%, 0.35 g/cm<sup>3</sup> and 2 760 m<sup>2</sup>/g, respectively. However,  $C_B$  has higher mesopore ratio of 24.1% and pore diameter of 2.3 nm. At the current density of 1 A/g,  $C_A$  attains the highest specific capacitance of 137.8 F/g.  $C_B$  shows good power discharge behavior with the capacitance loss of 4.7% at the current density of 20 A/g than that at 1 A/g.

**Key words:** petroleum coke; chemical activation; chemical-physical activation; activated carbon; supercapacitor

# 有色金属在线

## 中国有色金属权威知识平台

版权所有：《中南大学学报(自然科学版、英文版)》编辑部

地 址：湖南省长沙市中南大学 邮编： 410083

电 话： 0731-88879765 传真： 0731-88877727

电子邮箱： [zngdx@mail.csu.edu.cn](mailto:zngdx@mail.csu.edu.cn) 湘ICP备09001153号