

材料化学工程与纳米技术

基于预沥青烯的有序结构中孔炭及其电化学性能

周颖, 刘小雪, 王六平, 许钦一, 王志超, 邱介山

大连理工大学炭素材料研究室, 精细化工国家重点实验室; 大连理工大学辽宁省微纳米技术及系统重点实验室

收稿日期 2009-2-16 修回日期 2009-6-10 网络版发布日期 2009-9-11 接受日期

摘要

以预沥青烯为碳源、SBA-15为模板, 采用模板法合成了结构有序的中孔炭材料。用XRD、TEM、 N_2 吸附和电化学工作站等对中孔炭的微观结构及电化学性能进行了研究。结果表明, 以预沥青烯为碳源合成的炭材料具有高度有序的二维六方孔道和一定的石墨化程度, 它反转复制了模板SBA-15的结构。中孔炭的比表面积为 $542 \text{ m}^2 \cdot \text{g}^{-1}$, 孔容为 $0.479 \text{ cm}^3 \cdot \text{g}^{-1}$, 孔径呈单峰分布, 集中在 3.5 nm 左右。这种预沥青烯基中孔炭作为电化学电容器电极材料, 显示出良好的性能, 在 1 mA 的电流强度下其单电极质量比电容高达 $310 \text{ F} \cdot \text{g}^{-1}$ 。

关键词

[预沥青烯](#) [模板法](#) [中孔炭](#) [电化学性能](#)

分类号

Ordered mesoporous carbon from preasphaltene: preparation and capacitance properties

ZHOU Ying, LIU Xiaoxue, WANG Liuping, XU Qinyi, WANG Zhichao, QIU Jieshan

Abstract

Ordered mesoporous carbon was made from preasphaltene derived from coal liquefaction, with SBA-15 used as template. The microstructure and capacitance properties of the as-made ordered mesoporous carbon (OMC) were investigated with XRD, TEM, N_2 adsorption and electrochemical workstation. The results showed that the OMC had partially graphitized and well-ordered hexagonal structure that was a reverse replication of the template. The specific surface area of the OMC was $542 \text{ m}^2 \cdot \text{g}^{-1}$ with a pore volume of $0.479 \text{ cm}^3 \cdot \text{g}^{-1}$ and a narrow pore size distribution centering at 3.5 nm . The properties of the capacitor electrodes assembled from the OMC were tested in a three-electrodes system, showing that the OMC was a promising capacitor electrode material, of which the specific capacitance of single electrode at 1 mA was up to $310 \text{ F} \cdot \text{g}^{-1}$.

Key words

[preasphaltene](#) [template method](#) [mesoporous carbon](#) [capacitance properties](#)

DOI:

扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(776KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [参考文献](#)

服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

相关信息

- ▶ [本刊中 包含“](#)

[预沥青烯”的 相关文章](#)

- ▶ [本文作者相关文章](#)

- [周颖](#)
- [刘小雪](#)
- [王六平](#)
- [许钦一](#)
- [王志超](#)
- [邱介山](#)

