中国化学工程学报 2005.13(5):686-690 ISSN: 1004-054x CN: 11-3920/R

PROCESS AND PRODUCT TECHNOLOGY

碳含量对LiFePO4/C性能影响

杨秀娟*,郑丽君*,郑丽君**

* School of Chemical Engineering and Technology, Tianjin University, Tianjin 300072, China

** The Third Railway Survey and Design Institute, Tianjin 300130, China

收稿日期：修回日期： 网络版发布日期： 接受日期：

摘要：Olivine-type LiFePO4/C composite cathode materials were synthesized by a solid-state reaction method in an inert atmosphere. The glucose was added as conductive precursors before the formation of the crystalline phase. The effects of glucose content on the properties of as-synthesized cathode materials were investigated. The crystal structure and the electrochemical performance were characterized by X-ray diffraction（XRD）, scanning electron microscopy（SEM）, laser particle-size distribution measurement and electrochemical performance testing. The material has a single crystal olivine structure with grain-sizes ca. 100-200 nm. SEM micrographs and the corresponding energy dispersive spectrometer（EDS）data confirm that the carbon particulates produced by glucose pyrogenation are uniformly dispersed among the LiFePO4 grains, ensuring a good electronic contact. Impedance spectroscopy was used to investigate the ohmic and kinetic contributions to the cell performance. It is found that increasing the carbon content leads to a reduction of the cell impedance due to the reduction of the charge transfer resistance. The galvanostatically charge and discharge tests show that the material obtainedby adding 10% C（by mass）gives a maximum discharge capacity of 148.8mA·h·g-1 at the same rate（C/10）. The material also displays a more stable cycle-life than the others.

关键词：橄榄石结构； 碳含量；LiFePO4/C纳米复合正极材料； 固相合成法； 微颗粒； 阻抗谱； 充放电测试；

分类号：

DOI:

Effect of Carbon Content on Electrochemical Properties of LiFePO4/C Composite Cathode

HANXiuJuan, ZHENGLiJun, ZHENGLiJuan*

* School of Chemical Engineering and Technology, Tianjin Univeristy, Tianjin 300072, China

** The Third Railway Survey and Design Institute, Tianjin 300130, China

Received Revised Online Accepted

Abstract Olivine-type LiFePO4/C composite cathode materials were synthesized by a solid-state reaction method in an inert atmosphere. The glucose was added as conductive precursors before the formation of the crystalline phase. The effects of glucose content on the properties of as-synthesized cathode materials were investigated. The crystal structure and the electrochemical performance were characterized by X-ray diffraction（XRD）, scanning electron microscopy（SEM）, laser particle-size distribution measurement and electrochemical performance testing. The material has a single crystal olivine structure with grain-sizes ca. 100-200 nm. SEM micrographs and the corresponding energy dispersive spectrometer（EDS）data confirm that the carbon particulates produced by glucose pyrogenation are uniformly dispersed among the LiFePO4 grains, ensuring a good electronic contact. Impedance spectroscopy was used to investigate the ohmic and kinetic contributions to the cell performance. It is found that increasing the carbon content leads to a reduction of the cell impedance due to the reduction of the charge transfer resistance. The galvanostatically charge and discharge tests show that the material obtainedby adding 10%C（by mass）gives a maximum discharge capacity of 148.8mA·h·g-1 at the same rate（C/10）. The material also displays a more stable cycle-life than the others.

Key words olivine-type; cathode material; combined; pyrogenesis; cycle-life;

通讯作者：

杨秀娟 hxxiujuan@126.com

作者个人主页：杨秀娟*,郑丽君*,郑丽君**

本刊栏目

扩展功能

本文信息

Supporting info

PDF(2344KB)

HTML(1.2M)

参考文献

服务与反馈

把文章推荐给朋友

用户评论空间

加入RSS阅读器

问题报告

Email Alert

加为收藏

关闭此页面

相关信息

本刊中相关文章

作者相关文章

杨秀娟

郑丽君

郑丽君