

论文摘要

中国有色金属学报

ZHONGGUO YOUSEJINSHUXUEBAO XUEBAO

第18卷 专辑1 2008年6月

 [PDF全文下载]  [全文在线阅读]

文章编号: 1004-0609(2008)S1-0398-05

锂离子电池边角料中直接回收合成 LiCoO_2 的性能

刘云建, 胡启阳, 李新海, 王志兴, 郭华军, 彭文杰

(中南大学 冶金科学与工程学院, 长沙410083)

摘要: 研究了一种从锂离子蓄电池正极片的边角料中直接回收钴酸锂的新工艺。先用二甲基乙酰胺(DMAC)浸泡正极片, 将 LiCoO_2 从铝箔上剥离, 再在高温下除去正极中的聚偏氟乙烯(PVDF)和碳粉等杂质。然后添加不同的锂盐(Li_2CO_3 、 $\text{LiOH}\cdot\text{H}_2\text{O}$ 和 $\text{LiAc}\cdot 2\text{H}_2\text{O}$)调节回收粉末中的Li与Co的量比为1.00, 再在 $850\text{ }^\circ\text{C}$ 下焙烧12 h得到最终产品。用扫描电子显微镜(SEM)和X射线衍射(XRD)分析技术对得到的样品进行微观形貌与晶相结构的研究。研究表明, 添加 Li_2CO_3 合成的 LiCoO_2 层状结构发育最为完善, 其首次放电容量和循环性能也最好; 在3.0~4.3 V进行充放电, 首次放电容量达到 $160\text{ mA}\cdot\text{h/g}$, 经30次循环以后, 仍有 $150\text{ mA}\cdot\text{h/g}$ 。

关键字: LiCoO_2 ; 回收; 合成; 放电容量; 循环性能

Synthesis and electrochemical performances of LiCoO_2 recycled from incisors bound of Li-ion batteries

LIU Yun-jian, HU Qi-yang, LI Xin-hai, WANG Zhi-xing, GUO Hua-jun, PENG Wen-jie

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

Abstract: A new LiCoO_2 recovery technology from Li-ion battery was studied. LiCoO_2 was peeled off the Al foil with dimethyl acetamide(DMAC), and then the polyvinylidene fluoride(PVDF) and carbon powders in the active material were eliminated by high temperature calcining. And then the Li_2CO_3 , $\text{LiOH}\cdot\text{H}_2\text{O}$ and $\text{LiAc}\cdot 2\text{H}_2\text{O}$ were added into the recycled powders to adjust the molar ratio of Li to Co to 1.00. The new LiCoO_2 was obtained by calcining the mixture at $850\text{ }^\circ\text{C}$ for 12 h in the air. Structure and morphology of the recycled powders and resulted sample were observed by XRD and SEM technique, respectively. The layered structure of the LiCoO_2 synthesized by adding Li_2CO_3 is best with the characteristics as cathode material in terms of charge-discharge capacity and cycling performance. The first discharge capacity is $160\text{ mA}\cdot\text{h/g}$ from 3.0 V to 4.3 V. The discharge capacity after cycled 30 times is still $150\text{ mA}\cdot\text{h/g}$.

Key words: LiCoO_2 ; recycle; synthesis; discharge performance; cycling performance

版权所有：《中国有色金属学报》编辑部

地 址：湖南省长沙市岳麓山中南大学内 邮编： 410083

电 话： 0731-8876765, 8877197, 8830410 传真： 0731-8877197

电子邮箱： f-ysxb@mail.csu.edu.cn