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LiFePO₄ 包覆LiCoO₂ 的结构及性能

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摘要: 采用固相法在锂离子电池正极材料LiCoO₂表面包覆一层LiFePO₄; 研究了LiFePO₄包覆量对材料性能的影响; 采用X射线衍射仪和扫描电镜分析样品的晶体结构和表面形貌。研究表明: 样品具备LiCoO₂的 α -NaFeO₂型层状结构, 但随着包覆量的增加, XRD衍射谱显示样品存在多种杂相; 合成的样品电化学性能良好, 当LiFePO₄的包覆量为1%时, 在室温下以0.1C倍率充放电, 首次放电比容量达145.9 mA·h/g, 纯相LiCoO₂放电比容量为146.2 mA·h/g。样品采用1C倍率放电时, 首次放电比容量达138.9 mA·h/g, 循环性能较好, 经过20次循环放电比容量仅衰减4.97%。

关键字: 正极材料; LiCoO₂; LiFePO₄

Structure and properties of LiFePO₄ coated LiCoO₂

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Abstract: LiCoO₂ cathode materials were coated with LiFePO₄ by the solid state reaction for lithium-ion batteries. The effects of LiFePO₄ coating amount on properties of samples were studied. The crystalline structure and morphology of samples were analyzed by X-ray diffractometry and scanning electron microscopy, respectively. The results show that the samples own the α -NaFeO₂ layered structure of LiCoO₂. But with the increase of coating amount, XRD patterns show more impurity phases. The samples show excellent electrochemical performance. At room temperature, the specific discharge capacity of the sample coated with 1% LiFePO₄ reaches 145.9 mA·h/g at 0.1C, while the specific discharge capacity of pure LiCoO₂ reaches 146.2 mA·h/g. The specific discharge capacity at 1C reaches 138.9 mA·h/g. The materials show better cycle performance. The capacity only loses 4.97% after 20 cycles.

Key words: cathode material; LiCoO_2 ; LiFePO_4

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