

锂电池负极材料石墨片的简单制备及其性能

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Facile Synthesis of Graphite Nanosheets as Anode Materials for Lithium-ion Batteries

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- 摘要
- 参考文献
- 相关文章

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摘要

以石墨铅笔的笔芯为原料, 通过简单涂抹的方法成功制备类似石墨烯纳米片的薄片结构. 对该石墨片材料在0.1 C (1 C=372 mA/g) 电流密度下进行电化学性能测试, 并与铅笔芯直接研磨制备的石墨材料进行比较, 结果发现, 石墨纳米片的充放电曲线显著不同, 首次可逆比容量为402 mA·h/g, 高于石墨材料的比容量和碳的理论比容量. 经过20圈循环后, 可逆比容量下降为367 mA·h/g, 为首次比容量的91.3%. 石墨片材料具有较好的循环稳定性和较高的比容量, 主要是因为石墨片具有二维片状纳米结构, 比表面积很大, 锂离子可同时储存在纳米片的正反两面和侧面.

关键词: 石墨片; 负极材料; 锂离子电池; 铅笔芯

Abstract:

Graphite nanosheets have been successfully synthesized by pencil painting on the surface of Cu foil using commercial 6B pencil. Electrochemical properties of the as-prepared graphite nanosheets were tested at a constant current (0.1 C, 1 C=372 mA/g), and compared with graphite materials prepared by hand milling the pencil core. The nanosheets showed different discharging and charging curves and large reversible capacity of 402 mA·h/g in the first cycle, which was larger than the capacity of graphite materials and the theoretical value of carbon. After 20 cycles, charge capacity of 367 mA·h/g was retained, corresponding to 91.3% of the initial charge capacity. The obtained graphite nanosheet is a two-dimensional nanosheet with large surface areas, which can provide more active sites for lithium storage including both sides and the edge parts of the nanosheets.

Keywords: [graphite nanosheets](#); [anode material](#); [lithium-ion battery](#); [pencil core](#)

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