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Li₄Ti₅O₁₂/石墨负极材料的湿法制备与电化学表征

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Wet Method Preparation and Electrochemical Characterization of Li₄Ti₅O₁₂/Graphite Anode Material

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摘要 以无水乙醇为溶剂,醋酸锂、钛酸丁酯和石墨为原料,采用湿法制备了Li₄Ti₅O₁₂/石墨复合材料.采用X-射线衍射、红外光谱、扫描电镜和电化学测试等对合成产物进行了表征.结果表明:600℃氩气气氛中煅烧6 h可制得碳质量分数5%左右的Li₄Ti₅O₁₂/石墨复合材料,其可逆容量达到167.1 mAh·g⁻¹,经80次循环后,0.1C放电时,容量保持率为99.0%,2.0 C放电时容量保持率达到105.1%.与纯Li₄Ti₅O₁₂相比, Li₄Ti₅O₁₂/石墨复合材料具有更好的循环性能和倍率性能,是一种优良的锂离子电池负极材料.

关键词: 锂离子电池 Li₄Ti₅O₁₂ 负极 湿法

Abstract: Li₄Ti₅O₁₂/graphite composite was prepared by sol-gel method using ethyl alcohol as solvent,lithium acetate and tetrabutyl titanate and graphite as raw materials.Li₄Ti₅O₁₂/graphite composites were characterized by X-ray diffraction(XRD),scanning electron microscopy (SEM) combined with electrochemical tests.Results show that Li₄Ti₅O₁₂/graphite composite with 5% carbon mass fraction containing can be obtained by annealing the precursor at 600℃ for 6 h in Ar atmosphere.The composites can deliver a specific capacity of 167.1 mAh/g,99.0% and 105.1% of the capacity can be retained after discharged for 80 times at 0.1 C and 2.0 C,respectively.Compared with pureLi₄Ti₅O₁₂,Li₄Ti₅O₁₂/graphite composite shares larger discharge capacity,better cyclability and rate performance,suggesting Li₄Ti₅O₁₂/graphite composite is a promising anode material for lithium ion batteries.

Key words: lithium ion batteries Li₄Ti₅O₁₂ anode wet method

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