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尖晶石结构$Li_4Ti_5O_{12}$的制备及其电化学性能

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Preparation of Spinel $Li_4Ti_5O_{12}$ and Electrochemical Performance

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摘要 以TiO_2和醋酸锂为原料，采用在乙醇中预分散和在液相体系中熔融浸渍的协同共混技术，实现反应物料间微尺度混合，在较低温度下分段煅烧合成纳米结构钛酸锂.X射线衍射（X-ray diffraction,XRD）、扫描电子显微镜（scanning electron microscope，SEM）和粒度分布等测试结果表明，产物为尖晶石结构钛酸锂（$Li_4Ti_5O_{12}$），平均粒径约为550 nm.以该产物为负极材料组装锂离子电池并测试其电化学性能，结果表明其性能良好，0.1 C倍率下首次充放电比容量高达165 mA·h/g，具有稳定的电压平台，循环性能良好.

关键词： 尖晶石结构钛酸锂（$Li_4Ti_5O_{12}$） 醋酸锂 尖晶石结构 制备 电化学性能

Abstract: Nano-sized $Li_4Ti_5O_{12}$ was prepared at a low temperature with TiO_2 and lithium acetate as starting materials. Atom-sized blending was achieved by the liquid pre-dispersion and melting-soakage with ethyl alcohol as solvent. Calcination was carried out by different steps at relative low temperatures. The X-ray diffraction (XRD), scanning electron microscope (SEM) and size distribution tests showed that the $Li_4Ti_5O_{12}$ was spinel structure with an average size of about 550 nm. The $Li_4Ti_5O_{12}$ showed good electrochemical performance with the first charge-discharge capacity achieving 165 mA·h/g at 0.1 C and having a steady voltage and good cyclic performance.

Keywords: $Li_4Ti_5O_{12}$, lithium acetate, spinel structure, preparation, electrochemical performance

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