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## 锂离子电池正极材料LiMn<sub>2</sub>O<sub>4</sub>/Ag的合成及表征

(湖南省林产化工工程重点实验室, 湖南 张家界 427000)

### Synthesis and Characterization of LiMn<sub>2</sub>O<sub>4</sub>/Ag Composite for Lithium Ion Battery

(Key Laboratory of Forest Products and Chemical Industry Engineering, Zhangjiajie 427000, Hunan China)

- 摘要
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**摘要** 以醋酸锂、醋酸锰和硝酸银为原料,采用柠檬酸络合燃烧法制备LiMn<sub>2</sub>O<sub>4</sub>/Ag复合材料.通过X射线衍射、扫描电子显微镜、恒电流充放电以及交流阻抗技术分析和检测合成产物的物相、形貌及电化学性能.结果表明:LiMn<sub>2</sub>O<sub>4</sub>/Ag复合材料由LiMn<sub>2</sub>O<sub>4</sub>和金属Ag组成,银均匀地分布在LiMn<sub>2</sub>O<sub>4</sub>颗粒中;与LiMn<sub>2</sub>O<sub>4</sub>相比, LiMn<sub>2</sub>O<sub>4</sub>/Ag复合材料具有更高的比容量、更高的库伦效率和更低的极化;Ag的添加可提高LiMn<sub>2</sub>O<sub>4</sub>的循环性能,尤其是高倍率充放电循环性能.

**关键词:** 煅烧 复合材料 阻抗 电池

**Abstract:** The powder of LiMn<sub>2</sub>O<sub>4</sub>/Ag composite was prepared by citrate gel and combustion technique using lithium acetate, manganese acetate and silver nitrate as starting materials. Phase identification, surface morphology and electrochemical properties were studied by X-ray diffraction, scanning electron microscopy, galvanostatic charge-discharge experiments, and electrochemical impedance spectroscopy. The results show that the powder is the composite of LiMn<sub>2</sub>O<sub>4</sub> and Ag metal, and silver disperses homogeneously in LiMn<sub>2</sub>O<sub>4</sub> particles. Compared with LiMn<sub>2</sub>O<sub>4</sub>, LiMn<sub>2</sub>O<sub>4</sub>/Ag composite has higher specific capacity, higher columbic efficiency and lower polarization. The additive of Ag improves the cycle ability of LiMn<sub>2</sub>O<sub>4</sub> powders, especially at higher charge-discharge rate.

**Key words:** calcination composite impedance batteries

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