Short Communication

Effect of Temperature on Electrochemical Performance of $\text{LiMg}_{0.06}\text{Mn}_{1.94}\text{O}_4$ Prepared by a Molten-Salt Combustion Method

Junming Guo^{1,2,3,*}, Lei Hu^{1,2,3}, Chang-wei Su^{1,2,3}, Rui Wang^{1,2,3}, Xiaofang Liu^{1,2,3}, Jinhui Peng^{1,2,3*}

¹ Key Laboratory of Comprehensive Utilization of Mineral Resources in Ethnic Regions, Yunnan Minzu University, Kunming 650500, PR China

² Key Laboratory of Resource Clean Conversion in Ethnic Regions, Education Department of Yunnan, Yunnan Minzu University, Kunming 650500, PR China

³ Joint Research Centre for International Cross-border Ethnic Regions Biomass Clean Utilization in Yunnan, Yunnan Minzu University, Kunming 650500, PR China

*E-mail: guojunming@tsinghua.org.cn

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$\text{LiMg}_{0.06}\text{Mn}_{1.94}\text{O}_4$ cathode materials were synthesized by a molten-salt combustion method at 400 °C for 1h and two- step calcination at 500 °C, 600 °C, 700 °C and 800 °C for 3h. The temperature effect on the crystal structure and the morphology of $\text{LiMg}_{0.06}\text{Mn}_{1.94}\text{O}_4$ has been evaluated by X-ray diffraction (XRD) analysis and scanning electron microscopy (SEM). The materials synthesized at 600 °C and 700°C were single phase, while Mn_2O_3 and Mn_3O_4 impurity phases can be detected in the other materials synthesized at 800 °C and 900 °C, respectively. The average particle size of $\text{LiMg}_{0.06}\text{Mn}_{1.94}\text{O}_4$ increased with the increase of calcination temperature. The effect of the calcination temperature on the electrochemical performances of the $\text{LiMg}_{0.06}\text{Mn}_{1.94}\text{O}_4$ materials has also been studied by galvanostatic charge/discharge tests and cyclicvoltammetry (CV) measurements. The results showed that the prepared $\text{LiMg}_{0.06}\text{Mn}_{1.94}\text{O}_4$ at 600 °C and 700°C demonstrated better electrochemical performance than the ones at 500 °C and 800°C, with an initial discharge specific capacity of 117.7 mAh g⁻¹ and 112.8 mAh g⁻¹, and their capacity retention was 78.2% and 79.3% after 100 cycles at 0.5 C, respectively.

Keywords: Lithium-ion battery; $\text{LiMg}_{0.06}\text{Mn}_{1.94}\text{O}_4$; cathode materials; Electrochemical performance; molten-salt combustion method

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