The Electrochemical Performance of $\text{LiMn}_{1.96}\text{Mg}_{0.04}\text{O}_4$ Cathode Material Prepared by Solid-State Combustion Method

Lei Hu^{1,2,3}, Miaomiao Shao^{1,2,3}, Junming Guo^{1,2,3,*}, Chang-wei Su^{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

doi: 10.20964/2016.11.71

Received: 23 July 2016 / Accepted: 19 July 2016 / Published: 10 October 2016

Mg-doped cathode materials $\text{LiMn}_{1.96}\text{Mg}_{0.04}\text{O}_4$ were synthesized at 500°C for different calcining time by solid-state combustion method. The effects of calcining time on the crystal structure and microstructure were analyzed by scanning electron microscopy (SEM) and X-ray diffraction (XRD), the electrochemical properties were characterized by charge-discharge cycling test, cyclic voltammetry (CV) measurement and electrochemical impedance spectroscopy (EIS). The results showed that all samples demonstrated a single spinel structure; the crystal and the grain size grow up with the calcining time increasing. The $\text{LiMn}_{1.96}\text{Mg}_{0.04}\text{O}_4$ cathode calcined for 12 h had a high initial discharge specific capacity of 118.6 mAh g⁻¹ and the best capacity retention was 93.00 % after 40 cycles at 0.2 C.

Keywords: Lithium-ion battery; $\text{LiMn}_{1.96}\text{Mg}_{0.04}\text{O}_4$; Electrochemical performance; cathode materials; solid-state combustion method

[FULL TEXT](#)

© 2016 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).