Effect of molar ratio of $\text{Li}_2\text{CO}_3/\text{MnO}_2$ on characteristic of the Lithium Manganate Synthesized via High Temperature Ball Milling Method

Qing Zhao^{1,2}, Xuetian Li^{2,*}, Zhongbao Shao², Binshi Xu², Chengjun Liu^{1,2}, Maofa Jiang^{1,2}

¹ Key Laboratory for Ecological Metallurgy of Multimetallc Minerals (Ministry of Education), Northeastern University, Shenyang 110819, China

² School of Metallurgy, Northeastern University, Shenyang 110819, China

*E-mail: xuetian.li@163.com

doi: 10.20964/2018.04.46

Received: 16 December 2017 / Accepted: 5 February 2018 / Published: 6 March 2018

Lithium manganite (LiMn_2O_4) cathode materials were synthesized with Li_2CO_3 , MnO_2 and polyethylene glycol 12000 as raw materials via high temperature ball milling method, and the effect of the value of the molar ratio of Li/Mn on the impurity, structure, morphology, and electrochemical performance was experimentally investigated in this work. Some impurity of $\text{Li}_{1.4}\text{Mn}_2\text{O}_4$ was detected in the L-1.15 ($n_{\text{Li}}:n_{\text{Mn}} = 1.15:2$), and the lithium source influenced the uniformity of particles. Some button batteries were assembled with the lithium manganite and the electrochemical performance was tested. L-1.1 ($n_{\text{Li}}:n_{\text{Mn}} = 1.1:2$) exhibited the optimal electrochemical performance: initial discharge capacities were 121.5, 109.5, 98.3, 86.5 and 70.2 mAhg^{-1} at rates of 0.1, 0.5, 1.0, 2.0 and 5.0 C, respectively. After 100 cycles, the capacity was 89.5 mAhg^{-1} at rate of 1.0 C and the capacity retention was 91.0%.

Keywords: Li-ion batteries; High temperature ball milling method; Lithium source; Electrochemical performance

[FULL TEXT](#)

© 2018 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/>).