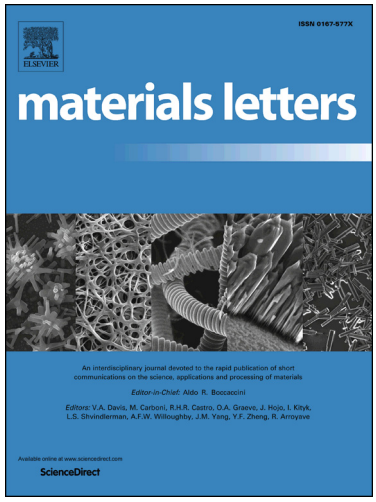

Novel Mn-based Li-rich layered oxide $0.3Li_2MnO_3 \cdot 0.7LiNi_{1/3}Co_{1/3}Mn_{1/3}O_2$ as Anode Material for Lithium-Ion Batteries

Yanling Jin, Youlong Xu, Jun Lin, Shengnan He, Baofeng Zhang

PII: S0167-577X(17)31322-8
DOI: http://dx.doi.org/10.1016/j.matlet.2017.08.116
Reference: MLBLUE 23093

To appear in: *Materials Letters*

Received Date: 6 July 2017
Revised Date: 9 August 2017
Accepted Date: 28 August 2017

Please cite this article as: Y. Jin, Y. Xu, J. Lin, S. He, B. Zhang, Novel Mn-based Li-rich layered oxide $0.3Li_2MnO_3 \cdot 0.7LiNi_{1/3}Co_{1/3}Mn_{1/3}O_2$ as Anode Material for Lithium-Ion Batteries, *Materials Letters* (2017), doi: http://dx.doi.org/10.1016/j.matlet.2017.08.116

Novel Mn-based Li-rich layered oxide $0.3Li_2MnO_3 \cdot 0.7LiNi_{1/3}Co_{1/3}Mn_{1/3}O_2$ as Anode Material for Lithium-Ion Batteries

Yanling Jin[a,b], Youlong Xu[a,b,*] Jun Lin[a,b], Shengnan He[a,b], Baofeng Zhang[a,b]

[a] Electronic Materials Research Laboratory, Key Laboratory of the Ministry of Education & International Center for Dielectric Research, Xi'an Jiaotong University, Xi'an 710049, China

[b] Shaanxi Engineering Research Center of Advanced Energy Materials & Devices, Xi'an Jiaotong University, Xi'an 710049, China

Corresponding Author : Youlong Xu[*]

E-mail: ylxu@mail.xjtu.edu.cn.

Telephone/ Fax numbers: +86 29 82665161/+86 29 82665161.

Abstract: The possibility of Mn-based Li-rich layered oxides $0.3Li_2MnO_3 \cdot 0.7LiNi_{1/3}Co_{1/3}Mn_{1/3}O_2$ as anode material for Li-ion batteries is explored. Ex-situ XRD patterns show that the layered structure remained when discharged to 1.2 V and ~~the emergence of~~ the phase of Li_2O and transition metal (Ni, Mn and Co) emerged when discharged to 0.05 V, indicating that there exists conversion reaction mechanism like transition-metal oxides anode material. The reversible capacities reach 574.2 and 449.8 mAh g^{-1} at the current density of 50 mA g^{-1} and 200 mA g^{-1} respectively after 80 cycles. This study suggests that further optimizing Mn-based Li-rich layered oxides is a promising alternative anode material for Li-ion batteries.

Keywords: Mn-based Li-rich layered oxides; crystal structure; energy storage and conversion; anode material; conversion reaction; Li-ion batteries

1. Introduction

Li-ion batteries (LIBs) dominate the rechargeable battery market segment for various electronic devices