

Accepted Manuscript



Synthesis and electrochemical performance of micro-nano structured  $\text{LiFe}_{1-x}\text{Mn}_x\text{PO}_4/\text{C}$  ( $0 \leq x \leq 0.05$ ) cathode for lithium-ion batteries

Chunyang Li , Guojun Li , Xiaomei Guan

PII: S2095-4956(17)30303-0  
DOI: [10.1016/j.jechem.2017.08.006](https://doi.org/10.1016/j.jechem.2017.08.006)  
Reference: JECHEM 373

To appear in: *Journal of Energy Chemistry*

Received date: 11 April 2017  
Revised date: 10 July 2017  
Accepted date: 7 August 2017

Please cite this article as: Chunyang Li , Guojun Li , Xiaomei Guan , Synthesis and electrochemical performance of micro-nano structured  $\text{LiFe}_{1-x}\text{Mn}_x\text{PO}_4/\text{C}$  ( $0 \leq x \leq 0.05$ ) cathode for lithium-ion batteries, *Journal of Energy Chemistry* (2017), doi: [10.1016/j.jechem.2017.08.006](https://doi.org/10.1016/j.jechem.2017.08.006)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Synthesis and electrochemical performance of micro-nano structured  $\text{LiFe}_{1-x}\text{Mn}_x\text{PO}_4/\text{C}$

( $0 \leq x \leq 0.05$ ) cathode for lithium-ion batteries

Chunyang Li<sup>a</sup>, Guojun Li<sup>a, b, \*</sup>, Xiaomei Guan<sup>b</sup>

<sup>a</sup>*Liaoning Key Lab for New Energy Battery, Dalian Jiaotong University, Dalian 116028, Liaoning, China*

<sup>b</sup>*School of Materials Science and Engineering, Dalian Jiaotong University, Dalian 116028, Liaoning, China*

### Abstract

Micro-nano structured  $\text{LiFe}_{1-x}\text{Mn}_x\text{PO}_4/\text{C}$  ( $0 \leq x \leq 0.05$ ) cathodes were prepared by spray drying, followed by calcination at 700 °C. The spherical  $\text{LiFe}_{1-x}\text{Mn}_x\text{PO}_4/\text{C}$  ( $0 \leq x \leq 0.05$ ) particles with the size of 0.5 to 5.0  $\mu\text{m}$  are composed of lots of nanoparticles of 20 to 30 nm, and have the well-developed interconnected pore structure. In contrast, when Mn doping content is 3 mol% ( $x=0.03$ ), the  $\text{LiFe}_{0.97}\text{Mn}_{0.03}\text{PO}_4/\text{C}$  demonstrates maximum specific surface area of 31.30  $\text{m}^2/\text{g}$ , more uniform pore size and relatively better electrochemical performance. The initial discharge capacities are 161.59, 157.04 and 153.13 mAh/g at a discharge rate of 0.2, 0.5 and 1 C, respectively. Meanwhile, the discharge capacity retentions are ~ 100% after 120 cycles. The improved electrochemical performance should be attributed to higher specific surface, smaller polarization voltage, and a high  $\text{Li}^+$  diffusion rate due to the micro-nano porous structure and lattice expansion

\*Corresponding author. [Tel: +86-13998680928](tel:+86-13998680928); Fax: +8641184109420; E-mail: [ligj@djtu.edu.cn](mailto:ligj@djtu.edu.cn).

This work was financially supported by the Department of Education of Liaoning Province of China.

Download English Version:

<https://daneshyari.com/en/article/6529661>

Download Persian Version:

<https://daneshyari.com/article/6529661>

[Daneshyari.com](https://daneshyari.com)