Short Communication

Effect of Annealing on Crystal Orientation and Electrochemical Performance of Nanocrystalline LiFePO₄

Wen-Li Kong¹, Yi-Jie Gu^{1,*}, Hong-Quan Liu¹, Yun-Bo Chen², Jie Yang¹, Cheng-Quan Liu³

¹ College of Materials Science and Engineering, Shandong University of Science and Technology, Qingdao 266510, China

² Advanced Manufacture Technology Center, China Academy of Machinery Science and Technology, Beijing 100044, China

³ Henan ZhongPingHanBo New Energy Co., Ltd., Pingdingshan 467000, China

*E-mail: 13792900643@163.com

doi: 10.20964/2018.03.44

Received: 14 November 2017 / Accepted: 2 January 2018 / Published: 5 February 2018

Nano single-crystalline LiFePO₄ (LFP) with large (010) plane exposure was synthesized by the hydrothermal method, followed by annealing to alleviate the main limitations of LiFePO₄ cathode material. The XRD results indicated that after annealing, the sample gained the preferred crystal orientation with a (020) crystallographic direction. Annealed LiFePO₄ showed a significantly improved capacity and excellent cycling and rate stability. Further electrochemical impedance analysis indicated that annealed LiFePO₄ has smaller film resistance R_{sf} , smaller charge-transfer resistance R_{ct} , and a larger diffusion coefficient of lithium ion (D_{Li}).

Keywords: LiFePO₄; annealing; crystal orientation; electrochemical impedance

[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/>).