Dehydration of $\text{FePO}_4 \cdot 2\text{H}_2\text{O}$ for the Synthesis of LiFePO_4/C : Effect of Dehydration Temperature

Wuliang Gongyan^{1,2,3}, Lingmeng Li^{1,2,3}, Haisheng Fang^{1,2,3,*}

¹ Key Laboratory of Advanced Battery Materials of Yunnan Province, Kunming University of Science and Technology, Kunming 650093, China

² Key Laboratory of Nonferrous Metals Vacuum Metallurgy of Yunnan Province, Kunming University of Science and Technology, Kunming 650093, China

³ Faculty of Metallurgy and Energy Engineering, Kunming University of Science and Technology, Kunming 650093, China

*E-mail: hsfang1981@hotmail.com

doi: 10.20964/2018.03.72

Received: 12 November 2017 / Accepted: 12 January 2018 / Published: 5 February 2018

To study the effect of dehydration temperature on synthesis and electrochemical performance of LiFePO_4/C , $\text{FePO}_4 \cdot 2\text{H}_2\text{O}$ is dehydrated at different temperatures (200-700 °C) and the resulting FePO_4 is adopted as a raw material to synthesize LiFePO_4/C composite. The results show that $\text{FePO}_4 \cdot 2\text{H}_2\text{O}$ can be fully dehydrated at a temperature above 184 °C, the crystalline form, particle size and morphology of the dehydrated FePO_4 varies with dehydration temperature, and the synthesized LiFePO_4/C composites from these FePO_4 have similar crystallinity, particle size and morphology, but have different electrochemical performance. Among all samples, the LiFePO_4/C synthesized from the FePO_4 dehydrated at 500 °C exhibits the best electrochemical performance. From these results, it is suggested that α -quartz FePO_4 with a trigonal structure (P3_121) is an optimum form for efficient synthesis of high performance LiFePO_4/C composite, and the dehydration of $\text{FePO}_4 \cdot 2\text{H}_2\text{O}$ should be controlled at a temperature around 500 °C.

Keywords: Lithium ion batteries; Cathode materials; LiFePO_4 ; $\text{FePO}_4 \cdot 2\text{H}_2\text{O}$; Dehydration

[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/>).