Electrochemical Properties of Hollow Spherical $\text{Na}_3\text{V}_2(\text{PO}_4)_3/\text{C}$ Cathode Materials for Sodium-ion Batteries

Chunmei Huang, Zonglin Zuo^{*}, Jianqiu Deng^{*}, Qingrong Yao, Zhongmin Wang,
Huaiying Zhou

School of Material Science and Engineering, Guilin University of Electronic Technology, Guilin,
541004, China

^{*}E-mail: jqdeng@guet.edu.cn (Deng Jianqiu), zuozonglin@163.com (Zuo Zonglin)

doi: 10.20964/2017.10.36

Received: 17 May 2017 / Accepted: 28 July 2017 / Published: 12 September 2017

Hollow Spherical $\text{Na}_3\text{V}_2(\text{PO}_4)_3/\text{C}$ cathode materials were successfully synthesized by a simple spray drying method. The structure and morphology of the samples were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM) and transmission electron microscopy (TEM) analysis. The electrochemical properties of the samples were also tested in details by cyclic voltammetry, charge-discharge testing and AC impedance technique. The experimental results show that the $\text{Na}_3\text{V}_2(\text{PO}_4)_3$ can be indexed as rhombohedral structure and exhibits hollow spherical morphology. $\text{Na}_3\text{V}_2(\text{PO}_4)_3/\text{C}$ cathode materials deliver good rate performance and relative high discharge capacity. The discharge capacities are 96.8 and 70.9 mAh g⁻¹ at the rate of 0.1C and 10C, respectively. And a stable capacity of 70 mAh g⁻¹ is retained and the capacity retention is 75.7% after 200 cycles at 1C.

Keywords: $\text{Na}_3\text{V}_2(\text{PO}_4)_3/\text{C}$ composite; Sodium-ion batteries; Cathode; Hollow spherical structure

[FULL TEXT](#)

© 2017 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/>).