

Electrochemical properties of $\text{Na}_x\text{MnFe}(\text{CN})_6 \cdot z\text{H}_2\text{O}$ synthesized in a Taylor-Couette reactor as a Na-ion battery cathode material

DOI: [10.1016/j.jallcom.2017.09.146](https://doi.org/10.1016/j.jallcom.2017.09.146)

To appear in: *Journal of Alloys and Compounds*

Revised Date: 13 September 2017

Accepted Date: 14 September 2017

Please cite this article as: I.-H. Jo, S.-M. Lee, H.-S. Kim, B.-S. Jin, Electrochemical properties of $\text{Na}_x\text{MnFe}(\text{CN})_6 \cdot z\text{H}_2\text{O}$ synthesized in a Taylor-Couette reactor as a Na-ion battery cathode material, *Journal of Alloys and Compounds* (2017), doi: 10.1016/j.jallcom.2017.09.146.

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.

Electrochemical properties of $\text{Na}_x\text{MnFe}(\text{CN})_6 \cdot z\text{H}_2\text{O}$ synthesized in a Taylor-Couette reactor as a Na-ion battery cathode material

In-Ho Jo, Sang-Min Lee, Hyun-Soo Kim, and Bong-Soo Jin*

Battery Research Center, Korea Electrotechnology Research Institute, Changwon 642-120, Republic of Korea

Abstract

Taylor-Couette reactors allow short reaction times and enable the synthesis of powders with uniform particle size, and thus are suitable for preparing secondary battery cathode materials. Herein, cubic, monoclinic, and rhombohedral $\text{Na}_x\text{MnFe}(\text{CN})_6 \cdot z\text{H}_2\text{O}$ samples were prepared in a Taylor-Couette reactor at various drying conditions/temperature and were shown to exhibit structure-dependent electrochemical properties.

When cycled at 0.1 C in a potential range of 2.0–4.0 V, cubic-, monoclinic-, and rhombohedral-structured samples exhibited reversible discharge capacities of 89.5, 91.4, and 150.1 mAh g⁻¹, respectively. Importantly, the rhombohedral-structured sample not only showed the highest reversible discharge capacity but also exhibited excellent capacity retention (88.03%) after 50 cycles at 0.5 C (300 mA g⁻¹), which was ascribed to its extremely low interstitial water content.

Keywords: electrode materials, chemical synthesis, crystal structure, X-ray diffraction, thermal analysis

1. Introduction

Li secondary batteries, developed in the early 1990s, are currently the main power source of portable electronic devices, exhibiting an application range encompassing both small electronic devices and large-scale systems such as electric vehicles and battery-based power systems [1,2]. However, the mass production of large-scale energy storage systems based on Li-ion batteries is

Download English Version:

<https://daneshyari.com/en/article/5458282>

Download Persian Version:

<https://daneshyari.com/article/5458282>

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