

Author's Accepted Manuscript

A novel border-rich Prussian blue synthesized by inhibitor control as cathode for sodium ion batteries

Yongxin Huang, Man Xie, Jiatao Zhang, Ziheng Wang, Ying Jiang, Genhua Xiao, Shuaijie Li, Li Li, Feng Wu, Renjie Chen



PII: S2211-2855(17)30411-1
DOI: <http://dx.doi.org/10.1016/j.nanoen.2017.07.005>
Reference: NANOEN2063

To appear in: *Nano Energy*

Received date: 6 May 2017
Revised date: 17 June 2017
Accepted date: 3 July 2017

Cite this article as: Yongxin Huang, Man Xie, Jiatao Zhang, Ziheng Wang, Ying Jiang, Genhua Xiao, Shuaijie Li, Li Li, Feng Wu and Renjie Chen, A novel border-rich Prussian blue synthesized by inhibitor control as cathode for sodium ion batteries, *Nano Energy*, <http://dx.doi.org/10.1016/j.nanoen.2017.07.005>

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 a review of the resulting galley proof before it is published in its final citable 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.

A novel border-rich Prussian blue synthesized by inhibitor control as cathode for sodium ion batteries

Yongxin Huang^{a1}, Man Xie^{a1}, Jiatao Zhang^b, Ziheng Wang^a, Ying Jiang^a, Genhua Xiao^a, Shuaijie Li^a, Li Li^{a,c}, Feng Wu^{a,c}, Renjie Chen^{a,c*}

^aSchool of Materials Science & Engineering, Beijing Key Laboratory of Environmental Science and Engineering, Beijing Institute of Technology, Beijing 100081, China

^bBeijing Key Laboratory of Construction-Tailorable Advanced Functional Materials and Green Applications, School of Materials Science & Engineering, Beijing Institute of Technology, Beijing, 100081, China

^cCollaborative Innovation Center of Electric Vehicles in Beijing, Beijing 100081, China

*Corresponding author at: School of Materials Science & Engineering, Beijing Key Laboratory of Environmental Science and Engineering, Beijing Institute of Technology, Beijing 100081, PR China. Tel.: +86 10 68451429. chenrj@bit.edu.cn

Abstract: The performance of a Prussian blue cathode is affected by its structure and stability. Through the inhibitor and temperature control, the border-rich structure was obtained, which provides a good contact between electrode-electrolyte interfaces and increases the transmission path for Na⁺ ions. In addition, the as-prepared sample with rhombohedral phase demonstrated lower band gap and lower energy barrier for Na⁺ ions insertion. Benefiting from the kinetics optimization, the as-prepared electrode exhibited initial capacity of 120 mA h g⁻¹ and maintained nearly 80 % after 280 cycles at current density of 100 mA g⁻¹. This electrode also exhibited good rate performance about 60 mA h g⁻¹ at rate of 10 C. The structural stability is also related to the formation of the passivation layer during the charge-discharge process. The optimized passivation layer not only protects the electrode from the adverse side reactions at high voltage but also delivers low interface impedance. It can be inferred that the passivation layer plays a positive role in long cycling performance. When the as-prepared electrode was measured in an electrolyte with FEC additive, it exhibited a high capacity retention rate of 79 % after 500 cycles.

¹ These authors contributed equally to this work.

Download English Version:

<https://daneshyari.com/en/article/5452366>

Download Persian Version:

<https://daneshyari.com/article/5452366>

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