Accepted Manuscript

VO_2 (A)/graphene nanostructure: Stand up to Na ion intercalation/deintercalation for enhanced electrochemical performance as a Na-ion battery cathode

Xinyuan Hu, Zhengjing Zhao, Lin Wang, Jingbo Li, Chengzhi Wang, Yongjie Zhao, Haibo Jin

PII: S0013-4686(18)32226-6

DOI: 10.1016/j.electacta.2018.10.010

Reference: EA 32806

To appear in: *Electrochimica Acta*

Received Date: 25 July 2018

Revised Date: 28 September 2018

Accepted Date: 1 October 2018

Please cite this article as: X. Hu, Z. Zhao, L. Wang, J. Li, C. Wang, Y. Zhao, H. Jin, VO_2 (A)/ graphene nanostructure: Stand up to Na ion intercalation/deintercalation for enhanced electrochemical performance as a Na-ion battery cathode, *Electrochimica Acta* (2018), doi: https://doi.org/10.1016/ j.electacta.2018.10.010.

VO_2 (A)/graphene nanostructure: stand up to Na ion intercalation/deintercalation for enhanced electrochemical performance as a Na-ion battery cathode

Xinyuan Hu, Zhengjing Zhao, Lin Wang, Jingbo Li*, Chengzhi Wang, Yongjie Zhao, Haibo Jin*

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

Abstract

Intercalation/deintercalation of large size Na ion leads to serious electrode materials fragmentation that would be the main reason of Na-ion battery capacity fading. Herein, we reported a Na-ion battery cathode material composed of layer-structured VO_2 (A) nanowires wrapped with graphene. The VO_2 (A)/graphene nanostructure which effectively suppressed pulverization of VO_2 (A) nanowires during cyclic charging and discharging exhibited prominent cycle stability and high specific capacity. A reversible capacity of 115 mA h g^{-1} was retained over 100 cycles at a high current density of 100 mA g^{-1}. Comparing to the electrochemical performance of other vanadium oxides, VO_2 (A)/graphene demonstrates a potential cathode material for Na-ion batteries.

Keywords: Na-ion battery; VO_2 (A) nanowire; VO_2 (A)/graphene composite; battery cathode material; cycle stability.