Accepted Manuscript

Title: Bismuth oxide nanoflake@carbon film: A free-standing battery-type electrode for aqueous sodium ion hybrid supercapacitors

Authors: Zhenshuai Zhao, Yihua Ye, Weihua Zhu, Liang Xiao, Bohua Deng, Jinping Liu

PII: S1001-8417(18)30019-6
DOI: https://doi.org/10.1016/j.cclet.2018.01.011
Reference: CCLET 4401

To appear in: *Chinese Chemical Letters*

Received date: 9-11-2017
Revised date: 4-1-2018
Accepted date: 5-1-2018

Please cite this article as: Zhenshuai Zhao, Yihua Ye, Weihua Zhu, Liang Xiao, Bohua Deng, Jinping Liu, Bismuth oxide nanoflake@carbon film: A free-standing battery-type electrode for aqueous sodium ion hybrid supercapacitors, Chinese Chemical Letters https://doi.org/10.1016/j.cclet.2018.01.011

Communication

Bismuth oxide nanoflake@carbon film: A free-standing battery-type electrode for aqueous sodium ion hybrid supercapacitors

Zhenshuai Zhao[a], Yihua Ye[a], Weihua Zhu[a], Liang Xiao[a], Bohua Deng[a,*], Jinping Liu[a,b,*]

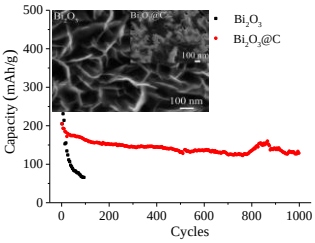
[a] *School of Chemistry, Chemical Engineering and Life Science, Wuhan University of Technology, Wuhan 430070, China*
[b] *State Key Laboratory of Advanced Technology for Materials Synthesis and Processing, Wuhan University of Technology, Wuhan 430070, China*

* Corresponding authors.
E-mail addresses: dengbh@qq.com (B. Deng), liujp@whut.edu.cn (J. Liu).

ARTICLE INFO

Article history:
Received
Received in revised form
Accepted
Available online

Graphical Abstract



An efficient strategy is developed to fabricate binder-free Bi_2O_3@C nanoflake film anode, which is utilized to assemble a high-performance aqueous sodium ion hybrid supercapacitor.

ABSTRACT

Aqueous hybrid supercapacitors are promising due to their low cost and high safety. Herein, a free-standing battery-type electrode of Bi_2O_3 nanoflake@C on carbon cloth is designed for aqueous sodium ion hybrid supercapacitors. Due to the integration of nanoarray architecture and the conductive carbon, the Bi_2O_3@C electrode exhibits a high specific capacity of 207 mAh/g at 2 A/g (6 C), good rate capability and cycling stability (133 mAh/g after 1,000 cycles). With the activated carbon as the capacitive electrode and neutral sodium salts as the electrolyte, a 1.9 V hybrid supercapacitor is assembled, delivering a high energy density of 18.94 Wh/kg. The device can still maintain 72.3% of initial capacity after 650 cycles. The present work holds great promise for developing next-generation hybrid supercapacitors.

Keywords:
Bi_2O_3 film
Free-standing
Carbon hybridization
Hybrid supercapacitors

The demand for efficient, economic, safe and eco-friendly energy storage systems (ESSs) is growing powerfully due to the