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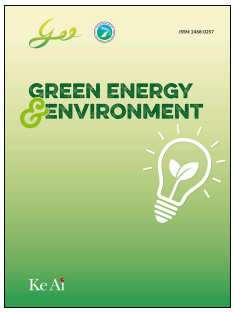

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Weina Ren, Haifeng Zhang, Dr. Cao Guan, Chuanwei Cheng, Prof.

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SnS_2 nanosheets arrays sandwiched by N-doped carbon and TiO_2 for high-performance Na-ion storage

Weina Ren[a], Haifeng Zhang[a], Cao Guan[b], and Chuanwei Cheng[ac*]*

[a] W. N. Ren, H. F. Zhang, Prof. C. W. Cheng
Shanghai Key Laboratory of Special Artificial Microstructure Materials and Technology, School of Physics Science and Engineering, Tongji University, Shanghai 200092, People's Republic of China.
E-mail: cwcheng@tongji.edu.cn

[b] Dr. C. Guan
Department of Materials Science and Engineering, National University of Singapore, 117574 Singapore.

[c] Prof. C. W. Cheng
The Institute of Dongguan-Tongji University, Dongguan, Guangdong, 523808, People's Republic of China.

Abstract

In this paper, SnS_2 nanosheets arrays sandwiched by porous N-doped carbon and TiO_2 (TiO_2@SnS_2@N-C) on flexible carbon cloth are prepared and tested as a free-standing anode for high-performance sodium ion batteries. The as-obtained TiO_2@SnS_2@N-C composite delivers a remarkable capacity performance (840 mA h g^{-1} at a current density of 200 mA g^{-1}), excellent rate capabilityand long-cycling life stability (293 mA h g^{-1} at 1 A g^{-1} after 600 cycles). The excellent electrochemical performance can be attributed to the synergistic effect of each component of the unique hybrid structure, in which the SnS_2 nanosheets with open framworks offer high capacity, while the porous N-doped carbon nanoplates arrays on flexible carbon cloth are able to improve the conductivity and the TiO_2 passivation layer can keep the structure integrity of SnS_2 nanosheets.

Keywords: Sandwich structure; SnS_2 nanosheets; N-doped carbon; TiO_2; sodium-ion battery