Bimetallic Cobalt–Nickel Selenide@Polypyrrole Core–Shell Nanotubes on Nickel Foam as High–Performance Electrode Material for Supercapacitors

Siqi Li, Wangfeng Cai, Xiao Ma, Jiahui Zhu, Yan Wang*

Department of Chemistry Engineering, Tianjin University, Tianjin, 300350, China

*E-mail: zhuwangyan@tju.edu.cn

doi: 10.20964/2020.04.24

Received: 3 December 2019 / Accepted: 20 January 2020 / Published: 10 March 2020

In this paper, bimetallic Co–Ni selenide@polypyrrole core–shell nanotubes on nickel foam (CoNi_{0.4}Se@PPy/NF) were synthesized according to a two-step hydrothermal reaction and an electrodeposition process. It was developed to be an electrode material for supercapacitors. This economical CoNi_{0.4}Se @PPy/NF electrode was highly conductive, and its specific areal capacitance at 5 mA cm^{−2} was as high as 13.27 F cm^{−2}. In addition, it showed good cycling stability. After 1000 cycles at 30 mA cm^{−2}, CoNi_{0.4}Se@PPy/NF retained 92.63% of its capacitance. It was suggested that its superior electrochemical properties were due to its great specific capacitance as well as to the electrical conductivities obtained from the synergy between selenide and polypyrrole and the unique structure of the core–shell and nanotubes. The above results showed that the CoNi_{0.4}Se@PPy core–shell nanotube composite material was a promising electrode material for supercapacitors.

Keywords: cobalt-nickel selenide, polypyrrole, core–shell structure, electrode material, supercapacitors

[FULL TEXT](#)

© 2020 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).