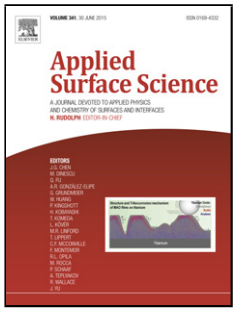

Title: One-step hydrothermal synthesis of sandwich-type $NiCo_2S_4$@reduced graphene oxide composite as active electrode material for supercapacitors

Authors: Fangping Wang, Guifang Li, Qianqian Zhou, Jinfeng Zheng, Caixia Yang, Qizhao Wang

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One-step hydrothermal synthesis of sandwich-type $NiCo_2S_4$@reduced graphene oxide composite as active electrode material for supercapacitors

Fangping Wang*, Guifang Li, Qianqian Zhou, Jinfeng Zheng, Caixia Yang, Qizhao Wang

Key Laboratory of Eco-Environment-Related Polymer Materials, Ministry of Education of China, Key Laboratory of Gansu Polymer Materials, College of Chemistry and Chemical Engineering, Northwest Normal University, Lanzhou 730070

*Corresponding author. E-mail: wangfp@nwnu.edu.cn

Highlights

- Sandwich-type $NiCo_2S_4$@RGO was first prepared successfully by hydrothermal process.
- This electrode exhibits a high specific capacitance of 2003 F/g at 1 A/g.
- With 86% capacitance retention from 1 A g^{-1} to 20 A g^{-1}.
- $NiCo_2S_4$@RGO//AC exhibits a high energy density of 21.9 Wh kg^{-1} at 417.1 W kg^{-1}.

Abstract: A facile one step hydrothermal process is developed for the synthesis of $NiCo_2S_4$@reduced graphene oxide ($NiCo_2S_4$@RGO) composite as electrode for electrochemical supercapacitors. This $NiCo_2S_4$@RGO electrode exhibits an ultrahigh specific capacitance of 2003 F g^{-1} at 1 A g^{-1} and 1726 F g^{-1} at 20 A g^{-1} (86.0% capacitance retention from 1 A g^{-1} to 20 A g^{-1}), excellent cycling stabilities (86.0% retention after 3500 cycles). Moreover, an asymmetric supercapacitor is successfully assembled by using $NiCo_2S_4$@RGO nanoparticle as the positive electrode and active