22nd Iranian Inorganic Chemistry Conference,
23-25 August, 2023
University of Kurdistan

Zinc cobalt telluride@nickel cobalt selenide as a battery type electrode in asymmetric supercapacitor

Shiva Moraveji[a], Lida Fotouhi[a,b*], Saeed Shahrokhian[c], Mohammad Zirak[d]

[a] *Department of Analytical Chemistry, Faculty of Chemistry, Alzahra University, Tehran, Iran*

[b] *Analytical and Bioanalytical Research Centre (ABRC), Alzahra University, Tehran, Iran*

[c] *Department of Chemistry, Sharif University of Technology, Tehran 11155–9516, Iran*

[d] *Department of Physics, Hakim Sabzevari University, P. O. Box 9617976487, Sabzevar, Iran*

[*] *E-mail: shiva1991.moraveji@gmail.com*

In recent decades, the fossil fuels have engendered climate changes and environmental pollution. Energy conversion and storage devices with low cost, high-efficiency and environment-friendly replaced the immoderate traditional energy [1,2]. Additionally, metal chalcogenide have been used as an electrode materials for supercapacitor applications[3]. Zinc cobalt telluride@nickel cobalt selenide were prepared by two step hydrothermal and electrodeposition method. Zinc cobalt telluride@nickel cobalt selenide electrode achieved highest specific capacitance of 800 F g^{-1} at 2 A g^{-1} current density. As fabricated electrode exhibited the retention of 93.5% after 5000 GCD cycles, confirmed the good stability and reversibility. An asymmetric device showed a high energy (55 W h kg^{-1}) and power density (560 W kg^{-1}).

Keywords: asymmetric supercapacitor, metal chalcogenide

References

[1] S. Moraveji, L. Fotouhi, M. Zirak, S. Shahrokhian, *Bimetallic nickel-cobalt nanospheres electrodeposited on nickel foam as a battery-type electrode material for fabrication of asymmetric supercapacitors, Journal of Alloys and Compounds.* **2023**, 946,169409.

[2] S. Zhang, P. Dai, H. Liu, L. Yan, H. Song, D. Liu, X. Zhao, *Metal-organic framework derived porous flakes of cobalt chalcogenides (CoX, X = O, S, Se and Te) rooted in carbon fibers as flexible electrode materials for pseudocapacitive energy storage, Electrochimica Acta.* **2021**, 369,137681.

[3] B. Ye, S. Xiao, X. Cao, J. Chen, A. Zhou, Q. Zhao, W. Huang, J. Wang, *Interface engineering for enhancing performance of additive-free NiTe@NiCoSe$_2$ core/shell nanostructure for asymmetric supercapacitors, J. Power Sources* **2021**, 506, 230056.

22nd Iranian Inorganic Chemistry Conference