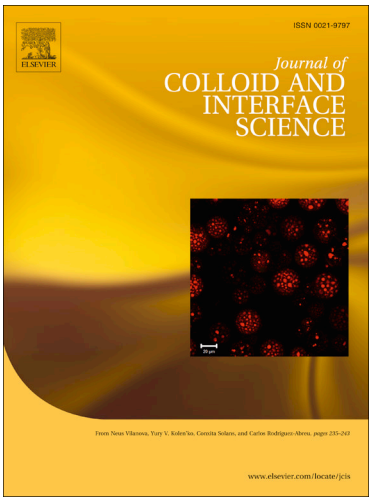

Fabrication of three-dimensional composite textile electrodes by metal-organic framework, zinc oxide, graphene and polyaniline for all-solid-state supercapacitors

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PII: S0021-9797(18)30710-0
DOI: https://doi.org/10.1016/j.jcis.2018.06.062
Reference: YJCIS 23753

To appear in: *Journal of Colloid and Interface Science*

Received Date: 17 May 2018
Revised Date: 21 June 2018
Accepted Date: 21 June 2018

Please cite this article as: Y-N. Liu, L-N. Jin, H-T. Wang, X-H. Kang, S-W. Bian, Fabrication of three-dimensional composite textile electrodes by metal-organic framework, zinc oxide, graphene and polyaniline for all-solid-state supercapacitors, *Journal of Colloid and Interface Science* (2018), doi: https://doi.org/10.1016/j.jcis.2018.06.062

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ABSTRACT: Textile electrode materials have attracted intense attention in the flexible supercapacitor field due to their flexibility, light weight, hierarchical porosity and mechanical robustness. However, their electrochemical performance is not good due to the low conductivity, ineffective ion diffusion and small electroactive surface area. In this study, a three-dimensional (3D) textile electrode material was constructed by utilizing ZIF-8 (Zeolitic Imidazolate Framework), metal oxides, conductive polymers and graphene sheets. The polyaniline/ZnO/ZIF-8/graphene/polyester textile electrode exhibited good electrochemical performance with a high areal capacitance of 1.378 F/cm^2 at 1 mA/cm^2 and high stability under different mechanical deformations. A flexible all-solid-state symmetric supercapacitor device was further fabricated, which can provide a high energy density of 235 μWh/cm^3 at a power density of 1542 μW/cm^3.