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Graphene-quntum-dots induced MnO_2 with needle-like nanostructure grown on carbon wood as advanced electrode for supercapacitors

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Abstract

Hydrothermal or electrochemical deposition method has been employed to fabricate porous wood carbon (PWC)/pseudocapacitance hybrid materials for use as a free-standing supercapacitor electrode. However, its cycle stability is rather poor, and its specific capacitance needs to be further improved because of the existence of pseudocapacitor material. In this paper, PWC was directly used as conductive matrix by the pyrolysis of nature balsa wood, and then manganese oxide (MnO_2) and graphene quantum dots (GQDs) were deposited to fabricate PWC/MnO_2/GQDs electrode by hydrothermal method. Compared with the PWC/MnO_2 electrode, unique needle-like nanostructures formed by adding GQDs have resulted in better electrochemical performance for supercapacitor electrode including high areal specific capacitance (2712 mF/cm^{-2} at the current density of 1.0 mA/cm^{-2}), good cycling stability, and excellent rate capability (95.3 % retention after 2000 cycles). This work indicate that GQDs decorated composites will promote the development of high performance energy storage device.

Biography:

Weiye Zhang received his B.S.Degree in Qufu Normal University in 2008.He is currently pursuing her Master's Degree at the College of Materials Science and Techlogy,Beijing Forestry University under the supervision of Prof.Hongwu Guo and Lecturer Yi Liu.His research has focused on wood-based advanced energy storage materials and devices.

Speaker Publications:

1. Z.J Tang, Z.X Pei, Z.F Wang, H.F Li, J Zeng, Z.H Ruan, et al., Highly anisotropic, multichannel wood carbon with optimized heteroatom doping for supercapacitor and oxygen reduction reaction, Carbon 130 (2018) 532-543.
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