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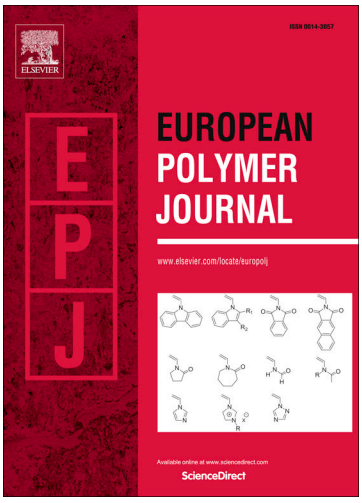

Electrochemical study on an activated carbon cloth modified by cyclic voltammetry with polypyrrole/anthraquinone sulfonate and reduced graphene oxide as electrode for energy storage

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PII: S0014-3057(18)30111-3
DOI: https://doi.org/10.1016/j.eurpolymj.2018.04.018
Reference: EPJ 8374

To appear in: *European Polymer Journal*

Received Date: 15 January 2018
Revised Date: 22 March 2018
Accepted Date: 15 April 2018

Please cite this article as: Fernández, J., Bonastre, J., Molina, J., Cases, F., Electrochemical study on an activated carbon cloth modified by cyclic voltammetry with polypyrrole/anthraquinone sulfonate and reduced graphene oxide as electrode for energy storage, *European Polymer Journal* (2018), doi: https://doi.org/10.1016/j.eurpolymj.2018.04.018

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Electrochemical study on an activated carbon cloth modified by cyclic voltammetry with polypyrrole/anthraquinone sulfonate and reduced graphene oxide as electrode for energy storage

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Abstract

This work describes a two-step procedure for the electrochemical coating of reduced graphene oxide (RGO) and polypyrrole anthraquinone sulfonate (PPyAQS) onto an activated carbon cloth (ACC) by cyclic voltammetry (CV). The textile samples were characterized by CV, electrochemical impedance spectroscopy (EIS) and galvanostatic charge-discharge measurements using a sandwich-type (electrode/separator/electrode) cell designed to operate in three or two-electrode configurations. The presence of RGO onto the ACC surface optimized the electrosynthesis of PPyAQS and reinforced the stability of the polymer with the number of charge/discharge cycles. A retention capacity of 90% after 100 charge-discharge cycles together with an energy density of 7.8×10^{-4} W h cm^{-2} at a power density of 1.8×10^{-3} W cm^{-2} were obtained for the ACC/RGO/PPyAQS sample. The analyses by field emission scanning electron microscopy (FESEM) showed the RGO veils-like and PPyAQS glomerular structures covering the ACC-fibers. The Fourier transform infrared spectroscopy (FTIR) analyses not only detected the presence of PPy and AQS, but also, the changes in the molecular

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