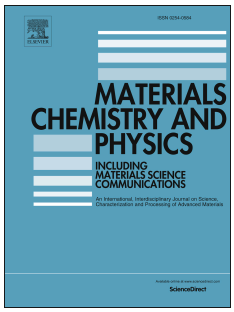
Accepted Manuscript



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PII: S0254-0584(18)30405-X

DOI: 10.1016/j.matchemphys.2018.05.009

Reference: MAC 20623

To appear in: *Materials Chemistry and Physics*

Please cite this article as: Alex Aboagye, Yiyang Liu, James G. Ryan, Jianjun Wei, Lifeng Zhang, Hierarchical Carbon Composite Nanofibrous Electrode Material for High-Performance Aqueous Supercapacitors, *Materials Chemistry and Physics* (2018), doi: 10.1016/j.matchemphys.2018.05.009

Hierarchical Carbon Composite Nanofibrous Electrode Material for High-Performance Aqueous Supercapacitors

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Abstract

In this research, a hierarchical carbon composite nanomaterial ECNFs/PtNPs, which is composed of electrospun carbon nanofibers (ECNFs) with both individual and agglomerate of Pt nanoparticles (PtNPs) homogeneously dispersed all over the ECNF surface, was prepared by successive electrospinning, carbonization, and controlled growth of the PtNPs. Morphology and structure of ECNFs and ECNFs/PtNPs with a variety of amount of PtNPs were characterized by scanning electron microscope, x-ray diffraction and BET surface area analysis. The ECNFs/PtNPs was evaluated as electrode material for supercapacitor with aqueous electrolyte. The results indicated that Pt nanoparticles on surface of ECNFs drastically increased specific capacitance as well as potential energy density of the electrode material by 50 times to 226 F g^{-1} and 20 W h kg^{-1}, respectively, at 0.14 g/cm^2 Pt loading with 6M KOH aqueous electrolyte. This