

Accepted Manuscript

Novel nanocomposite of MnFe_2O_4 and nitrogen-doped carbon from polyaniline carbonization as electrode material for symmetric ultra-stable supercapacitor

Laleh Saleh Ghadimi, Nasser Aarsalani, Amin Goljanian Tabrizi, Abdolkhaled Mohammadi, Iraj Ahadzadeh

PII: S0013-4686(18)31215-5

DOI: [10.1016/j.electacta.2018.05.160](https://doi.org/10.1016/j.electacta.2018.05.160)

Reference: EA 31946

To appear in: *Electrochimica Acta*

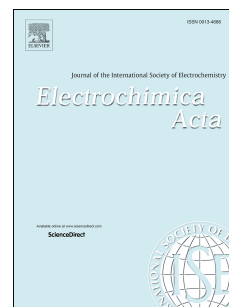
Received Date: 28 July 2017

Revised Date: 20 May 2018

Accepted Date: 24 May 2018

Please cite this article as: L.S. Ghadimi, N. Aarsalani, A.G. Tabrizi, A. Mohammadi, I. Ahadzadeh, Novel nanocomposite of MnFe_2O_4 and nitrogen-doped carbon from polyaniline carbonization as electrode material for symmetric ultra-stable supercapacitor, *Electrochimica Acta* (2018), doi: 10.1016/j.electacta.2018.05.160.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Novel Nanocomposite of MnFe₂O₄ and Nitrogen-doped Carbon from Polyaniline Carbonization as Electrode material for Symmetric Ultra-stable Supercapacitor

Laleh Saleh Ghadimi^a, Nasser Arsalani^{*a}, Amin Goljanian Tabrizi^a, Abdolkhaled Mohammadi^b and Iraj Ahadzadeh^c

^a Research Laboratory of Polymer, Department of Organic and Biochemistry, Faculty of Chemistry, University of Tabriz, Tabriz, Iran

^b Research Laboratory of Polymer, Faculty of Chemical and Petroleum Engineering, University of Tabriz, Tabriz, Iran

^c Research Laboratory of Electrochemical Instrumentation and Energy Systems, Faculty of Chemistry, University of Tabriz, Tabriz, Iran

* Corresponding author. Tel: +98 (41) 33393174; Email-address: arsalani@tabrizu.ac.ir (N. Arsalani)

Abstract

In this work, direct carbonization of polyaniline manganese ferrite (Mn-PANI) nanocomposite was employed to prepare a novel N-doped carbon material decorated with manganese ferrite (Mn-CPANI) and implemented as an ultra-stable symmetric supercapacitor electrode material. The surface morphology of as-prepared samples is investigated with field-emission scanning electron microscopy (FE-SEM) and transmission electron microscopy (TEM). Also, uniform distribution of manganese ferrite (MnFe₂O₄) on PANI surface and the N-doped carbon material is confirmed through EDX analysis. Carbonized nanocomposite contains about 8 wt. % of nitrogen. The obtained Mn-CPANI nanocomposite shows a high specific capacitance of 329 F g⁻¹ and exhibits excellent capacitance retention of 83.2% from 1 to 10 A g⁻¹, which is more stable compared to Mn-PANI nanocomposite. Moreover, the symmetric Mn-CPANI supercapacitor cell possesses a specific capacitance of about 246 F g⁻¹ (at 1 A g⁻¹) and an excellent stable cyclability (only 3% of specific capacitance decreases after 10000 cycles). The excellent enhanced electrochemical performance of Mn-CPANI nanocomposite could be originated from the combination and synergism of N-doped carbon material as an electrical double-layer capacitor with pseudocapacitive MnFe₂O₄. As a result, a novel electrode material is developed for high-performance ultra-stable energy storage devices.

Keywords : Carbonization, Manganese ferrite, Polyaniline, Nitrogen-doped carbon, Supercapacitor, Symmetric system

Download English Version:

<https://daneshyari.com/en/article/6602134>

Download Persian Version:

<https://daneshyari.com/article/6602134>

[Daneshyari.com](https://daneshyari.com)