Short Communication

Capacitance of MnO$_2$ Micro-Flowers Decorated CNFs in Alkaline Electrolyte and Its Bi-Functional Electrocatalytic Activity toward Hydrazine Oxidation

Seong-Min Ji$^1$, Zafar Khan Ghouri$^2$, Khaled Elsaid$^3$, Yo Han Ko$^4$, Saeed Al-Meer$^2$, M.I.Ahmad$^2$, Dong Ick Son$^4$, Hak Yong Kim$^{1, *}$

$^1$Department of Bin Fusion Technology, Chonbuk National University, Jeonju 561-756, Republic of Korea
$^2$Central Laboratory Unit, Qatar University, P. O. Box: 2713, Doha, Qatar
$^3$Chemical Engineering Program, Texas A&M University at Qatar, P.O. 23874, Doha, Qatar
$^4$Institute of Advanced Composite Materials, Korea Institute of Science and Technology (KIST), Jeonbuk 565-905, Republic of Korea
$^*$E-mail: khy@jbnu.ac.kr
doi: 10.20964/2017.03.73

Received: 9 December 2016 / Accepted: 28 January 2017 / Published: 12 February 2017

Well-dispersed MnO$_2$ micro-flowers were grown directly on carbon nanofibers via a simple hydrothermal technique without any template. Structure and morphology were characterized by X-ray diffraction (XRD) and field-emission scanning electron microscopy (FESEM) equipped with rapid energy dispersive analysis X-ray (EDX). The appealed characterization techniques specified that the obtained material is carbon nanofibers decorated by MnO$_2$ micro-flowers. Super capacitive performance of the MnO$_2$ micro-flowers decorated CNFs as active electrode material was evaluated by cyclic voltammetry (CV) in alkaline medium and yield a reasonable specific capacitance of 120 Fg$^{-1}$ at 5 mV s$^{-1}$. As an electrocatalyst for hydrazine oxidation, the MnO$_2$ micro-flowers decorated CNFs showed high current density. The impressive bi-functional electrochemical activity of MnO$_2$ micro-flowers decorated CNFs is mainly attributed to its unique architectural structure.

Keywords: Supercapacitors; Bi-functional; Carbon nanofibers; MnO$_2$, Hydrazine; Direct liquid fuel cells.

FULL TEXT

© 2017 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (http://creativecommons.org/licenses/by/4.0/).