

Accepted Manuscript

Electrochemical performance of nickel hydroxide nanopetals for supercapacitor electrodes

Biny R. Wiston, M. Ashok

PII: S0167-577X(18)31556-8
DOI: <https://doi.org/10.1016/j.matlet.2018.09.169>
Reference: MLBLUE 25041

To appear in: *Materials Letters*

Received Date: 24 July 2018
Revised Date: 12 September 2018
Accepted Date: 30 September 2018

Please cite this article as: B.R. Wiston, M. Ashok, Electrochemical performance of nickel hydroxide nanopetals for supercapacitor electrodes, *Materials Letters* (2018), doi: <https://doi.org/10.1016/j.matlet.2018.09.169>

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.



Electrochemical performance of nickel hydroxide nanopetals for supercapacitor electrodes

Biny R. Wiston^a, M. Ashok^{a,*}

^aNew Generation Materials Laboratory, Department of Physics, National Institute of Technology, Tiruchirappalli 620015, India

*ashokm@nitt.edu (M. Ashok)

Abstract

Nickel hydroxide and nickel oxide were prepared via a facile chemical precipitation method, whose structure, morphology and electrochemical properties were compared. Nickel hydroxide demonstrated nanopetal-like morphology, pseudocapacitive nature, a superior specific capacitance of 701 F g^{-1} at 1 A g^{-1} and admirable capacitance retention of 84.16 % even after 5000 consecutive charge-discharge cycles in 2 M KOH aqueous electrolyte. Meanwhile, nickel oxide grew into a cluster of randomly shaped nanostructures with pseudocapacitive behavior and comparatively lower specific capacitance of 171 F g^{-1} at 1 A g^{-1} . In nickel hydroxide, the freedom of movement of electrolyte ions is responsible for its loftier charge storage capability.

Keywords: Energy storage & conversion, surfaces, Pseudocapacitance

1. Introduction

Increased usage of portable electronic gadgets elevated the demand for efficient energy storage device. Supercapacitors are promising next generation energy storage devices with superior cycling stability, high power density, improvable energy density and expandable potential window [1-3]. Currently, materials with a high specific surface area, appropriate morphology for swift ion and electron transfer and good stability are making a breakthrough as supercapacitor electrodes. Over a variety of electrode materials, transition metal hydroxides have drawn much attention, owing to their unique layered structure, high specific surface area and good chemical stability [4-6]. High theoretical capacitance, stability, low cost and easy availability make nickel hydroxide as an attractive electrode material for supercapacitors [7]. Meanwhile, the choice of suitable current collector also plays a crucial

Download English Version:

<https://daneshyari.com/en/article/11001677>

Download Persian Version:

<https://daneshyari.com/article/11001677>

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