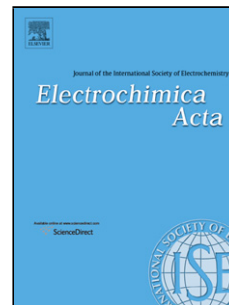


Accepted Manuscript

Title: Controlled synthesis and enhanced electrochemical performance of self-assembled rosette-type Ni-Al layered double hydroxide

Author: Hai Li Zexiang Chen Yan Wang Jijun Zhang Xinyu Yan



PII: S0013-4686(16)31210-5
DOI: <http://dx.doi.org/doi:10.1016/j.electacta.2016.05.132>
Reference: EA 27356

To appear in: *Electrochimica Acta*

Received date: 22-3-2016
Revised date: 17-5-2016
Accepted date: 19-5-2016

Please cite this article as: Hai Li, Zexiang Chen, Yan Wang, Jijun Zhang, Xinyu Yan, Controlled synthesis and enhanced electrochemical performance of self-assembled rosette-type Ni-Al layered double hydroxide, *Electrochimica Acta* <http://dx.doi.org/10.1016/j.electacta.2016.05.132>

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.

**Controlled synthesis and enhanced electrochemical performance of
self-assembled rosette-type Ni-Al layered double hydroxide**

Hai Li^a, Zexiang Chen^{*a, b}, Yan Wang^{*a}, Jijun Zhang^a and Xinyu Yan^a

^a School of Optoelectronic Information, University of Electronic Science and Technology of China, North Jianshe Road 4, 610054 Chengdu, China.

^b Center for Information in Medicine, University of Electronic Science and Technology of China, North Jianshe Road 4, 610054 Chengdu, China.

* Corresponding author. E-mail: zxchen@uestc.edu.cn; wangyan127@uestc.edu.cn.

Abstract

We report the synthesis of a rosette-type three-dimensional Ni-Al layered double hydroxide (Ni-Al LDH) positive electrode material for energy storage devices using a template-free, simple, self-assembling hydrothermal synthesis method. Poly (sodium-p-styrene-sulfonate) (PSS) plays a key role in efficiently controlling the morphology. Moreover a model that explains the formation mechanism of rosette-type Ni-Al LDH is proposed. The model is verified by a series of experiments. SEM images reveal that the three-dimensional (3D) structure of Ni-Al LDH consists of individual nanosheets that form a rosette-type morphology thus improving its mechanical stability. The electrochemical properties of the material were studied by means of cyclic voltammetry (CV), galvanostatic charge/discharge measurements, and by electrochemical impedance spectroscopy (EIS). Owing to the greatly improved faradaic redox reaction and mass transfer, the 3D Ni-Al LDH structure exhibits excellent energy storage performance. This positive electrode material shows a high specific capacity of 788 C/g (the corresponding area-normalized capacity is 23.64 C/cm²) at a charge/discharge current density of 1 A/g and retains 82.9% of its capacity after 1000 cycles at current densities of 2 A/g. These

Download English Version:

<https://daneshyari.com/en/article/6606529>

Download Persian Version:

<https://daneshyari.com/article/6606529>

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