### **Accepted Manuscript**

Nickel cobaltite nanoflakes grown around nickel foam-supported expanded mesocarbon microbeads for battery-like electrochemical capacitors

Mao-Sung Wu, Wei-Ann Chen, Fang-Yi Chen, Farn-Yih Chuang

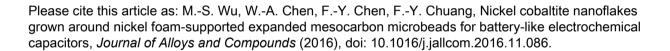
PII: S0925-8388(16)33556-3

DOI: 10.1016/j.jallcom.2016.11.086

Reference: JALCOM 39582

To appear in: Journal of Alloys and Compounds

Received Date: 4 September 2016
Revised Date: 5 November 2016
Accepted Date: 7 November 2016



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.



#### ACCEPTED MANUSCRIPT

# Nickel cobaltite nanoflakes grown around nickel foam-supported expanded mesocarbon microbeads for battery-like electrochemical capacitors

Mao-Sung Wu\*, Wei-Ann Chen, Fang-Yi Chen, and Farn-Yih Chuang

Department of Chemical and Materials Engineering, National Kaohsiung University of Applied Sciences, Kaohsiung 807, Taiwan

#### **Abstract**

The eMCMBs (expanded mesocarbon microbeads) composed of fluffy graphene oxide nanosheets were obtained by chemical oxidation of MCMB graphite powder. The eMCMBs were attached to the skeleton of nickel foam through electrophoretic deposition. After heat treatment in reducing atmosphere, the eMCMBs were converted into reduced eMCMBs (reMCMBs) composed of sponge-like graphene nanosheets. Nickel foam with attached reMCMBs was used as a highly conductive scaffold to support nickel cobaltite nanoflakes. The sponge-like reMCMBs accommodated electrolyte solution, afforded current collector, and functioned as a stress buffer to alleviate electrode damage. Macroporous nickel cobaltite film with mesoporous thin nanoflakes could provide large amounts of pores for easy penetration of electrolyte solution, huge interfacial area for facile redox reactions, and short transport distance for ions and electrons. Nickel cobaltite grown around nickel foam with attached reMCMBs could deliver a high specific capacitance of 1025 F g<sup>-1</sup> at 5 A g<sup>-1</sup>, greater than that grown around nickel foam (688 F g<sup>-1</sup>). Nickel cobaltite nanoflakes grown on reMCMBs turned out to decrease the kinetic resistance, diffusive impedance, and volumetric strain, resulting in better capacitance, rate capability, and electrochemical stability.

*Keywords*: Nickel cobaltite; Expanded graphite; Energy storage; Nickel foam; Electrochemical capacitors.

E-mail: *ms\_wu@url.com.tw* 

.

<sup>\*</sup>Author to whom correspondence should be addressed.

#### Download English Version:

## https://daneshyari.com/en/article/5461414

Download Persian Version:

https://daneshyari.com/article/5461414

<u>Daneshyari.com</u>