

**Title:** Fabrication of Three-Dimensional Dendritic Ni-Co Films By Electrodeposition on Stainless Steel Substrates

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**Source:** Journal of Physical Chemistry C

**Volume:** 116 **Issue:** 42 **Pages:** 22425-22431 **DOI:** 10.1021/jp307612g **Published:** Oct 25 2012

**Document Type:** Article

**Language:** English

**Abstract:** Co-deposition of nickel and cobalt was carried out on austenitic stainless steel (AISI 304) substrates by imposing a square waveform current in the cathodic region. The innovative procedure applied in this work allows creating a stable, fully developed, and open porous three-dimensional (3D) dendritic structure, which can be used as electrode for redox supercapacitors. This study investigates in detail the influence of the applied current density on the morphology, mass, and chemical composition of the deposited Ni-Co films and the resulting 3D porous network dendritic structure. The morphology and the physicochemical composition were studied by scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy (EDS) and X-ray diffraction (W). The electrochemical behavior of the materials was evaluated by cyclic voltammetry (CV). The results highlight the mechanism involved in the coelectrodeposition process and how the lower limit current density tailors the film composition and morphology, as well as its electrochemical activity.

**KeyWords Plus:** Nickel; Alloys; Powders; Growth

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**Funding:**

Funding Agency	Grant Number
FCT	PTDC/CTM-MET/119411/2010
European Institute of Innovation and Technology, under the KIC InnoEnergy New Mat project	

COST Action	MP 1004
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**Publisher:** Amer Chemical Soc

**Publisher Address:** 1155 16TH ST, NW, Washington, DC 20036 USA

**ISSN:** 1932-7447

**Citation:** Silva R P, Eugénio S, Silva T M, Carmezim M J, Montemor M F. Fabrication of Three-Dimensional Dendritic Ni-Co Films By Electrodeposition on Stainless Steel Substrates. Journal of Physical Chemistry C. 2012; 45 (116): 22425-22431.