

# **II Columbian Congress of Electrochemistry (CCEQ 2016) and 2nd Symposium on Nanoscience and Nanotechnology (SNN 2016)**

Journal of Physics: Conference Series Volume 786

Bucaramanga, Columbia  
4 – 7 October 2016

**Editor:**

**Ely Dannier V. Nino**

ISBN: 978-1-5108-3604-4  
ISSN: 1742-6588

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2016) by the Institute of Physics  
All rights reserved. The material featured in this book is subject to  
IOP copyright protection, unless otherwise indicated.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact the Institute of Physics  
at the address below.

Institute of Physics  
Dirac House, Temple Back  
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481  
Fax: 44 1 17 920 0979

[techtracking@iop.org](mailto:techtracking@iop.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# Table of contents

## Volume 786

**II Colombian Congress of Electrochemistry (CCEQ) and 2nd Symposium on Nanoscience and Nanotechnology (SNN)**

**4–7 October 2016, Bucaramanga, Colombia**

**Accepted papers received: 7 December 2016**

**Published online: 25 January 2017**

### Preface

011001

OPEN ACCESS

[II Colombian Congress of Electrochemistry \(CCEQ\) and 2nd Symposium on Nanoscience and Nanotechnology \(SNN\)](#)

011002

OPEN ACCESS

[Peer review statement](#)

### Papers

#### Oral Presentations

012001

OPEN ACCESS

[Fabrication of pH sensitive nanovalves using smart surface coated nanopores](#)

A M Nieto-Soto, D K Diaz-Maldonado and F A Rios Angarita.....1

012002

OPEN ACCESS

[Solid-state fabrication of Al/CNTs nanocomposites](#)

O J Toro Cadavid, M F Valencia García, H V Martínez Tejada and G Suárez Guerrero.....6

012003

OPEN ACCESS

[Nanocomposites fabrication by self-assembly method to modify macroscopic properties](#)

N Lopez-Barbosa and J F Osma.....13

012004

OPEN ACCESS

[Characterization of the optical non-linear response of the \(E\)-4-\(4-dimethylaminophenyl\) but-3-en-2-one and \(E\)-4-\(4-nitrophenyl\) but-3-en-2-one by Z-Scan](#)

K Rodriguez, A Pérez and F Racedo.....21

012005

OPEN ACCESS

[Characterization of the nonlinear optical properties of the new 2-amino-4,6-difenilnicotinonitrilo by UV-Vis spectroscopy absorption and Z-Scan](#)

C Cueto, A Pérez and F Racedo.....28

012006

OPEN ACCESS

[Magneto-electric effect in non-uniform quantum nanotube](#)

L F Garcia, I D Mikhailov and J Sierra-Ortega.....34

012007

OPEN ACCESS

[Effect of variation of the central-hole depth and the axial anisotropy on the AB oscillations in a wide nanoring](#)

F A Rodríguez Prada, W Gutiérrez and I D Mikhailov.....41

012008

OPEN ACCESS

[Identification of metal elements by time-resolved LIBS technique in sediments lake the "Cisne"](#)

P Pacheco, E Arregui, J Álvarez, N Rangel and R Sarmiento.....48

012009

OPEN ACCESS

[Global characterization of a nematic liquid crystal display LCX038ARA using the retarder-rotor model in the modulation amplitude regime-coupled without applied voltage](#)

C J Cuevas Cely, C H Acevedo and Y Torres Moreno.....53

012010

OPEN ACCESS

[HOS cell adhesion on TiO<sub>2</sub> nanotubes texturized by laser engraving](#)

A Sandoval Amador, N D Montañez Supelano, A M Vera Arias, P Escobar Rivero and D Y Peña Ballesteros.....59

012011

OPEN ACCESS

[Characterization of Tungsten Carbide coatings deposited on AISI 1020 steel](#)

A Santos, C Gonzalez and Z Y Ramirez.....65

012012

OPEN ACCESS

[Influence on the wear resistance of the particle size used in coatings of Alumina](#)

A Santos, R Guzmán and Z Y Ramirez.....71

012013

OPEN ACCESS

[Induction hardening treatment and simulation for a grey cast iron used in engine cylinder liners](#)

E L Castellanos-Leal, D A Miranda, A E Coy, J G Barrero, J A González and O P Vesga Rueda.....78

012014

OPEN ACCESS

[Impedance spectroscopy in photovoltaic materials of Cu<sub>2</sub>ZnSnS<sub>4</sub> \(CZTS\) and use of the KK transform](#)

M Patarroyo, E Vera, Y Pineda, J Gómez, G Soracá and D Sánchez.....84

012015

OPEN ACCESS

[Design and implementation of a web application to estimate the surface density of implanted ions in solid substrates](#)

B R Pérez Gutiérrez, F H Vera-Rivera and E D V Niño.....91

012016

OPEN ACCESS

[Computational simulation of a diffusion process of carbon nanotubes in aluminium to improve the mechanical properties of a composite material](#)

G Suárez Guerrero, M F Valencia-García, H V Martínez Tejada and O J Toro Cadavid.....97

012017

OPEN ACCESS

[Preparation of YBCO-BYTO and YBCO-BZO nanostructured superconducting films by chemical method](#)

P Garcés, M Coll, H Castro, T Puig and X Obradors.....105

012018

OPEN ACCESS

[Evaluation of hot corrosion of 8YSZ coatings elaborated by suspension plasma spraying](#)

A G González-Hernández, H Ageorges and M E López-Gómez.....110

012019

OPEN ACCESS

[Development of highly open polyhedral networks from vitreous carbon for orthopaedic applications](#)

V Güiza-Argüello, M Bayona-Becerra, S Cruz-Orellana and E Córdoba-Tuta.....115

012020

OPEN ACCESS

[Silver nanoparticles: Influence of the temperature synthesis on the particles' morphology](#)

S Piñero, S Camero and S Blanco.....119

012021

OPEN ACCESS

Synthesis and characterization of nanometric zinc oxide for a stationary phase in liquid chromatography

F Gordillo-Delgado, C C Soto-Barrera and J Plazas-Saldaña.....123

012022

OPEN ACCESS

Systematic study of inorganic functionalization of ZnO nanorods by Sol-Gel method

J K Gamarra, C Solano, I Piñeres, H Gómez, J Mass and D N Montenegro.....128

012023

OPEN ACCESS

Synthesis, characterization and magnetic evaluation of praseodymium modified cerium oxide

A F Cruz Pacheco, J A Gómez Cuaspud and C A Parra Vargas.....134

012024

OPEN ACCESS

Effect of modification substrate on the microstructure of hydroxyapatite coating

J Realpe-Jaramillo, J A Morales-Morales, J A González-Sánchez, R Cabanzo, E Mejía-Ospino and J Rodríguez-Pereira.....139

012025

OPEN ACCESS

Production of sunflower oil biodiesel and used cooking oil through heterogeneous catalysts compared to conventional homogeneous catalysts

C A Gutiérrez-Zapata, D Blanco Martínez, C A Collazos, H E Castellanos Acuña, J A Cuervo and C P Fernandez.....145

012026

OPEN ACCESS

Obtaining and characterization of La<sub>0.8</sub>Sr<sub>0.2</sub>CrO<sub>3</sub> perovskite by the combustion method

A M Morales Rivera, J A Gómez Cuaspud and E Vera López.....150

012027

OPEN ACCESS

Synthesis and characterization of the Cu<sub>2</sub>ZnSnS<sub>4</sub> system for photovoltaic applications

D L Sánchez Pinzón, G Y Soracá Perez, J A Gómez Cuaspud and E Vera López.....155

012028

OPEN ACCESS

Synthesis and characterization by solid-state impedance spectroscopy of semiconductor Cu<sub>2</sub>ZnSnS<sub>4</sub> material for photovoltaic technologies

M Muñoz, E Vera-López, J A Gómez-Cuaspud and Y Pineda-Triana.....160

012029

OPEN ACCESS

Structural and electrical study of LaCrO<sub>3</sub> modified with Fe and Co

W Rativa-Parada, J A Gómez-Cuaspud, E Vera-López and J B Carda.....166

012030

OPEN ACCESS

Effect of substrate nature on the electrochemical deposition of calcium-deficient hydroxyapatites

A F Gualdrón-Reyes, V Domínguez-Vélez, J A Morales-Morales, R Cabanzo and A M Meléndez.....172

012031

OPEN ACCESS

Enriched alloy layer on an Al-Cu alloy studied by cyclic voltammetry

S J García Vergara, C E Blanco Pinzon and P Skeldon.....177

012032

OPEN ACCESS

Effect of the layer of anodized 7075-T6 aluminium corrosion properties

R D Montoya Z, E Vera L, Y Pineda T and M L Cedeño.....181

012033

OPEN ACCESS

[Influence of Na<sup>+</sup>, K<sup>+</sup>, Mn<sup>2+</sup>, Fe<sup>2+</sup> and Zn<sup>2+</sup> ions on the electrodeposition of Ni-Co alloys: Implications for the recycling of Ni-MH batteries](#)

S Blanco, R Orta-Rodriguez and P Delvasto.....187

012034

OPEN ACCESS

[Crevice corrosion of nickel superalloy in deaerated chloride/sulphate solution at 90°C](#)

M Rincón Ortiz, R M Carranza and M A Rodríguez.....192

012035

OPEN ACCESS

[Cyclic oxidation to high temperature of ASTM - A53 grade B](#)

D Pérez, J L Marulanda and A Santos.....196

012036

OPEN ACCESS

[Oxidation of 1020 steel in the abnormal glow discharge](#)

J A García Zúñiga, A Sarmiento Santos and E Y Soto Gómez.....202

012037

OPEN ACCESS

[Characterization of mechanical properties and electrochemical behaviour in a Hank's solution of 316L/Cr<sub>1-x</sub>Al<sub>x</sub>N system](#)

D M Osorio, J C Caicedo, W Aperador, A M Benitez-Castro, A L Giraldo-Betancur, J Muñoz-Saldaña, J M Yañez-Limón, O Sanchez and G Zambrano.....208

012038

OPEN ACCESS

[A study of corrosion inhibition of steel AISI-SAE 1020 in CO<sub>2</sub>-brine using surfactant Tween 80](#)

M L Cedeño, E Vera L and Y Pineda T.....215

012039

OPEN ACCESS

[Effect of contents oil temperature and flow rate in the electrochemical corrosion of the AISI-SAE1020-steel](#)

M L Cedeño, E Vera L and Y Pineda T.....222

012040

OPEN ACCESS

[Implementation of electrochemical elements for an alternative detection of ochratoxin A](#)

D H Aristizabal, D A Giraldo, S Sanchez, G Taborda and A Baeza.....229

012041

OPEN ACCESS

[Implementation of coulometric titration system at constant current for developing of certified materials as primary standards](#)

H Suarez, R Cristancho, F Peralta and H Torres.....235

012042

OPEN ACCESS

[Simultaneous leaching of Pt, Pd and Rh from automotive catalytic converters in chloride-containing solutions](#)

M Hasani, A Khodadadi, S M J Koleini, A H Saeedi and A M Meléndez.....240

012043

OPEN ACCESS

[Platinum leaching from automotive catalytic converters with aqua regia](#)

M Hasani, A Khodadadi, S M J Koleini, A H Saeedi, Y Pérez-Pacheco and A M Meléndez.....249

012044

OPEN ACCESS

[Fabrication of transparent TiO<sub>2</sub> nanotube-based photoanodes for CdS/CdTe quantum co-sensitized solar cells](#)

A F Gualdrón-Reyes, A Cárdenas-Arenas, C A Martínez, V V Kouznetsov and A M Meléndez.....254

012045

OPEN ACCESS

Effect of substrate surface treatment on electrochemically assisted photocatalytic activity of N-S co-doped TiO<sub>2</sub> films

N J Parada-Gamboa, J A Pedraza-Avella and A M Meléndez.....260

012046

OPEN ACCESS

Formation of TiO<sub>2</sub> nanostructure by plasma electrolytic oxidation for Cr(VI) reduction

D A Torres, F Gordillo-Delgado and J Plazas-Saldaña.....266