

Roberto Hernandez-Maya

Postdoctoral Research

Electrical Engineering Department

Electronic Section of the Solid State

CINVESTAV

SNI Level I

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Skills

- Hands-on in the use of SEM (Scanning Electron Microscopy), for superficial characterization with the application of different tools, FIB (Focused Ion Beam), EDS, EBSD, BSE.
- Hands-on in the use of the VersaScan Workstation (Electrochemical Scanning System), with the application of different localized techniques, LEIS (Localized Electrochemical Impedance Spectroscopy), SECM (Scanning Electrochemical Microscopy), SVET (Scanning Vibration Electrochemical Technique).
- Hands-on in the use of AFM (Atomic Force Microscopy), for superficial characterization, by using Contac Mode and Tapping Mode.
- Hands-on in the use of Glove Box for development of the experimental setup in research on Lithium batteries.
- Hands-on in conducting experiments in different Corrosion topics.
- Experience generating proposals to get funds in the government trough CONACyT, related nanoparticles to be used on drinking water treatment. Experience generating proposals related with thin film solar cells. Experience in the synthesis of different nanoparticles by different routes, with application in different fields

Education

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| 2012 | Ph.D Engineering
National University of Mexico | Study of the anodic oxidation of organic species
C2 in bimetallic catalysts for fuel cell
applications |
| 2008 | M.Sc. Engineering,
National University of Mexico | Electrochemical study in the dissolution and
inhibition of 1018 steel electrode in a solution
containing different oxygen conditions in the
presence of hydroxyphosphonoacetic acid. |
| 2005 | B. S. Chemical Metallurgical
Engineering,
National University of Mexico | Electrochemical evaluation of two nontoxic and
biodegradable prototype inhibitors with
application in cooling towers. |

Professional Appointments

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| September 2016 to Date | <i>Postdoctoral Research</i>
Electric Engineering Department
Electronic Section of the Solid State
CINVESTAV-Unidad Zacatenco, Mexico City |
| December, 2014 to June, 2016 | <i>Research Scientist,</i>
NCERCAMP (National Center for Education and
Research on Corrosion and Materials Performance),
The University of Akron, Akron OH. |
| April, 2013 to November, 2013 | <i>Postdoctoral Research Assistant,</i>
Chemical and Biomolecular Engineering Department,
The University of Akron, Akron OH. |
| September, 2012 to March, 2013 | <i>Postdoctoral Research Assistant,</i>
Water Center for Latin America and the Caribbean,
Technological Institute of Superior Studies
Monterrey, Mexico |

Scholarship and Honors

- 2017-2020 National Research Council in Mexico, SNI Level I
- 2014-2017 National Research Council in Mexico, SNI Level Candidate
- 2009-2012 Scholarship from National Council of Science and Technology, (CONACyT) to pursue Ph. D. studies at the National University of Mexico.
- 2008 Honorable Mention by M. Sc. thesis.
- 2005-2007 Scholarship from National Council of Science and Technology (CONACyT) to pursue M. Sc. studies at the National University of Mexico.

Patents:

Homero Castaneda and **Roberto Maya**, “A method for charging batteries”, USA, Patent No. WO 2015164592 A1.

Publications

1. Photocatalytic degradation of Orange G using TiO₂/Fe₃O₄ nanocomposites. B. Mercyrani, **R. Hernandez-Maya**, M. Solis-Lopez, Chriteena Th-Th, S. Velumani, *Journal of Materials Science: Materials in Electronics*, (In press, 2018).
2. Photocatalytic AB113 Removal Properties of BiVO₄ /TiO₂ nanocomposites, T. Drisya, M. Solís-López, **R. Hernández-Maya**, R. Vazquez Rodriguez, A. Kassiba, S. Velumani, *Journal of Materials Science: Materials in Electronics* (In press, 2018).
3. Study of the electrochemical activities of Mo-modified Pt catalysts, for applications as anodes in direct methanol fuel cells: effect of the aggregation route. O. Ugalde-Reyes, **R. Hernandez-Maya**, A. L. Ocampo-Flores, F. Alvarez-Ramirez, E. Sosa-Hernandez, C. Angeles-Chavez and P. Roquero. *Journal of the Electrochemical Society*, 162 (3), H132-H141, (2015).
4. Dynamic characterization of dendrite deposition and growth in Li-surface by Electrochemical Impedance Spectroscopy. **R. Hernandez-Maya**, O. Rosas, J.

- Saunders and H. Castaneda, *Journal of the Electrochemical Society*, 162 (4), A687-A696 (2015).
5. A Voltammetry Study of Ethanol Oxidation on Carbon Supported, Non Alloyed Platinum-Tungsten Catalysts. **Roberto C. Hernández Maya**, Orlando Ugalde Reyes, Jesús Gracia Fadrique, Homero Castañeda López, Pedro Roquero Tejada. *Journal of The Electrochemical Society*, 160 (3), H185-H191 (2013).
 6. Oxygen Reduction Studies on Carbon-Supported, Nonalloyed, Pt-M Catalysts (M: Ru, W, Mo). **R. Hernández Maya**, A. J. Armenta González, O. Ugalde, M. T. Oropeza Guzmán, P. Roquero. *Journal of New Materials for Electrochemical Systems*, 15, 137-143, (2012).
 7. A comparative study of carbon-supported Pt-Mo and Pt-Ru catalysts for the anodic oxidation of methanol. O. Ugalde Reyes, P Roquero, **R. Hernández Maya**, A. L. Ocampo Flores, E. Sosa Hernández. *ECS Transactions*, 36 (1) 21-28, (2011).
 8. The Behavior of Carbon Steel in Artificial Cooling Water in Presence of Hydroxyphosphonoacetic Acid and Different Oxygen Content Using Electrochemical Impedance Spectroscopy. H. Castaneda, **R. Hernandez** and M. Galicia. *The Open Corrosion Journal*, 2, 139-149, 2009.
 9. Electrochemical Characterization of X80 Steel Under Sour Environments and Addition of Imidazoline Based Compounds, **R. Hernandez**, M. Galicia, H. Castaneda. *ECS Transactions*, 3 (13) 181-198 (2007).
 10. Dissolution and inhibition mechanism of 1018 steel in simulated cooling water by adding phosphonic acid compound under two flow conditions. **R. Hernández**, M. Galicia, H. Castaneda. *ECS Transactions*, 1 (9) 223-240 (2006).

Proceedings and Conferences

1. *Degradación fotocatalítica de Naranja G con un material nanocompuesto de TiO_2/Fe_3O_4* , **R. Hernández-Maya**, Mercyrani B., M. Solís-López, José Álvaro Chávez Caravayar, Antonieta García Murillo, Felipe de Jesús Carillo Romo, Kassiba Abdelhadi, Eleicer Ching Prado, S. Velumani, Congreso Nacional de Estudiantes de Energías Renovables (CNEER) 2017, Temixco, Mexico, November 2017.

2. *Degradación fotocatalítica de azul ácido113 usando nanocompositos de BiVO₄/TiO₂ bajo irradiación visible: efecto de la concentración de BiVO₄*, M. Solís-López, Drisya KT., **R. Hernández-Maya**, R. Rodríguez-Vázquez, M. Barajas-Aceves, Y. Matsumoto-Kuwabara, A. Maldonado-Álvarez, M. Olvera-Amador, S. Velumani, Congreso Nacional de Estudiantes de Energías Renovables (CNEER) 2017, Temixco, Mexico, November 2017.
3. *Synthesis and characterization of TiO₂/Multi-walled Carbon Nanotubes heterostructure. Study of the photocatalytic properties on the pollutants degradation in aqueous phase*, **R. Hernandez-Maya**, M. Solís-López, Mercyrani B., S. Velumani, XXVI International Materials Research Congress, Cancun, Quintana Roo, Mexico, August 2017.
4. *Synthesis and characterization of BiVO₄/TiO₂ nanoheterostructure by a mechanochemical process*, KT. Drisya, M. Solís-López, **R. Hernández-Maya**, P. Reyes, S. Velumani, XXVI International Materials Research Congress, Cancun, Quintana Roo, Mexico, August 2017.
5. *Organic compound degradation in aqueous phase by the use of TiO₂/Fe₃O₄ nanocomposite heterostructure*, Mercyrani B., **R. Hernandez-Maya**, M. Solís-López, S. Velumani, XXVI International Materials Research Congress, Cancun, Quintana Roo, Mexico, August 2017.
6. *Characterizing Lithium ion dendrites growth with dynamic impedance and transmission line modeling- initial stage and grow stage*, H. Castaneda, **R. Hernandez**, J. Saunders, O. Rosas, Oral presentation ISE, Qro, Mexico, September 2013
7. *Time evolution quantification of the interfacial parameters for lithium ion interfaces using liquid ions*, O. Rosas, J. Saunders, H. Castaneda and **R. Hernandez**, Oral presentation ISE, Qro, Mexico, September 2013
8. *Oxygen Reduction Studies on Carbon-Supported Pt-M Catalysts (M: Ru, W, Mo)*, **R. Hernández Maya**, A. J. Armenta González, O. Ugalde, M. T. Oropeza Guzmán, P. Roquero en “XI International Congress of the Mexican Hydrogen Society”, September, 20 to 23, **2011**, Cuernavaca, México.

9. *Synthesis, evaluation and comparison between Pt-Mo/C, Pt-Ru/C as catalysts for fuel cell of direct methanol.* O. Ugalde Reyes, P. Roquero, **R. Hernández Maya**, A. L. Ocampo Flores and E. Sosa en “XXVI Congreso Nacional de la Sociedad Mexicana de Electroquímica y 4th Meeting of The Mexican Section of The Electrochemical Society”, May, 30 to June, 3, **2011**, D. F. México.
10. *Voltammetric study of ethanol oxidation in platinum-tungsten catalysts supported on carbon.* **R. Hernández**, Orlando Ugalde Reyes, H. Castañeda, Jesús Gracia Fadrique, Pedro Roquero Tejeda en “X Congreso Internacional de la Sociedad Mexicana del Hidrogeno-Energías Renovables” y “IV Congreso Internacional de Uso Racional y Eficiente de la Energía-CIUREE 2010,” September, 27 to October, 1, **2010**, Toluca, México.
11. *Electrochemical Characterization of X80 Steel Under Sour Environments and Addition of Imidazoline Based Compounds,* **R. Hernández**, M. Galicia, H. Castañeda en Joint International Meeting of the 210th Electrochemical Society, “Corrosion of Infrastructure”, October, 29 a November, 3, **2006**, Cancun, México.
12. *Dissolution and inhibition mechanism of 1018 steel in simulated cooling water by adding phosphonic acid compound under two flow conditions,* **R. Hernández**, M. Galicia, H. Castañeda, L. Zamudio, 208th Electrochemical Society Meeting, october, 16-21, **2005**, Los Angeles, Cal.

Professional references

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