

Raúl Hernández Sánchez
 Chevron Science Center
 219 Parkman Ave., Pittsburgh, PA 15260
 (412) 648-4218, www.hernandezsanchezgroup.org
 raulhs@pitt.edu

A. Professional preparation

ITESM Campus Monterrey	Monterrey, Mexico	Chemistry	B.S. 2010
Harvard University	Cambridge, MA, USA	Chemistry	A.M. 2012, Ph.D. 2015
Columbia University	New York, NY, USA	Chemistry	Postdoc 2016-18

B. Appointments

Assistant Professor, University of Pittsburgh, 2018 – present
 Columbia Nano Initiative Postdoctoral Fellow, 2016 – 2018

C. Products

Publications

- Bartholomew A. K.; Teesdale, J. J.; **Hernández Sánchez, R.**; Malbrecht, B.J; Juda, C.; Ménard, G.; Bu, W.; Iovan, D. A.; Mikhailine, A. A.; Zheng, S.-L.; Sarangi, R.; Wang, S. G.; Chen, Y.-S.; Betley, T. A. “Multiple-wavelength anomalous diffraction studies of trinuclear iron clusters: effects of coordination environment, M-M bonding, and mixed valency”. *Submitted*.
- Milton, M.; Schuster, N.; Paley, D. W.; **Hernández Sánchez, R.**; Ng, F.; Steigerwald, M. L.; Nuckolls, C. “Defying Strain in the Synthesis of an Electroactive Bilayer Helicene”. *Chem. Sci.* **2019**, *10*, 1029.
- Hernández Sánchez, R.**; Betley, T. A. “Thermally Persistent High-Spin Ground States in Octahedral Iron Clusters”. *J. Am. Chem. Soc.* **2018**, *140*, 16792.
- Hernández Sánchez, R.***; Champsaur, A. M.; Choi, B.; Wang, S. G.; Bu, W.; Roy, X.; Chen, Y.-S.*; Steigerwald, M. L.*; Nuckolls, C.*; Paley, D. W.*. “Electron cartography in clusters”. *Angew. Chem. Int. Ed.* **2018**, *57*, 13815.
- Schuster, N.; **Hernández Sánchez, R.**; Bukharina, D.; Kotov, N. A.; Breova, N.; Ng, F.*; Steigerwald, M. L.*; Nuckolls, C.*. “A Helicene Nanoribbon with Greatly Amplified Chirality”. *J. Am. Chem. Soc.* **2018**, *140*, 6235.
- Zhang, B.; [§]**Hernández Sánchez, R.**; [§]Zhong, Y.; Ball, M.; Terban, M. W.; Paley, D.; Billinge, S. J. L.; Ng, F.; Steigerwald, M. L.; Nuckolls, C. “Hollow Organic Capsules Assemble into Cellular Semiconductors”. *Nat. Commun.* **2018**, *9*, 1957. [§] = equal contribution.
- Milton, M.; Cheng, Q.; Yang, Y.*; Nuckolls, C.*; **Hernández Sánchez, R.***; Sisto, T.* “Molecular materials for Non-Aqueous Flow Batteries with High Coulombic Efficiency and Stable Cycling”. *Nano Lett.* **2017**, *17*, 7859.
- Keener, M.; Peterson, M.; **Hernández Sánchez, R.**; Oswald, V. F.; Wu, G.; Ménard, G.*. “Towards Catalytic Ammonia Oxidation to Dinitrogen: A Synthetic Cycle Using a Simple Manganese Complex”. *Chem. Eur. J.* **2017**, *23*, 11479.
- Amiri, H.; Shepard, K.*; Nuckolls, C.*; **Hernández Sánchez, R.***. “Single-Walled Carbon Nanotubes: Mimics of Biological Ion Channels”. *Nano Lett.* **2017**, *17*, 1204.
- Lee, H.; Campbell, M. G.; **Hernández Sánchez, R.**; Börgel, J.; Raynaud, J.; Parker, S. E.; Ritter, T. “Mechanistic Insight Into High-Spin Iron(I)-Catalyzed Butadiene Dimerization”. *Organometallics* **2016**, *35*, 2923.
- Furneaux, A. G.; Piro, N. A.; **Hernández Sánchez, R.**; Garmigna, K. M.; Fey, N.; Robinson, M. J.; Kassel, W. S.; Nataro, C. “Spectroscopic, structural and computational analysis of [Re(CO)₃(dippM)Br]ⁿ⁺ (dippM = 1,1'-bis(diiso-propylphosphino)metallocene, M = Fe, n = 0 or 1; M = Co, n = 1)”. *Dalton Trans.* **2016**, *45*, 4819.
- Blass, B. L.; **Hernández Sánchez, R.**; Decker, V. A.; Robinson, M. J.; Piro, N. A.; Kassel, W. S.; Diaconescu, P. L.; Nataro, C. “Structural, Computational, and Spectroscopic Investigation of [Pd(κ^3 -

- 1,1'-bis(di-*tert*-butylphosphino)ferrocenediyl)X]⁺ (X = Cl, Br, I) Compounds”. *Organometallics* **2016**, *35*, 462.
14. **Hernández Sánchez, R.**; Bartholomew, A.; Powers, T.; Ménard, G.; Betley, T. A. “Maximizing electron exchange in a [Fe₃] cluster”. *J. Am. Chem. Soc.* **2016**, *138*, 2235.
 13. **Hernández Sánchez, R.**; Betley, T. A. “Meta-Atom Behavior in Clusters Revealing Large Spin Ground States”. *J. Am. Chem. Soc.* **2015**, *137*, 13949.
 12. **Hernández Sánchez, R.**; Zheng, S.-L.; Betley, T. A. “Ligand Field Strength Mediates Electron Delocalization in Octahedral [(^HL)₂Fe₆(L')_m]ⁿ⁺ Clusters”. *J. Am. Chem. Soc.* **2015**, *137*, 11126.
 11. **Hernández Sánchez, R.**; Willis, A. M.; Zheng, S.-L.; Betley, T. A. “Synthesis of Well-Defined Biccapped Octahedral Iron Clusters [(^{ten}L)₂Fe₈(PMe₂Ph)₂]ⁿ (n = 0, -1)”. *Angew. Chem. Int. Ed.* **2015**, *54*, 12009.
 10. Cramer, S. A.; **Hernández Sánchez, R.**; Brakhage, D. F.; Jenkins, D. M. “Probing the role of an Fe^{IV} tetrazene in catalytic aziridination”. *Chem. Commun.* **2014**, *50*, 13967.
 9. Wu, B.; **Hernández Sánchez, R.**; Bezpalko, M. W.; Foxman, B. M.; Thomas, C. M. “Formation of a Heterobimetallic Zirconium/Cobalt Diimido Complexes via a Four-Electron Transformation”. *Inorg. Chem.* **2014**, *53*, 10021.
 8. Powers, T. M.; Gu, N. X.; Fout, A. R.; Baldwin, A. M.; **Hernández Sánchez, R.**; Alfonso, D. M.; Chen, Y.-S.; Zheng, S.-L.; Betley, T. A. “Synthesis of Open-Shell, Bimetallic Mn/Fe Trinuclear Clusters”. *J. Am. Chem. Soc.* **2013**, *135*, 14448.
 7. Eames, E.; **Hernández Sánchez, R.**; Betley, T. A. “Metal atom lability in polynuclear complexes”. *Inorg. Chem.* **2013**, *56*, 5006.
 6. Kraft, S. J.; **Hernández Sánchez, R.**; Hock, A. S. “A Remarkably Active Iron Catecholate Immobilized in a Porous Organic Polymer”. *ACS Catal.* **2013**, *3*, 826.
 5. Wong, L. J.; **Hernández Sánchez, R.**; Glancy Logan, J.; Zarkesh, R. A.; Ziller, J. W.; Heyduk, A. F. “Disulfide reductive elimination from an iron(III) complex”. *Chem. Sci.* **2013**, *4*, 1906.
 4. Harris, T. D.; Zhao, Q.; **Hernández Sánchez, R.**; Betley, T. A. “Expanded Redox Accessibility via Ligand Substitution in an Octahedral Fe₆Br₆ Cluster”. *Chem. Commun.* **2011**, *47*, 6344.
 3. Yamazaki, Y.; **Hernandez-Sanchez, R.**; Haile, S. M. “Cation nonstoichiometry in yttrium-doped barium zirconate: phase behavior, microstructure, and proton conductivity”. *J. Mater. Chem.* **2010**, *20*, 8158-8166.
 2. Telila, H.; Mamo, T.; **Hernandez Sanchez, R.** “The Fabrication of nanoparticle CsH₂PO₄ Electrolyte for Fuel Cell Applications”. *Caltech Undergraduate Research Journal* **2009**, Vol. 9 (No. 1), 33 – 39.
 1. Yamazaki, Y.; **Hernandez-Sanchez, R.**; Haile, S. M. “High Total Proton Conductivity in Large-Grained Yttrium-Doped Barium Zirconate”. *Chem. Mater.* **2009**, *21* (13), 2755-2762.

Patents

1. Milton, M.; Cheng, Q.; Yang, Y.*; Nuckolls, C.*; **Hernández Sánchez, R.***; Sisto, T.* “Non-Aqueous Flow Batteries”. U.S. Application No. **62/546,967**, filed August 17, 2017.

D. Synergistic Activities

3. Mentor at Eureka Street Corporation (www.eurekastreet.org). Student mentoring program to support students from minority serving institutions on their applications to graduate programs in physics and Chemistry in the USA.
2. City Coordinator of “Clubes de Ciencia Mexico” 2017, 2018, and 2019 (www.clubesdeciencia.mx). Science outreach program designed to bring hands-on week-long workshops in STEM to students in high school and undergraduate in Mexico. The instructors are PhD volunteers from top universities in the United States and Mexico.
1. PhD for a Day. Instructor. Science outreach program organized by the Campos and Venkataraman groups (at Columbia University).

E. Collaborators

Collaborators at Columbia University: Professor Simon Billinge (Applied Physics and Applied Math, and Brookhaven National Laboratory). *Collaborators at Argonne National Laboratory:* Dr. Yu-Sheng Chen (ChemMatCARS – The University of Chicago).

Graduate Advisor: Professor Theodore A. Betley (Harvard)

Postdoctoral Sponsors: Professor Colin Nuckolls (Columbia) and Columbia Nano Initiative

F. Mentorship

Current postdoctoral supervision: (2) Dr. Thomas H. Allen and Dr. Edison Arley Castro Portillo

Current Ph.D. students: (2) Omri David Abarbanel and Mohammad Azizur Rahman

Current undergraduate students: (8) Addison Averill, James S. Dages, Nicolas D'Annunzio, Bridget E. Glessner, Michael Kane, Madison N. Keating, Derek R. Lamb, and Ryan W. McLane.

G. Teaching assignments

Chem 2120 Fall 2018 – Descriptive Inorganic and Organometallic Chemistry – 18 PhD students enrolled