



Thomas Jaramillo

Associate Professor of Chemical Engineering, of Photon Science and Senior Fellow at the Precourt Institute for Energy

 Curriculum Vitae available Online

CONTACT INFORMATION

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Bio

BIO

Recent years have seen unprecedented motivation for the emergence of new energy technologies. Global dependence on fossil fuels, however, will persist until alternate technologies can compete economically. We must develop means to produce energy (or energy carriers) from renewable sources and then convert them to work as efficiently and cleanly as possible. Catalysis is energy conversion, and the Jaramillo laboratory focuses on fundamental catalytic processes occurring on solid-state surfaces in both the production and consumption of energy. Chemical-to-electrical and electrical-to-chemical energy conversion are at the core of the research. Nanoparticles, metals, alloys, sulfides, nitrides, carbides, phosphides, oxides, and biomimetic organo-metallic complexes comprise the toolkit of materials that can help change the energy landscape. Tailoring catalyst surfaces to fit the chemistry is our primary challenge.

ACADEMIC APPOINTMENTS

- Associate Professor, Chemical Engineering
- Associate Professor, Photon Science Directorate
- Affiliate, Precourt Institute for Energy

ADMINISTRATIVE APPOINTMENTS

- Director, SUNCAT Center for Interface Science and Catalysis, (2018- present)
- Deputy Director, SUNCAT Center for Interface Science and Catalysis, (2014-2018)

PROFESSIONAL EDUCATION

- PhD, University of California, Santa Barbara (2004)
- MS, University of California, Santa Barbara , Chemical Engineering (2000)
- BS, Stanford , Chemical Engineering (1998)

LINKS

- <http://jaramillogroup.stanford.edu>: <http://jaramillogroup.stanford.edu>

Teaching

COURSES

2021-22

- Chemical Process Modeling, Dynamics, and Control: CHEMENG 100 (Aut)
- Special Topics in Energy and Catalysis: CHEMENG 516 (Aut, Win, Spr, Sum)

2020-21

- Electrochemical Energy Conversion: CHEMENG 432 (Aut)
- Graduate Practical Training: CHEMENG 299 (Sum)
- Special Topics in Energy and Catalysis: CHEMENG 516 (Aut, Win, Spr, Sum)

2019-20

- Energy: Chemical Transformations for Production, Storage, and Use: CHEMENG 25E, ENGR 25E (Win)
- Graduate Practical Training: CHEMENG 299 (Sum)
- Special Topics in Energy and Catalysis: CHEMENG 516 (Aut, Win, Spr, Sum)

2018-19

- Energy: Chemical Transformations for Production, Storage, and Use: CHEMENG 25E, ENGR 25E (Win)
- Special Topics in Energy and Catalysis: CHEMENG 516 (Aut, Win, Spr, Sum)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Timothy Goh, Jinyu Guo, Matthew Liu, Emily Penn

Postdoctoral Faculty Sponsor

Filippo Balzaretti, Peter Benedek, Suman Bhasker Ranganath, Neha Bothra, Junjie Chen, Benjamin Comer, Shyam Deo, Joakim Halldin Stenlid, Md Delowar Hossain, Karun Kumar Rao, Sang-Won Lee, Shyama Mandal, Aniket Sandip Mule, Viswanath Pasumarthi, Joseph Perryman, Shikha Saini, Hori Pada Sarker, Johanna Schroeder, Michael Tang, Yi Xu

Doctoral Dissertation Advisor (AC)

Kabir Abiose, Ashton Aleman, Jaime Avilés Acosta, Sarah Blair, Samuel Dull, Rachel Hermanson, Gaurav Kamat, Daniela Marin, Jesse Matthews, Lingze Wei, Wrayzene Willoughby, Kyra Yap, Jose Zamora Zeledon

Doctoral Dissertation Co-Advisor (AC)

Brandon Loong

Postdoctoral Research Mentor

Peter Benedek, Junjie Chen, Melissa Kreider, Sang-Won Lee, Aniket Sandip Mule, Joseph Perryman, Johanna Schroeder, Yi Xu

Publications

PUBLICATIONS

- **Lithium-Mediated Electrochemical Nitrogen Reduction: Tracking Electrode-Electrolyte Interfaces via Time-Resolved Neutron Reflectometry** *ACS ENERGY LETTERS*
Blair, S. J., Doucet, M., Browning, J. F., Stone, K., Wang, H., Halbert, C., Acosta, J., Zeledon, J., Nielander, A. C., Gallo, A., Jaramillo, T. F.
2022; 7 (6): 1939-1946

- **Methods-A Practical Approach to the Reversible Hydrogen Electrode Scale** *JOURNAL OF THE ELECTROCHEMICAL SOCIETY*
Zeledon, J., Jackson, A., Stevens, M., Kamat, G. A., Jaramillo, T. F.
2022; 169 (6)
- **Vapor-Fed Electrolyzers for Carbon Dioxide Reduction Using Tandem Electrocatalysts: Cuprous Oxide Coupled with Nickel-Coordinated Nitrogen-Doped Carbon** *ADVANCED FUNCTIONAL MATERIALS*
Lin, Y., Lee, D., Tan, S., Koshy, D. M., Lin, T. Y., Wang, L., Corral, D., Aviles Acosta, J. E., Zamora Zeledon, J. A., Beck, V. A., Baker, S. E., Duoss, E. B., Hahn, et al
2022
- **Enhancing the connection between computation and experiments in electrocatalysis** *NATURE CATALYSIS*
Resasco, J., Abild-Pedersen, F., Hahn, C., Bao, Z., Koper, M. M., Jaramillo, T. F.
2022; 5 (5): 374-381
- **Using pH Dependence to Understand Mechanisms in Electrochemical CO Reduction** *ACS CATALYSIS*
Kastlunger, G., Wang, L., Govindarajan, N., Heenen, H. H., Ringe, S., Jaramillo, T., Hahn, C., Chan, K.
2022; 12 (8): 4344-4357
- **First-Row Transition Metal Antimonates for the Oxygen Reduction Reaction.** *ACS nano*
Gunasooriya, G. T., Kreider, M. E., Liu, Y., Zamora Zeledon, J. A., Wang, Z., Valle, E., Yang, A., Gallo, A., Sinclair, R., Stevens, M. B., Jaramillo, T. F., Norskov, J. K.
2022
- **Engineering metal-metal oxide surfaces for high-performance oxygen reduction on Ag-Mn electrocatalysts** *ENERGY & ENVIRONMENTAL SCIENCE*
Zeledon, J., Gunasooriya, G., Kamat, G. A., Kreider, M. E., Ben-Naim, M., Hubert, M. A., Acosta, J., Norskov, J. K., Stevens, M., Jaramillo, T. F.
2022
- **Acid anion electrolyte effects on platinum for oxygen and hydrogen electrocatalysis** *COMMUNICATIONS CHEMISTRY*
Kamat, G., Zeledon, J., Gunasooriya, G., Dull, S. M., Perryman, J. T., Norskov, J. K., Stevens, M., Jaramillo, T. F.
2022; 5 (1)
- **Gas diffusion electrodes, reactor designs and key metrics of low-temperature CO₂ electrolyzers** *NATURE ENERGY*
Wakerley, D., Lamaison, S., Wicks, J., Clemens, A., Feaster, J., Corral, D., Jaffer, S. A., Sarkar, A., Fontecave, M., Duoss, E. B., Baker, S., Sargent, E. H., Jaramillo, et al
2022
- **Characterization of a Dynamic Y₂Ir₂O₇ Catalyst during the Oxygen Evolution Reaction in Acid** *JOURNAL OF PHYSICAL CHEMISTRY C*
Hubert, M. A., Gallo, A., Liu, Y., Valle, E., Sanchez, J., Sokaras, D., Sinclair, R., King, L. A., Jaramillo, T. F.
2022
- **Evaluating the Case for Reduced Precious Metal Catalysts in Proton Exchange Membrane Electrolyzers** *ACS ENERGY LETTERS*
Hubert, M. A., King, L. A., Jaramillo, T. F.
2022; 7 (1): 17-23
- **Engineering Surface Architectures for Improved Durability in III-V Photocathodes.** *ACS applied materials & interfaces*
Ben-Naim, M., Aldridge, C. W., Steiner, M. A., Britto, R. J., Nielander, A. C., King, L. A., Deutsch, T. G., Young, J. L., Jaramillo, T. F.
1800
- **Improving intrinsic oxygen reduction activity and stability: Atomic layer deposition preparation of platinum-titanium alloy catalysts** *APPLIED CATALYSIS B-ENVIRONMENTAL*
Kim, Y., Xu, S., Park, J., Dadlani, A., Vinogradova, O., Krishnamurthy, D., Orzov, M., Lee, D., Dull, S., Schindler, P., Han, H., Wang, Z., Graf, et al
2022; 300
- **Designing a Zn-Ag Catalyst Matrix and Electrolyzer System for CO₂ Conversion to CO and Beyond.** *Advanced materials (Deerfield Beach, Fla.)*
Lamaison, S., Wakerley, D., Kracke, F., Moore, T., Zhou, L., Lee, D. U., Wang, L., Hubert, M. A., Aviles Acosta, J. E., Gregoire, J. M., Duoss, E. B., Baker, S., Beck, et al
2021: e2103963
- **Chemical Modifications of Ag Catalyst Surfaces with Imidazolium Ionomers Modulate H₂ Evolution Rates during Electrochemical CO₂ Reduction.** *Journal of the American Chemical Society*
Koshy, D. M., Akhade, S. A., Shugar, A., Abiose, K., Shi, J., Liang, S., Oakdale, J. S., Weitzner, S. E., Varley, J. B., Duoss, E. B., Baker, S. E., Hahn, C., Bao, et al

2021

- **Electrolyte-Guided Design of Electroreductive CO Coupling on Copper Surfaces** *ACS APPLIED ENERGY MATERIALS*
Akhade, S. A., Jayathilake, B. S., Weitzner, S. E., Eshelman, H., Hamilton, J., Feaster, J. T., Wakerley, D. W., Wang, L., Lamaison, S., Lee, D., Hahn, C., Jaramillo, T. F., Duoss, et al
2021; 4 (8): 8201-8210
- **Dynamics and Hysteresis of Hydrogen Intercalation and Deintercalation in Palladium Electrodes: A Multimodal In Situ X-ray Diffraction, Coulometry, and Computational Study** *CHEMISTRY OF MATERIALS*
Landers, A. T., Peng, H., Koshy, D. M., Lee, S., Feaster, J. T., Lin, J. C., Beeman, J. W., Higgins, D., Yano, J., Drisdell, W. S., Davis, R. C., Bajdich, M., Abild-Pedersen, et al
2021; 33 (15): 5872-5884
- **Probing the Effects of Acid Electrolyte Anions on Electrocatalyst Activity and Selectivity for the Oxygen Reduction Reaction** *CHEMELECTROCHEM*
Zamora Zeledon, J. A., Kamat, G., Gunasooriya, G., Norskov, J. K., Stevens, M., Jaramillo, T. F.
2021; 8 (13): 2467-2478
- **Phosphate-passivated mordenite for tandem-catalytic conversion of syngas to ethanol or acetic acid** *JOURNAL OF CATALYSIS*
Upham, D., Orazov, M., Jaramillo, T. F.
2021; 399: 132-141
- **Understanding Degradation Mechanisms in SrIrO₃ Oxygen Evolution Electrocatalysts: Chemical and Structural Microscopy at the Nanoscale** *ADVANCED FUNCTIONAL MATERIALS*
Ben-Naim, M., Liu, Y., Stevens, M., Lee, K., Wette, M. R., Boubnov, A., Trofimov, A. A., Ievlev, A. V., Belianinov, A., Davis, R. C., Clemens, B. M., Bare, S. R., Hikita, et al
2021
- **Direct Integration of Strained-Pt Catalysts into Proton-Exchange-Membrane Fuel Cells with Atomic Layer Deposition.** *Advanced materials (Deerfield Beach, Fla.)*
Xu, S., Wang, Z., Dull, S., Liu, Y., Lee, D. U., Lezama Pacheco, J. S., Orazov, M., Vullum, P. E., Dadlani, A. L., Vinogradova, O., Schindler, P., Tam, Q., Schladt, et al
2021: e2007885
- **A refraction correction for buried interfaces applied to in situ grazing-incidence X-ray diffraction studies on Pd electrodes.** *Journal of synchrotron radiation*
Landers, A. T., Koshy, D. M., Lee, S. H., Drisdell, W. S., Davis, R. C., Hahn, C., Mehta, A., Jaramillo, T. F.
2021; 28 (Pt 3): 919-23
- **Advanced manufacturing for electrosynthesis of fuels and chemicals from CO₂** *ENERGY & ENVIRONMENTAL SCIENCE*
Corral, D., Feaster, J. T., Sobhani, S., DeOtte, J. R., Lee, D., Wong, A. A., Hamilton, J., Beck, V. A., Sarkar, A., Hahn, C., Jaramillo, T. F., Baker, S. E., Duoss, et al
2021; 14 (5): 3064-3074
- **Isolating the Electrocatalytic Activity of a Confined NiFe Motif within Zirconium Phosphate** *ADVANCED ENERGY MATERIALS*
Sanchez, J., Stevens, M., Young, A. R., Gallo, A., Zhao, M., Liu, Y., Ramos-Garces, M. V., Ben-Naim, M., Colon, J. L., Sinclair, R., King, L. A., Bajdich, M., Jaramillo, et al
2021
- **Bridging thermal catalysis and electrocatalysis: Catalyzing CO₂ conversion with carbon-based materials.** *Angewandte Chemie (International ed. in English)*
Koshy, D., Nathan, S., Asundi, A., Abdellah, A., Dull, S., Cullen, D., Higgins, D., Bao, Z., Bent, S., Jaramillo, T.
2021
- **Tungsten oxide-coated copper gallium selenide sustains long-term solar hydrogen evolution** *SUSTAINABLE ENERGY & FUELS*
Palm, D. W., Muzzillo, C. P., Ben-Naim, M., Khan, I., Gaillard, N., Jaramillo, T. F.
2021; 5 (2): 384-90
- **Cobalt porphyrin intercalation into zirconium phosphate layers for electrochemical water oxidation** *SUSTAINABLE ENERGY & FUELS*
Barraza Alvarez, I., Wu, Y., Sanchez, J., Ge, Y., Ramos-Garces, M. V., Chu, T., Jaramillo, T. F., Colon, J. L., Villagran, D.
2021; 5 (2): 430-37
- **Bottom-Up Fabrication of Oxygen Reduction Electrodes with Atomic Layer Deposition for High-Power-Density PEMFCs** *CELL REPORTS PHYSICAL SCIENCE*
Dull, S. M., Xu, S., Goh, T., Lee, D., Higgins, D., Orazov, M., Koshy, D. M., Vullum, P., Kirsch, S., Huebner, G., Torgersen, J., Jaramillo, T. F., Prinz, et al

2021; 2 (1)

- **CO as a Probe Molecule to Study Surface Adsorbates during Electrochemical Oxidation of Propene** *CHEMELECTROCHEM*
Winiwarter, A., Boyd, M. J., Scott, S. B., Higgins, D. C., Seger, B., Chorkendorff, I., Jaramillo, T. F.
2021; 8 (1): 250–56
- **Understanding Selectivity in CO₂ Hydrogenation to Methanol for MoP Nanoparticle Catalysts Using In Situ Techniques** *CATALYSTS*
Duyar, M. S., Gallo, A., Regli, S. K., Snider, J. L., Singh, J. A., Valle, E., McEnaney, J., Bent, S. F., Ronning, M., Jaramillo, T. F.
2021; 11 (1)
- **Guiding the Catalytic Properties of Copper for Electrochemical CO₂ Reduction by Metal Atom Decoration.** *ACS applied materials & interfaces*
Nishimura, Y. F., Peng, H. J., Nitopi, S., Bajdich, M., Wang, L., Morales-Guio, C. G., Abild-Pedersen, F., Jaramillo, T. F., Hahn, C.
2021
- **Tuning the electronic structure of Ag-Pd alloys to enhance performance for alkaline oxygen reduction.** *Nature communications*
Zamora Zeledón, J. A., Stevens, M. B., Gunasooriya, G. T., Gallo, A. n., Landers, A. T., Kreider, M. E., Hahn, C. n., Nørskov, J. K., Jaramillo, T. F.
2021; 12 (1): 620
- **Identifying and Tuning the In Situ Oxygen-Rich Surface of Molybdenum Nitride Electrocatalysts for Oxygen Reduction** *ACS APPLIED ENERGY MATERIALS*
Stevens, M., Kreider, M. E., Patel, A. M., Wang, Z., Liu, Y., Gibbons, B. M., Statt, M. J., Ievlev, A., Sinclair, R., Mehta, A., Davis, R. C., Nørskov, J. K., Gallo, et al
2020; 3 (12): 12433–46
- **Acidic Oxygen Evolution Reaction Activity-Stability Relationships in Ru-Based Pyrochlores** *ACS CATALYSIS*
Hubert, M. A., Patel, A. M., Gallo, A., Liu, Y., Valle, E., Ben-Naim, M., Sanchez, J., Sokaras, D., Sinclair, R., Nørskov, J. K., King, L. A., Bajdich, M., Jaramillo, et al
2020; 10 (20): 12182–96
- **Direct Characterization of Atomically Dispersed Catalysts: Nitrogen-Coordinated Ni Sites in Carbon-Based Materials for CO₂ Electroreduction** *ADVANCED ENERGY MATERIALS*
Koshy, D. M., Landers, A. T., Cullen, D. A., Ievlev, A., Meyer, H. M., Hahn, C., Bao, Z., Jaramillo, T. F.
2020
- **Addressing the Stability Gap in Photoelectrochemistry: Molybdenum Disulfide Protective Catalysts for Tandem III-V Unassisted Solar Water Splitting** *ACS ENERGY LETTERS*
Ben-Naim, M., Britto, R. J., Aldridge, C. W., Mow, R., Steiner, M. A., Nielander, A. C., King, L. A., Friedman, D. J., Deutsch, T. G., Young, J. L., Jaramillo, T. F.
2020; 5 (8): 2631–40
- **Nanosized Zirconium Porphyrinic Metal-Organic Frameworks that Catalyze the Oxygen Reduction Reaction in Acid** *SMALL METHODS*
Chen, G., Stevens, M., Liu, Y., King, L. A., Park, J., Kim, T., Sinclair, R., Jaramillo, T. F., Bao, Z.
2020
- **Low-pressure methanol synthesis from CO₂ over metal-promoted Ni-Ga intermetallic catalysts** *JOURNAL OF CO₂ UTILIZATION*
Duyar, M. S., Gallo, A., Snider, J. L., Jaramillo, T. F.
2020; 39
- **Ni₅Ga₃ catalysts for CO₂ reduction to methanol: Exploring the role of Ga surface oxidation/reduction on catalytic activity** *APPLIED CATALYSIS B-ENVIRONMENTAL*
Gallo, A., Snider, J. L., Sokaras, D., Nordlund, D., Kroll, T., Ogasawara, H., Kovarik, L., Duyar, M. S., Jaramillo, T. F.
2020; 267
- **A cyclic electrochemical strategy to produce acetylene from CO₂, CH₄, or alternative carbon sources** *SUSTAINABLE ENERGY & FUELS*
McEnaney, J. M., Rohr, B. A., Nielander, A. C., Singh, A. R., King, L. A., Nørskov, J. K., Jaramillo, T. F.
2020; 4 (6): 2752–59
- **Nitride or Oxynitride? Elucidating the Composition-Activity Relationships in Molybdenum Nitride Electrocatalysts for the Oxygen Reduction Reaction** *CHEMISTRY OF MATERIALS*
Kreider, M. E., Stevens, M., Liu, Y., Patel, A. M., Statt, M. J., Gibbons, B. M., Gallo, A., Ben-Naim, M., Mehta, A., Davis, R. C., Ievlev, A., Nørskov, J. K., Sinclair, et al
2020; 32 (7): 2946–60

- **In Situ X-Ray Absorption Spectroscopy Disentangles the Roles of Copper and Silver in a Bimetallic Catalyst for the Oxygen Reduction Reaction** *CHEMISTRY OF MATERIALS*
Gibbons, B. M., Wette, M., Stevens, M., Davis, R. C., Siahrostami, S., Kreider, M., Mehta, A., Higgins, D. C., Clemens, B. M., Jaramillo, T. F.
2020; 32 (5): 1819–27
- **Electrolyte Engineering for Efficient Electrochemical Nitrate Reduction to Ammonia on a Titanium Electrode** *ACS SUSTAINABLE CHEMISTRY & ENGINEERING*
McEnaney, J. M., Blair, S. J., Nielander, A. C., Schwalbe, J. A., Koshy, D. M., Cargnello, M., Jaramillo, T. F.
2020; 8 (7): 2672–81
- **Using Microenvironments to Control Reactivity in CO₂ Electrocatalysis** *JOULE*
Hahn, C., Jaramillo, T. F.
2020; 4 (2): 292–94
- **A Combined Theory-Experiment Analysis of the Surface Species in Lithium-Mediated NH₃ Electrosynthesis** *CHEMELECTROCHEM*
Schwalbe, J. A., Statt, M. J., Chosy, C., Singh, A. R., Rohr, B. A., Nielander, A. C., Andersen, S. Z., McEnaney, J. M., Baker, J. G., Jaramillo, T. F., Norskov, J. K., Cargnello, M.
2020
- **Selective reduction of CO to acetaldehyde with CuAg electrocatalysts.** *Proceedings of the National Academy of Sciences of the United States of America*
Wang, L., Higgins, D. C., Ji, Y., Morales-Guio, C. G., Chan, K., Hahn, C., Jaramillo, T. F.
2020
- **Morphology control of metal-modified zirconium phosphate support structures for the oxygen evolution reaction.** *Dalton transactions (Cambridge, England : 2003)*
Ramos-Garces, M. V., Sanchez, J., La Luz-Rivera, K., Del Toro-Pedrosa, D. E., Jaramillo, T. F., Colon, J. L.
2020
- **A Spin Coating Method To Deposit Iridium-Based Catalysts onto Silicon for Water Oxidation Photoanodes.** *ACS applied materials & interfaces*
Ben-Naim, M. n., Palm, D. W., Strickler, A. L., Nielander, A. C., Sanchez, J. n., King, L. A., Higgins, D. C., Jaramillo, T. F.
2020
- **Modified atomic layer deposition of MoS₂ thin films** *Modified atomic layer deposition of MoS₂ thin films*
Zeng, L., Richey, N. E., Palm, D. W., Oh, I., Shi, J., MacIsaac, C., Jaramillo, T., Bent, S. F.
2020; 38: 060403
- **Two-Dimensional Conductive Ni-HAB as a Catalyst for the Electrochemical Oxygen Reduction Reaction.** *ACS applied materials & interfaces*
Park, J. n., Chen, Z. n., Flores, R. A., Wallnerström, G. n., Kulkarni, A. n., Nørskov, J. K., Jaramillo, T. F., Bao, Z. n.
2020
- **Readily Constructed Glass Piston Pump for Gas Recirculation.** *ACS omega*
Nielander, A. C., Blair, S. J., McEnaney, J. M., Schwalbe, J. A., Adams, T. n., Taheri, S. n., Wang, L. n., Yang, S. n., Cargnello, M. n., Jaramillo, T. F.
2020; 5 (27): 16455–59
- **Double layer charging driven carbon dioxide adsorption limits the rate of electrochemical carbon dioxide reduction on Gold.** *Nature communications*
Ringe, S. n., Morales-Guio, C. G., Chen, L. D., Fields, M. n., Jaramillo, T. F., Hahn, C. n., Chan, K. n.
2020; 11 (1): 33
- **Understanding the Origin of Highly Selective CO₂ Electroreduction to CO on Ni, N-doped Carbon Catalysts.** *Angewandte Chemie (International ed. in English)*
Koshy, D. n., Chen, S. n., Lee, D. U., Burke Stevens, M. n., Abdellah, A. n., Dull, S. n., Chen, G. n., Nordlund, D. n., Gallo, A. n., Hahn, C. n., Higgins, D. C., Bao, Z. n., Jaramillo, et al
2020
- **Oxidation State and Surface Reconstruction of Cu under CO₂ Reduction Conditions from In Situ X-ray Characterization.** *Journal of the American Chemical Society*
Lee, S. H., Lin, J. C., Farmand, M. n., Landers, A. T., Feaster, J. T., Avilés Acosta, J. E., Beeman, J. W., Ye, Y. n., Yano, J. n., Mehta, A. n., Davis, R. C., Jaramillo, T. F., Hahn, et al
2020
- **The Materials Research Platform: Defining the Requirements from User Stories** *MATTER*

- Aykol, M., Hummelshoj, J. S., Anapolosky, A., Aoyagi, K., Bazant, M. Z., Bligaard, T., Braatz, R. D., Broderick, S., Cogswell, D., Dagdelen, J., Drisdell, W., Garcia, E., Garikipati, et al
2019; 1 (6): 1433–38
- **A non-precious metal hydrogen catalyst in a commercial polymer electrolyte membrane electrolyser.** *Nature nanotechnology*
King, L. A., Hubert, M. A., Capuano, C., Manco, J., Danilovic, N., Valle, E., Hellstern, T. R., Ayers, K., Jaramillo, T. F.
2019
 - **Transition Metal Arsenide Catalysts for the Hydrogen Evolution Reaction** *JOURNAL OF PHYSICAL CHEMISTRY C*
Gauthier, J. A., King, L. A., Stults, F., Flores, R. A., Kibsgaard, J., Regmi, Y. N., Chan, K., Jaramillo, T. F.
2019; 123 (39): 24007–12
 - **Surface Engineering of 3D Gas Diffusion Electrodes for High-Performance H₂ Production with Nonprecious Metal Catalysts** *ADVANCED ENERGY MATERIALS*
Sanchez, J., Hellstern, T. R., King, L. A., Jaramillo, T. F.
2019
 - **Aqueous Electrochemical Reduction of Carbon Dioxide and Carbon Monoxide into Methanol with Cobalt Phthalocyanine.** *Angewandte Chemie (International ed. in English)*
Boutin, E., Wang, M., Lin, J. C., Mesnage, M., Mendoza, D., Lassalle-Kaiser, B., Hahn, C., Jaramillo, T., Robert, M.
2019
 - **Understanding vapor-fed carbon dioxide reduction at the gas diffusion electrode and electrolyte interface Using flow-electrolyte systems**
Lee, D., Koshy, D., Abiose, K., Corral, D., Wang, L., Higgins, D., Hahn, C., Jaramillo, T.
AMER CHEMICAL SOC.2019
 - **Promoting reliable electrocatalytic N₂ reduction**
Nielander, A., McEnaney, J., Blair, S., Schwalbe, J., Baker, J., Jaramillo, T.
AMER CHEMICAL SOC.2019
 - **Crystalline Strontium Iridate Particle Catalysts for Enhanced Oxygen Evolution in Acid** *ACS APPLIED ENERGY MATERIALS*
Strickler, A. L., Higgins, D., Jaramillo, T. F.
2019; 2 (8): 5490–98
 - **Electro-Oxidation of Methane on Platinum under Ambient Conditions** *ACS CATALYSIS*
Boyd, M. J., Latimer, A. A., Dickens, C. F., Nielander, A. C., Hahn, C., Norskov, J. K., Higgins, D. C., Jaramillo, T. F.
2019; 9 (8): 7578–87
 - **Electrochemically converting carbon monoxide to liquid fuels by directing selectivity with electrode surface area** *NATURE CATALYSIS*
Wang, L., Nitopi, S., Wong, A. B., Snider, J. L., Nielander, A. C., Morales-Guio, C. G., Orazov, M., Higgins, D. C., Hahn, C., Jaramillo, T. F.
2019; 2 (8): 702–8
 - **Interfacial engineering of gallium indium phosphide photoelectrodes for hydrogen evolution with precious metal and non-precious metal based catalysts** *JOURNAL OF MATERIALS CHEMISTRY A*
Britto, R. J., Young, J. L., Yang, Y., Steiner, M. A., LaFehr, D. T., Friedman, D. J., Beard, M., Deutsch, T. G., Jaramillo, T. F.
2019; 7 (28): 16821–32
 - **Precious Metal-Free Nickel Nitride Catalyst for the Oxygen Reduction Reaction.** *ACS applied materials & interfaces*
Kreider, M. E., Gallo, A., Back, S., Liu, Y., Siahrostami, S., Nordlund, D., Sinclair, R., Norskov, J. K., King, L. A., Jaramillo, T. F.
2019
 - **A Versatile Method for Ammonia Detection in a Range of Relevant Electrolytes via Direct Nuclear Magnetic Resonance Techniques** *ACS CATALYSIS*
Nielander, A. C., McEnaney, J. M., Schwalbe, J. A., Baker, J. G., Blair, S. J., Wang, L., Pelton, J. G., Andersen, S. Z., Enemark-Rasmussen, K., Colic, V., Yang, S., Bent, S. F., Cargnello, et al
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