



Thomas Jaramillo

Professor of Chemical Engineering, of Energy Science Engineering, and of Photon Science

 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

- Professor, Chemical Engineering
- Professor, Energy Science & Engineering
- 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

2023-24

- Electrochemical Energy Conversion: CHEMENG 432, ENERGY 432 (Aut)
- Fundamentals and Applications of Spectroscopy: CHEMENG 345 (Spr)

2022-23

- Chemical Process Modeling, Dynamics, and Control: CHEMENG 100 (Win)
- Fundamentals and Applications of Spectroscopy: CHEMENG 345 (Spr)
- Special Topics in Energy and Catalysis: CHEMENG 516 (Aut)

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)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Evan Carlson, Timothy Goh, Jinyu Guo, Maggy Harake, Matthew Liu, Dean Miller

Postdoctoral Faculty Sponsor

Changzhi Ai, Hussein Osama Mohamed Badr Badr, Filippo Balzaretto, Pooja Basera, Peter Benedek, Suman Bhasker Ranganath, Neha Bothra, Junjie Chen, Ara Cho, Lakshay Dheer, Ezgi Erdem, Roman Fanta, Anshuman Goswami, Ryan Hannagan, Hyeonjung Jung, Sang-Won Lee, Ruchika Mahajan, Shyama Mandal, Aniket Sandip Mule, Hori Pada Sarker, Johanna Schroeder, Dongjae Shin, Michael Tang, Xin Yang, Judith Zander

Doctoral Dissertation Advisor (AC)

Kabir Abiose, Yamile Cornejo Carrillo, Colin Crago, Tristan Gilbert, Gaurav Kamat, Daniela Marin, Jesse Matthews, Isa Rios Amador, Milenia Rojas Mendoza, Rachel Spurlock, Alfred Vargas, Wrayzene Willoughby, Katherine Yan, Kyra Yap, Sihe Zhang

Doctoral Dissertation Co-Advisor (AC)

Ashton Aleman, Valerie Niemann

Postdoctoral Research Mentor

Peter Benedek, Junjie Chen, Sang-Won Lee, Aniket Sandip Mule, Johanna Schroeder

Publications

PUBLICATIONS

- **Modeling Planar Electrodes and Zero-Gap Membrane Electrode Assemblies for CO₂ Electrolysis** *CHEMELECTROCHEM*
Ehlinger, V. M., Lee, D., Lin, T. Y., Duoss, E. B., Baker, S. E., Jaramillo, T. F., Hahn, C.
2024
- **Controlling Mass Transport in Direct Carbon Dioxide Zero-Gap Electrolyzers via Cell Compression** *ACS SUSTAINABLE CHEMISTRY & ENGINEERING*

- Lee, D., Joensen, B., Jenny, J., Ehlinger, V. M., Lee, S., Abiose, K., Xu, Y., Sarkar, A., Lin, T. Y., Hahn, C., Jaramillo, T. F.
2023; 11 (46): 16661-16668
- **High-performance ionomerless cathode anion-exchange membrane fuel cells with ultra-low-loading Ag-Pd alloy electrocatalysts** *NATURE ENERGY*
Douglin, J. C., Zeledon, J., Kreider, M. E., Singh, R. K., Stevens, M., Jaramillo, T. F., Dekel, D. R.
2023
 - **Protocol for assembling and operating bipolar membrane water electrolyzers.** *STAR protocols*
Rios Amador, I., Hannagan, R. T., Marin, D. H., Perryman, J. T., Rémy, C., Hubert, M. A., Lindquist, G. A., Chen, L., Stevens, M. B., Boettcher, S. W., Nielander, A. C., Jaramillo, T. F.
2023; 4 (4): 102606
 - **Calcium-mediated nitrogen reduction for electrochemical ammonia synthesis.** *Nature materials*
Fu, X., Niemann, V. A., Zhou, Y., Li, S., Zhang, K., Pedersen, J. B., Saccoccio, M., Andersen, S. Z., Enemark-Rasmussen, K., Benedek, P., Xu, A., Deissler, N. H., Mygind, et al
2023
 - **Quantifying Influence of the Solid-Electrolyte Interphase in Ammonia Electrosynthesis** *ACS ENERGY LETTERS*
McShane, E. J., Niemann, V. A., Benedek, P., Fu, X., Nielander, A. C., Chorkendorff, I., Jaramillo, T. F., Cargnello, M.
2023
 - **Development of a versatile electrochemical cell for in situ grazing-incidence X-ray diffraction during non-aqueous electrochemical nitrogen reduction.** *Journal of synchrotron radiation*
Blair, S. J., Nielander, A. C., Stone, K. H., Kreider, M. E., Niemann, V. A., Benedek, P., McShane, E. J., Gallo, A., Jaramillo, T. F.
2023
 - **Carbon flowers as electrocatalysts for the reduction of oxygen to hydrogen peroxide** *NANO RESEARCH*
Gong, H., Wei, L., Chen, S., Chen, Z., Jaramillo, T. F., Bao, Z.
2023
 - **Electrochemical Flow Reactor Design Allows Tunable Mass Transport Conditions for Operando Surface Enhanced Infrared Absorption Spectroscopy** *CHEMCATCHEM*
Acosta, J. E., Lin, J. C., Un Lee, D., Jaramillo, T. F., Hahn, C.
2023
 - **Mechanistic Insights into Aldehyde Production from Electrochemical CO₂ Reduction on CuAg Alloy via Operando X-ray Measurements** *ACS CATALYSIS*
Qiao, Y., Kastlunger, G., Davis, R. C., Rodriguez, C., Vishart, A., Deng, W., Xu, Q., Li, S., Benedek, P., Chen, J., Schroder, J., Perryman, J., Lee, et al
2023: 9379-9391
 - **Combined, time-resolved, in situ neutron reflectometry and X-ray diffraction analysis of dynamic SEI formation during electrochemical N₂ reduction** *ENERGY & ENVIRONMENTAL SCIENCE*
Blair, S. J., Doucet, M., Niemann, V. A., Stone, K. H., Kreider, M. E., Browning, J. F., Halbert, C. E., Wang, H., Benedek, P., McShane, E. J., Nielander, A. C., Gallo, A., Jaramillo, et al
2023
 - **A framework for understanding efficient diurnal CO₂ reduction using Si and GaAs photocathodes** *CHEM CATALYSIS*
Yap, K. K., Lee, S., Steiner, M. A., Acosta, J., Kang, D., Kim, D., Warren, E. L., Nielander, A. C., Jaramillo, T. F.
2023; 3 (6)
 - **Tracking the Dynamics of a Ag-MnO_x Oxygen Reduction Catalyst Using In Situ and Operando X-ray Absorption Near-Edge Spectroscopy** *ACS ENERGY LETTERS*
Schroder, J., Zamora Zeledon, J. A., Kamat, G. A., Kreider, M. E., Wei, L., Mule, A. S., Torres, A., Yap, K., Sokaras, D., Gallo, A., Stevens, M., Jaramillo, T. F.
2023
 - **Hydrogen production with seawater-resilient bipolar membrane electrolyzers** *JOULE*
Marin, D. H., Perryman, J. T., Hubert, M. A., Lindquist, G. A., Chen, L., Aleman, A. M., Kamat, G. A., Niemann, V. A., Stevens, M., Regmi, Y. N., Boettcher, S. W., Nielander, A. C., Jaramillo, et al
2023; 7 (4): 765-781
 - **Insights into Active Sites and Mechanisms of Benzyl Alcohol Oxidation on Nickel-Iron Oxyhydroxide Electrodes** *ACS CATALYSIS*
Wei, L., Hossain, M., Boyd, M. J., Aviles-Acosta, J., Kreider, M. E., Nielander, A. C., Stevens, M., Jaramillo, T. F., Bajdich, M., Hahn, C.

2023: 4272-4282

- **Understanding the Stability of Manganese Chromium Antimonate Electrocatalysts through Multimodal In Situ and Operando Measurements.** *Journal of the American Chemical Society*
Kreider, M. E., Kamat, G. A., Zamora Zeledón, J. A., Wei, L., Sokaras, D., Gallo, A., Stevens, M. B., Jaramillo, T. F.
2022
- **A Versatile Li_{0.5}FePO₄ Reference Electrode for Nonaqueous Electrochemical Conversion Technologies** *ACS ENERGY LETTERS*
McShane, E. J., Benedek, P., Niemann, V. A., Blair, S. J., Kamat, G. A., Nielander, A. C., Jaramillo, T. F., Cargnello, M.
2022: 230-235
- **Investigation of the Structure of Atomically Dispersed Ni_x Sites in Ni and N-Doped Carbon Electrocatalysts by ⁶¹Ni Mossbauer Spectroscopy and Simulations.** *Journal of the American Chemical Society*
Koshy, D. M., Hossain, M. D., Masuda, R., Yoda, Y., Gee, L. B., Abiose, K., Gong, H., Davis, R., Seto, M., Gallo, A., Hahn, C., Bajdich, M., Bao, et al
2022
- **Bridging knowledge gaps in liquid- and vapor-fed CO₂ electrolysis through active electrode area** *CHEM CATALYSIS*
Corral, D., Lee, D., Ehlinger, V. M., Nitopi, S., Acosta, J., Wang, L., King, A. J., Feaster, J. T., Lin, Y., Weber, A. Z., Baker, S. E., Duoss, E. B., Beck, et al
2022; 2 (11): 3239-3253
- **Origins of wear-induced tungsten corrosion defects in semiconductor manufacturing during tungsten chemical mechanical polishing** *APPLIED SURFACE SCIENCE*
Choi, S., Kreider, M. E., Nielander, A. C., Stevens, M., Kamat, G., Koo, J., Bae, K., Kim, H., Yoon, I., Yoon, B., Hwang, K., Lee, D., Jaramillo, et al
2022; 598
- **Strategies for Modulating the Catalytic Activity and Selectivity of Manganese Antimonates for the Oxygen Reduction Reaction** *ACS CATALYSIS*
Kreider, M. E., Gunasooriya, G., Liu, Y., Zeledon, J., Valle, E., Zhou, C., Montoya, J. H., Gallo, A., Sinclair, R., Norskov, J. K., Stevens, M., Jaramillo, T. F.
2022
- **New challenges in oxygen reduction catalysis: a consortium retrospective to inform future research** *ENERGY & ENVIRONMENTAL SCIENCE*
Stevens, M., Anand, M., Kreider, M. E., Price, E. K., Zeledon, J., Wang, L., Peng, J., Li, H., Gregoire, J. M., Hummelshoj, J., Jaramillo, T. F., Jia, H., Norskov, et al
2022
- **Alloyed Pt-Zn Oxygen Reduction Catalysts for Proton Exchange Membrane Fuel Cells** *ACS APPLIED ENERGY MATERIALS*
Dull, S. M., Vinogradova, O., Xu, S., Koshy, D. M., Vullum, P., Torgersen, J., Kirsch, S., Viswanathan, V., Jaramillo, T. F., Prinz, F. B.
2022
- **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)
 - **Acid anion electrolyte effects on platinum for oxygen and hydrogen electrocatalysis.** *Communications chemistry*
Kamat, G. A., Zamora Zeledón, J. A., Gunasooriya, G. T., Dull, S. M., Perryman, J. T., Nørskov, J. K., Stevens, M. B., Jaramillo, T. F.
2022; 5 (1): 20
 - **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
 - **Demonstration of photoreactor platform for on-sun unassisted photoelectrochemical hydrogen generation with tandem III-V photoelectrodes** *CHEM CATALYSIS*
Ben-Naim, M., Aldridge, C. W., Steiner, M. A., Nielander, A. C., Deustch, T. G., Young, J. L., Jaramillo, T. F.
2022; 2 (1): 195-209
 - **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., Orazov, 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-Garcés, 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-Garcés, 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.
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