

**Thomas William Hamann**  
Michigan State University  
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## EDUCATION

Ph.D. 2006, Chemistry    California Institute of Technology    Advisor: Nathan Lewis  
*Thesis: "Interfacial electron-transfer reactions at semiconductor electrodes"*

M.S. 2000, Chemistry    University of Massachusetts, Boston    Advisor: Hans Van Willigen  
*Thesis: "FT-EPR study of electron transfer reactions mediated by the photo-excited triplets of a C<sub>60</sub> adduct"*

B.A. 1996, Chemistry    University of Texas, Austin

## PROFESSIONAL EXPERIENCE

Professor	Michigan State University	2018 – present
Director	CORE-Complex Materials	2018 – 2022
Associate Editor	ACS Applied Materials & Interfaces	2017 – present
James Dye Professor	Michigan State University	2014 – present
Associate Professor	Michigan State University	2013 – 2018
Assistant Professor	Michigan State University	2008 – 2013
Postdoctoral Fellow w/ Prof. Joseph Hupp	Northwestern University	2006 – 2008

## RESEARCH INTERESTS

Energy, material synthesis, coordination chemistry, homogeneous and heterogeneous electron-transfer reactions and catalysis, photovoltaic and photoelectrochemical cells.

## AWARDS

- 2020 MSU College of Natural Science Outstanding Faculty Award
- 2016 Camille and Henry Dreyfus Environmental Chemistry Mentor
- 2015 Kavli Fellow
- 2015 SEAC Royce W. Murray Young Investigator Award
- 2013 Camille Dreyfus Teacher-Scholar
- 2012 Alfred P. Sloan Research Fellowship
- 2012 National Science Foundation, CAREER award
- 2011 Department of Energy, Early Career Research Program award

## PUBLICATIONS

[https://scholar.google.com/citations?user=KRbt0\\_AAAAAJ&hl=en](https://scholar.google.com/citations?user=KRbt0_AAAAAJ&hl=en)

### **Book Chapters:**

- 1) Shadabipour, P., Hajibabaei, H., Hamann, T.W. “Advanced understanding of kinetics and reaction mechanisms on semiconductor surfaces.” Springer Handbook of Inorganic Photochemistry; **2022**; Part F, Chapter 3, pp. 851-878. <https://doi.org/10.1007/978-3-030-63713-2>
- 2) Hajibabaei, H., Gao, Y., Hamann, T.W. “Unravelling the Charge Transfer Mechanism in Water Splitting Hematite Photoanodes.” In *Advances in Photoelectrochemical Water Splitting: Theory, Experiment and Systems Analysis*; The Royal Society of Chemistry, **2018**; pp 100 – 127.

### **Peer Reviewed Articles:** *h-index 50, >10,000 citations*

- 90) J. Amtawong, G. P. Bein, C. L. Montgomery, A. L. Raithel, T. W. Hamann, C. H. Chen, and J. L. Dempsey; “Kinetic Studies of Acid-Dependent Electrocatalytic HER Mechanisms Operative through Cobalt Hydride Intermediates” under review at *Journal of the American Chemical Society*
- 89) C. P. Chen, W. Alharbib, T. R. Cundari, T. W. Hamann, and M. R. Smith III, “Deciphering the Mechanism of Lewis Base Triggered Conversion of Ammonia to Molecular Nitrogen and Methylamine to Cyanide” under review at *Journal of the American Chemical Society*
- 88) S. Daemi, S. Kaushik, S. Das, Hamann, T.W., Osterloh, F.; “A BiVO<sub>4</sub> - liquid junction photovoltaic cell with 0.2% solar energy conversion efficiency” minor revision at *Journal of the American Chemical Society*
- 87) Kim, T.Y., Suh, E.H., Firestone, E., Raithel, A.L, Xu, C.Q., Ke, X., Jang, J., McCracken, J., and Hamann, T.W.; “Metal complex molecular solids showing band-like transport driven by in situ ligand exchange” *Chemistry of Materials* **2023**, 35, 17, 6726–6736
- 86) Raithel, A.L., Meador, W., Kim, T.Y., Staples, R.J., Delcamp, J., Hamann, T.W.; “Molecular Switch Cobalt Redox Shuttle with a Tunable Hexadentate Ligand” *Journal of the American Chemical Society* **2023**, 145, 2, 1367–1377
- 85) Devdass, A., Watson, J., Firestone, E., Hamann, T.W., Delcamp, J.H., Jurss, J.W.; “An Efficient Copper-based Redox Shuttle Bearing a Hexadentate Polypyridyl Ligand for DSCs Under Low-Light Conditions” *ACS Applied Energy Materials*, **2022**, 5, 5964–5973
- 84) Mi, C., Ghazfar, R., Smith, M.R., Hamann, T.W.; “Ammonia euefstics: Electrolytes for liquid energy storage and conversion at room temperature and ambient pressure” *Joule* **2022**, 6, 1 – 10
- 83) Velore, J., Pradhan, S.C., Hamann, T.W., Hagfeldt, A., Unni, K.N.N., Soman, S.; “Understanding Mass Transport in Copper Electrolyte-Based Dye-Sensitized Solar Cells: *ACS Applied Energy Materials* **2022**, 5, 3, 2647–2654
- 82) Xiao, Y., Vanka, S., Pham, T.A., Dong, W.J. Sun, Y, Liu, X., Navid, A.N., Varley, J.B., Hajibabaei, H., Hamann, T.W., Ogitsu, T., Mi, Z.; “Crystallographic Effects of GaN Nanostructures in Photoelectrochemical Reaction” *Nano Letters* **2022**, 22, 6, 2236–2243

- 81) Kim, T.Y., Kim, B.S., Oh, J.G., Park, S.C., Jang, J., Hamann, T.W., Kang, Y.S., Bang, J.H., Giménez, S., Kang Y.S.; “Interfacial Engineering at Quantum Dot-Sensitized TiO<sub>2</sub> Photoelectrodes for Ultrahigh Photocurrent Generation” *ACS Applied Materials and Interfaces* **2021**, 13 (5), 6208–6218
- 80) Han, R., Kim, T.Y., Hamann, T.W., Osterloh, F.; “Photochemical Charge Separation and Dye Self-Oxidation Control Performance of Fluorescein, Rose Bengal, and Triphenylamine Dye-Sensitized Solar Cells” *Journal of Physical Chemistry* **2020** 124, 48, 26174–26183
- 79) Shadabipour, P., Raithel, A.L., Hamann, T.W.; “Charge Carrier Dynamics at the CuWO<sub>4</sub>/Electrocatalyst Interface for Photoelectrochemical Water Oxidation” *ACS Applied Materials & Interfaces* **2020** 12, 45, 50592–50599
- 78) Vanka, S., Zhou, B., Awni, R.A., Song, Z., Chowdhury, F.A., Liu, X., Hajibabaei, H., Shi, W., Navid, I.A., Xiao, Y., Pandey, A., Chen, R., Botton, G.A., Hamann, T.W., Wang, D., Yan, Y., Mi, Z.; “An InGa<sub>N</sub>/Si Double-Junction Photocathode for Unassisted Solar Water Splitting” *ACS Energy Letters* **2020** 5, 12, 3741–3751
- 77) Qing, G., Ghazfar, R., Jackowski, S.T., Habibzadeh, F., Maleka Ashtiani, M., Chen, C. Smith, M.R., Hamann, T.W.; “Recent Advances and Challenges of Electrocatalytic N<sub>2</sub> Reduction to Ammonia” *Chemical Reviews* **2020**, 120, 12, 5437–5516
- 76) Raithel, A.L., Kim, T.Y., Nielsen, K., Staples, R.J., Hamann, T.W.; “Low-Spin Cobalt(II) Redox Shuttle by Isocyanide Coordination” *Sustainable Energy & Fuels* **2020** 4, 2497–2507
- 87) Kim, T.Y., Wang, Y., Raithel, A.L., Hamann, T.W.; “Real-Time Observation of the Diffusion Mechanism Progression from Liquid to Solid-State of Transition Metal Complexes” *ACS Energy Letters* **2020**, 5, 2, 583–588
- 74) Shadabipour, P., Hamann, T.W.; “Interface Passivation to Overcome Shunting in Semiconductor-Catalyst Junctions” *Chemical Communications* **2020**, 56, 2570–2573
- 73) Broadwater, D., Bates, M., Jayaram, M., Young, M., He, J., Raithel, A.L., Hamann, T.W., Zhang, W., Borhan, B., Lunt, R.R., Lunt, S.Y. “Modulating Cellular Cytotoxicity and Phototoxicity of Fluorescent Organic Salts through Counterion Pairing” *Scientific reports* **2019**, 9, 15288
- 72) Hajibabaei, H., Little, D.J., Pandey, A., Wang, D., Mi, Z., Hamann, T.W. “Direct Deposition of Crystalline Ta<sub>3</sub>N<sub>5</sub> Thin Films on FTO for PEC Water Splitting” *ACS Applied Materials & Interfaces* **2019**, 11 (17), 15457–15466
- 71) Qing, G., Hamann, T.W.; “New Electrolytic Devices Produce Ammonia with Exceptional Selectivity” *Joule* **2019**, 3 (3) 634–636
- 70) He, Y., Vanka, S., Gao, T., He, D., Espano, J., Zhao, Y., Dong, Q., Lang, C., Wang, Y., Hamann, T.W., Mi, Z., Wang, D. "Dependence of interface energetics and kinetics on catalyst loading in a photoelectrochemical system" *Nano Research*, **2019**, 12 (9) 2378–2384
- 69) He, Y., Hamann, T.W., Wang, D.; “Thin film photoelectrodes for solar water splitting” *Chemical Society Reviews* **2019**, 48, 2182–2215

- 68) Habib-Zadeh, F., Miller, S.L., Hamann, T.W., Smith, M.R.; “Homogenous Electro-Catalytic Oxidation of Ammonia to N<sub>2</sub> Under Mild Conditions” *Proceedings of the National Academy of Science* **2019**, 116 (8) 2849–2853
- 67) Wang, Y., Hamann, T.W.; “Improved Performance Induced by in-situ Ligand Exchange Reactions of Copper Bipyridyl Redox Couples in Dye-Sensitized Solar Cells” *Chemical Communications* **2018**, 54, 12361–12364
- 66) Baillargeon, J., Xie, Y., Raithel, A.L., Ghaffari, B., Staples, R.J., Hamann, T.W.; “Spin-Doctoring Cobalt Redox Shuttles for Dye-Sensitized Solar Cells” *Inorganic Chemistry* **2018**, 57 (18), 11633–11645
- 65) Qiu, J., Hajibabaei, H., Nellist, M.R., Laskowski, F.A.L., Oener, S.Z., Hamann, T.W., Boettcher, S.W.; “Correction to Catalyst Deposition on Photoanodes: The Roles of Intrinsic Catalytic Activity, Catalyst Electrical Conductivity, and Semiconductor Morphology” *ACS Energy Letters* **2018**, 3, 1771–1771
- 64) Liu, D., Wang, Q., Elinski, M., Chen, P., Traverse, C.J., Yang, C., Young, M., Hamann, T.W., Lunt, R.R.; “Ultrathin Hole Extraction Layer for Efficient Inverted Perovskite Solar Cells” *ACS Omega* **2018**, 3 (6), 6339–6345
- 63) Wang, Q., Jiang, C., Zhang, P., Hamann, T.W.; “Overcoming Bulk Recombination Limits of Layered Perovskite Solar Cells with Mesoporous Substrates” *Journal of Physical Chemistry C* **2018**, 122 (25), 14177–14185
- 62) Jiang, C., Xie, Y., Lunt, R.R., Hamann, T.W., Zhang, P.; Elucidating the Impact of Thin Film Texture on Charge Transport and Collection in Perovskite Solar Cells” *ACS Omega* **2018**, 3 (3), 3522–3529
- 61) Qiu, J., Hajibabaei, H., Nellist, M.R., Laskowski, F.A.L., Hamann, T.W., Boettcher, S.W.; “Catalyst Deposition on Photoanodes: The Roles of Intrinsic Catalytic Activity, Catalyst Electrical Conductivity, and Semiconductor Morphology” *ACS Energy Letters* **2018**, 3, 961–969
- 60) Liu, D., Wang, Q., Traverse, C.J., Yang, C., Young, M., Kuttipillai, P.S., Lunt, S.Y., Hamann, T.W., Lunt, R.R.; “Impact of Ultrathin C60 on Perovskite Photovoltaic Devices” *ACS Nano* **2018**, 12 (1) 876–883
- 59) Nellist, M.R., Laskowski, F.A.L., Qiu, J., Hajibabaei, H., Sivula, K., Hamann, T.W., Boettcher, S.W.; “Potential-sensing electrochemical atomic force microscopy enables *in-operando* analysis of electrocatalysis during (photo)electrochemical water splitting” *Nature Energy* **2018**, 3, 46–52
- 58) Hajibabaei, H., Hamann, T.W.; “Selective Electrodeposition of Tantalum(V) Oxide Electrodes” *Langmuir* **2017**, 33 (41), 10800–10806
- 57) Farha, O., Hamann, T.W., Martinson, A.B.F., Mulfort, K.; “Material and Interfaces for Energy Related Applications” *ACS Applied Materials & Interfaces* **2017**, 9 (39), 33377–33378
- 56) Chu, S., Li, W., Yan, Y., Hamann, T.W., Shih, I., Wang, D., Mi, Z.; “Roadmap on Solar Water Splitting: Current Status and Future Prospects” *Nano Futures* **2017**, 1, 022001

- 55) Qiu, J., Hajibabaei, H., Nellist, M.R., Laskowski, F.A.L, Hamann, T.W., Boettcher, S.W.; “Direct in Situ Measurement of Charge Transfer Processes During Photoelectrochemical Water Oxidation on Catalyzed Hematite” *ACS Central Science* **2017**, 3 (9), 1015–1025
- 54) Hajibabaei, H., Schon, A.R., Hamann, T.W.; “Interface Control of PEC Water Oxidation Performance with Ni<sub>1-x</sub>Fe<sub>x</sub>O<sub>y</sub> Modified Hematite Photoanodes” *Chemistry of Materials* **2017**, 29 (16), 6674–6683
- 53) Gao, Y., Hamann, T.W.; “Elucidation of CuWO<sub>4</sub> Surface States During PEC Water Oxidation” *Journal of Physical Chemistry Letters* **2017**, 8 (12), 2700–2704
- 52) Little, D.J., Edwards, D., Smith, M.R., Hamann, T.W.; “As Precious as Platinum: Iron Nitride for Electrocatalytic Oxidation of Liquid Ammonia” *ACS Applied Materials & Interfaces* **2017**, 9 (19), 16228–16235
- 51) Baillargeon, J., Xie, Y., Hamann, T.W.; “Bifurcation of Regeneration and Recombination in Dye-Sensitized Solar Cells via Electronic Manipulation of Tandem Cobalt Redox Shuttles” *ACS Applied Materials & Interfaces* **2017**, 9 (39), 33544–33548
- 50) Gao, Y., Hamann, T.W.; “Quantitative hole collection for photoelectrochemical water oxidation with CuWO<sub>4</sub>” *Chemical Communications* **2017**, 53, 1285–1288
- 49) Hajibabaei, H., Zandi, O., Hamann, T.W.; “Tantalum Nitride Films Integrated with Transparent Conductive Oxide Substrates via Atomic Layer Deposition for Photoelectrochemical Water Splitting” *Chemical Science*, **2016**, 7, 6760–6767
- 48) Zandi, O., Hamann, T.W.; “Determination of Photoelectrochemical Water Oxidation Intermediates on α-Fe<sub>2</sub>O<sub>3</sub> Electrode Surfaces Employing Operando ATR–IR Spectroscopy” *Nature Chemistry*, **2016**, 8, 778–783
- 47) Mandal, D., Hamann, T.W.; “Charge distribution in nanostructured TiO<sub>2</sub> photoanodes determined by quantitative analysis of the band edge unpinning” *ACS Applied Materials & Interfaces* **2016**, 8 (1), 419–424
- 46) Zandi, O., Schon, A.R., Hajibabaei, H., Hamann, T.W.; “Enhanced Charge Separation and Collection in High Performance Electrodeposited Hematite Films” *Chemistry of Materials*, **2016**, 28 (3), 765–771
- 45) Gao, Y., Zandi, O., Hamann, T.W.; “Atomic Layer Stack Deposition-Annealing Synthesis of CuWO<sub>4</sub>” *Journal of Materials Chemistry A*, **2016**, 4, 2826–2830
- 44) Xie, Y., Baillargeon, J., Hamann, T.W.; “Regeneration and Recombination Reactions in Dye Sensitized Solar Cells Employing Cobalt Redox Shuttles” *Journal of Physical Chemistry C.*, **2015**, 119 (50), 28155–28166
- 43) Zandi, O., Hamann, T.W.; “The Potential versus Current State of Water Splitting with Hematite” *Physical Chemistry Chemical Physics*, **2015**, 17, 22485–22503
- 42) Little, D.J., Smith, M.R., Hamann, T.W.; “Electrolysis of Liquid Ammonia for Hydrogen Generation” *Energy & Environmental Science*, **2015**, 8, 2775–2781

- 41) Mandal, D., Hamann, T.W.; “Energetics of Nanoparticle Semiconductor Electrodes Determined by Spectroelectrochemical Measurements of Free Electrons.” *Physical Chemistry Chemical Physics* **2015**, 17, 11156–11160
- 40) Klahr, B., Gimenez, S. Zandi, O., Fabregat-Santiago, F., Hamann, T.W.; “Competitive Photoelectrochemical Methanol and Water Oxidation with Hematite Electrodes.” *ACS Applied Materials & Interfaces* **2015**, 7 (14), 7653–7660
- 39) Hamann, T.W.; “Perovskites take lead in solar hydrogen race.” *Science* **2014**, 345, 1566–1567
- 38) Young, K.M.H., Hamann, T.W.; “Enhanced photocatalytic water oxidation efficiency with Ni(OH)<sub>2</sub> catalysts deposited on  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> via ALD.” *Chemical Communications* **2014**, 50 (63) 8727–8730
- 37) Kronawitter, C.X., Zegkinoglou, I., Shen, S.H., Liao, P., Cho, I.S., Zandi, O., Lashgari, K., Westin, G., Guo, J.H., Himpfel, F.J., Carter, E.A., Zheng, X.L., Hamann, T.W., Koel, B.E., Mao, S.S., Vayssieres, L.; “On Theoretical and Experimental Titanium Incorporation into Hematite Nanostructures” *Energy and Environmental Science*, **2014**, 7, 3100–3121
- 36) Soman, S., Xie, Y., Hamann, T.W.; “Cyclometalated sensitizers for DSSCs employing cobalt redox shuttles” *Polyhedron*, **2014**, 82, 139–147
- 35) Zandi, O., Hamann, T.W.; “Enhanced Photovoltage Through Selective Surface State Removal” *Journal of Physical Chemistry Letters* **2014**, 5 (9), 1522–1526
- 34) Klahr, B.M.; Hamann, T.W.; “Water Oxidation on Hematite Photoelectrodes: Insight on the Nature and Identity of Surface States through In-situ Spectroelectrochemistry” *Journal of Physical Chemistry C* **2014**, 118 (19), 10393–10399
- 33) Zandi, O., Beardslee, J.A., Hamann, T.W.; “Substrate Dependent Water Splitting with Ultrathin  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> Electrodes” *Journal of Physical Chemistry C* **2014**, 118 (30), 16494–16503
- 32) Hamann, T.W.; “Water splitting: An adaptive junction.” *Nature Materials* **2014**, 13, 3–4
- 31) Young, M.H., Klahr, B.M., Zandi, O., Hamann, T.W.; “Photocatalytic Water Oxidation with Hematite Electrodes.” *Catalysis Science & Technology*, **2013**, 2013, 3, 1660–1671
- 30) Riha, S.C., Klahr, B.M., Tyo, E.C., Seifert, S., Vajda S., Pellin, M.J., Hamann, T.W., Martinson, A.B.F.; “Atomic Layer Deposition of a Sub-monolayer Catalyst for the Enhanced Photoelectrochemical Performance of Water Oxidation with Hematite.” *ACS Nano*, **2013**, 7 (3), 2396–2405
- 29) Xie, Y., Hamann, T.W.; “Fast Low Spin Cobalt Complex Redox Shuttles for Dye-Sensitized Solar Cells.” *Journal of Physical Chemistry Letters*, **2013**, 4, 328–332
- 28) Zandi, O., Klahr, B.M., Hamann, T.W.; “Highly Photoactive Ti-doped  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> Thin Film Electrodes; Resurrection of the Dead Layer.” *Energy and Environmental Science* **2013**, 6, 634–642

- 27) Ondersma, J.W.; Hamann, T.W.; “Recombination and Redox Couples in Dye-Sensitized Solar Cells.” *Coordination Chemistry Reviews* **2013**, 257, 1533–1543
- 26) Ondersma, J.W.; Hamann, T.W.; “Conduction Band Energy Determination by Variable Temperature Spectroelectrochemistry.” *Energy and Environmental Science* **2012**, 5 (11), 9476–9480
- 25) Klahr, B.M., Gimenez S., Fabregat-Santiago, F., Bisquert, J., Hamann, T.W.; “Photoelectrochemical and Impedance Spectroscopic Investigation of Water Oxidation with “Co-Pi” coated Hematite Electrodes.” *Journal of the American Chemical Society* **2012**, 134 (40), 16693–16700
- 24) Hamann, T.W.; “Splitting Water with Rust: Hematite Photoelectrochemistry.” *Dalton Transactions*, **2012**, 41, 7830–7834
- 23) Klahr, B.M., Gimenez S., Fabregat-Santiago, F., Bisquert, J., Hamann, T.W.; “Electrochemical and Photoelectrochemical Investigation of Water Oxidation with Hematite Electrodes.” *Energy and Environmental Science* **2012**, 5 (6), 7626–7636
- 22) Klahr, B.M., Gimenez S., Fabregat-Santiago, F., Hamann, T.W., Bisquert, J.; “Water oxidation at hematite photoelectrodes: the role of surface states.” *Journal of the American Chemical Society* **2012**, 134 (9), 4294–4302
- 21) Hamann, T.W.; “The End of Iodide? Cobalt Complex Redox Shuttles in DSSCs.” *Dalton Transactions*, **2012**, 41 (11), 3111–3115
- 20) Ondersma, J.W.; Hamann, T.W.; “Spatially-Resolved Sources of Dark Current in DSSCs.” *Langmuir* **2011**, 27, 13361–13366
- 19) Klahr, B.M.; Hamann, T.W.; “Voltage Dependent Photocurrent of Thin Film Hematite Electrodes.” *Applied Physics Letters* **2011**, 99, 063508
- 18) Ondersma, J.W.; Hamann, T.W.; “Measurements and Modeling of Recombination from Nanoparticle TiO<sub>2</sub> Electrodes.” *Journal of the American Chemical Society* **2011**, 133, 8264–8271
- 17) Klahr, B.M.; Hamann, T.W.; “Current and Voltage Limiting Processes in Thin Film Hematite Electrodes.” *Journal of Physical Chemistry C* **2011**, 115, 8393–8399
- 16) Klahr, B.M.; Martinson, A.B.F.; Hamann, T.W.; “Photoelectrochemistry of Ultra Thin Film Iron Oxide Electrodes Prepared by Atomic Layer Deposition.” *Langmuir* **2011**, 27 (1), 461–468
- 15) Hamann, T.W.; Ondersma, J.W.; “Redox Shuttles in Dye-Sensitized Solar Cells.” *Energy and Environmental Science*, **2011**, 4, 370–381
- 14) Ondersma, J.W.; Hamann, T.W.; “Impedance Investigation of Dye-Sensitized Solar Cells Employing Outer-Sphere Redox Shuttles.” *Journal of Physical Chemistry C* **2010**, 114, 638–645
- 13) Klahr, B.M.; Hamann, T.W.; “Performance Enhancement and Limitations of Cobalt Dipyriddy Redox Shuttles in Dye-Sensitized Solar Cells.” *Journal of Physical Chemistry C*

### ***Postdoctoral Work***

- 12) Hamann, T.W.; Farha O.K.; M.; Hupp, J.T.; “Outer-sphere Redox Couples as Shuttles in Dye-Sensitized Solar Cells. Performance Enhancement Based on Photoelectrode Modification via Atomic Layer Deposition.” *Journal of Physical Chemistry C* **2008**, 112, 19756–19764
- 11) Hamann, T.W.; Jensen, R.A.; Martinson, A.B.F.; Van Ryswyk H.; Hupp, J.T.; “Advancing beyond current generation dye-sensitized solar cells.” *Energy and Environmental Science* **2008**, 1, 66–78
- 10) Hamann, T.W.; Martinson, A.B.F.; Pellin, M.; Hupp, J.T.; “Novel TiO<sub>2</sub> Nanostructured Photoanodes in Dye-Sensitized Solar Cells.” *Journal of Physical Chemistry C* **2008**, 112, 10303–10307
- 9) Hamann, T.W.; Martinson, A.B.F.; Pellin, M.; Hupp, J.T.; “Aerogel templated ZnO Dye-Sensitized Solar Cells.” *Advanced Materials* **2008**, 20, 1560–1564
- 8) Martinson, A.B.F.; Hamann, T.W.; Pellin, M.; Hupp, J.T.; “Alternative Photoanode Architectures for Dye-Sensitized Solar Cells.” *Chemistry – A European Journal* **2008**, 14, 4458–4467

### ***Graduate Work***

- 7) Hamann, T.W.; Brunshwig, B. S.; Lewis, N. S.; “A Comparison of the Self-Exchange and Interfacial Charge-Transfer Rate Constants for Methyl vs. t-Butyl Substituted Os(III) Polypyridyl Complexes.” *Journal of Physical Chemistry B* **2006**, 110, 25514–2552
- 6) Hamann, T.W.; Lewis, N. S.; “Control of the Stability, Electron-Transfer Kinetics, and pH-Dependent Energetics of Si/H<sub>2</sub>O Interfaces Through Methyl Termination of Si(111) Surfaces” *Journal of Physical Chemistry B* **2006**, 110, 22291–22294
- 5) Royea, W.J.; Hamann, T.W.; Brunshwig, B. S.; Lewis, N. S.; “A Comparison Between Interfacial Electron-Transfer Rate Constants at Metallic and Graphite Electrodes.” *Journal of Physical Chemistry B* **2006**, 110, 19433–19442
- 4) Hamann, T.W.; Gstrein, F.; Brunshwig, B. S.; Lewis, N. S.; “Measurement of the Driving Force Dependence of Interfacial Charge-Transfer Rate Constants in Response to pH Changes at n-ZnO/H<sub>2</sub>O Interface.” *Chemical Physics* **2006**, 326, 13–26
- 3) Hamann, T.W.; Srivatsan, N.; Van Willigen, H.; “Time-Resolved EPR Study of the Photophysics and Photochemistry of 1-(3-(Methoxycarbonyl)Propyl)-1-Phenyl[6.6]C<sub>61</sub>” *Journal of Physical Chemistry A* **2005**, 109, 11665–11672
- 2) Hamann, T.W.; Gstrein, F.; Brunshwig, B. S.; Lewis, N. S.; “Measurement of the Dependence of Interfacial Charge-Transfer Rate Constants on the Reorganization Energy of Redox Species at n-ZnO/H<sub>2</sub>O Interfaces.” *Journal of the American Chemical Society* **2005**,



127, 13949–13954

- 1) Hamann, T.W.; Gstrein, F.; Brunschwig, B. S.; Lewis, N. S.; “Measurement of the Free Energy Dependence of Interfacial Charge-Transfer Rate Constants Using ZnO/H<sub>2</sub>O Semiconductor/Liquid Contacts.” *Journal of the American Chemical Society* **2005**, *127*, 7815–7824

## PRESENTATIONS AT SCHOLARLY MEETINGS

### *Invited Presentations:*

Electrochemical Society, Boston, MA	May 28, 2023
DOE Solar Photochemistry Research Conference, Rockville, MD	May 22, 2023
The 24th International Symposium on the Photochemistry and Photophysics of Coordination Compounds, Vancouver Canada *had to withdraw due to COVID	July 25, 2022
nanoGe Fall Meeting, Berlin Germany	November 5, 2019
American Chemical Society, San Diego, CA	August 27, 2019
Electrochemical Society, Dallas, TX	May 29, 2019
<b>GRC:</b> Inorganic Reaction Mechanisms, Galveston, TX	March 12, 2019
Electrochemical Society, Canadian Section, Montreal Canada * <i>Keynote lecture</i>	November 10, 2018
Int’l Symposium on Solar Fuels and Solar Cells, Dalian China * <i>Keynote lecture</i>	October 19, 2018
Electrochemical Society, Seattle, WA	May 14, 2018
American Chemical Society, New Orleans, LA	April 19, 2018
DOE Solar Photochemistry Research Conference, Annapolis, MD	June 5, 2017
Electrochemical Society, New Orleans, LA	May 29, 2017
Materials Research Society, Boston, MA	December 2, 2016
Materials Research Society, Boston, MA	November 30, 2016
Electrochemical Society, San Diego, CA	May 2016
Materials Research Society, Phoenix, AZ	March 2016
<b>GRC:</b> Solar Fuels, Il Ciocco, Italy	February 2016
Sustainably Lighting the World, East Lansing, MI	October 2015
PittCon, New Orleans, LA * <i>Royce W. Murray Young Investigator Award Lecture</i>	March 2015

Kavli Frontiers of Science, Jerusalem, Israel <i>*one of 13 American Scientists chosen by the US Academy of Science</i>	February 2015
Materials for Tomorrow, Gothenburg, Sweden	November 2014
Dreyfus Teacher-Scholar Symposium, New York, NY	October 2014
American Vacuum Society, East Lansing, MI	August 2014
DOE Solar Photochemistry Research Conference, Annapolis, MD	June 2014
American Chemical Society, Dallas, TX	March 2014
PittCon, Chicago, IL	March 2014
Materials Challenges in Alternative & Renewable Energy	February 2014
<b>GRC: Solar Fuels</b> , Ventura, CA	January 2014
Transatlantic Frontiers of Chemistry, Kloster Seon, Germany <i>*one of 19 American Chemists chosen by ACS</i>	August 2013
nanoGe SolarFuels13, Granada Spain	June 2013
Materials Research Society, San Francisco, CA	April 2013
American Chemical Society, Philadelphia, PA <i>*Committee on Science's Young Investigator Forum</i>	August 2012
Canadian Chemistry Conference, Calgary, Canada	May 2012
nanoGe SolarFuels12, Mallorca Spain	March 2012
Smart Surfaces, Dublin Ireland <i>*keynote lecture</i>	March 2012
American Chemical Society, Anaheim, CA	March 2011
Pacifichem, Honolulu, HI	December 2010
American Chemical Society, Boston, MA	August 2010
<b>GRC: Electron Donor-Acceptor Interactions</b> , Newport, RI	August 2010
Complex Materials for Energy Applications, East Lansing, MI	June 2010
PittCon, Orlando, FL	March 2010
CeRMACS, Cleveland, OH	May 2009
American Chemical Society, Salt Lake City, UT	March 2009
Electrochemical Society- Detroit Section, Detroit, MI	December 2008
<b><i>Attended/Presentation:</i></b>	
DOE Catalysis, Rockville MD	October 2024
DOE Solar Photochemistry, zoom	June 2022

DOE Solar Photochemistry, zoom	June 2021
DOE Solar Photochemistry, Gaithersburg, MD	June 2019
DOE Solar Photochemistry, Gaithersburg, MD	June 2018
GRC: Solar Fuels, Ventura, CA	January 2018
DOE Solar Photochemistry, Gaithersburg, MD	June 2016
DOE Solar Photochemistry, Gaithersburg, MD	June 2015
International Symposium on the Photochemistry and Photophysics of Coordination Compounds, ISPPCC, Traverse City, MI	July 2013
DOE Solar Photochemistry, Annapolis, MD	June 2013
American Chemical Society National Meeting, New Orleans, LA	April 2013
DOE Solar Photochemistry, Annapolis, MD	June 2012
GRC: Solar Fuels, Il Ciocco, Italy <i>*poster talk</i>	May 2012
Hybrid and Organic Photovoltaics; Upsalla, Sweden <i>*session chair</i>	May 2012
Electrochemical Society, Boston, MA	October 2011
Hybrid and Organic Photovoltaics; Valencia, Spain	May 2011
European- Materials Research Society; Nice, France	May 2011
Materials Research Society, San Francisco, CA	April 2011
GRC: Solar Fuels, Ventura, CA	February 2011
Zing, Solar Fuels, Cancun Mexico	December 2010
CERMACS, Dayton, OH	June, 2010
Materials Research Society, Boston, MA	December 2009
Electrochemical Society, Vienna, Austria	October 2009
Electrochemical Society, Honolulu, HI	October 2008
American Chemical Society National Meeting, Boston, MA	August 2007
Fifteenth Western Photosynthesis Conference, Pacific Grove, CA	January 2006
Electrochemical Society, Honolulu, HI	October 2004
American Chemical Society National Meeting, Anaheim, CA	March 2004
American Chemical Society National Meeting, New York, NY	March 2004
Organometallics Seminar, California Institute of Technology	June 2003

## INVITED SEMINARS

The Abdus Salam ICTP, Trieste, Italy	April 22, 2021
Emory University	February 2020
Indiana University–Purdue University Indianapolis	October 2016
MIT / Harvard Joint Seminar	September 2016
University of Wisconsin	September 2016
Boston College	September 2016
Yale University	November 2015
University of California, Irvine	November 2015
Purdue University	April 2014
CORE-CM, Michigan State University	April 2013
Bowling Green University	March 2013
University of Colorado	February 2013
Colorado State University	February 2013
University of Wyoming	February 2013
Northwestern University	December 2012
Michigan State University	November 2012
Kalamazoo College	October 2012
University of Connecticut	October 2012
University of Southern California	October 2012
California Institute of Technology	October 2012
University of California Berkeley	September 2012
University of Washington	May 2012
Ohio State University	April 2012
Grand Valley State University	October 2011
Adrian College	October 2011
Northern Illinois University	March 2011
Argonne National Laboratory, Material Science Division	October 2010
University of New Orleans	April 2010
Hillsdale College	October 2009
Oakland University	March 2009

University of California Berkeley	January 2008
Brown University	January 2008
University of California Davis	January 2008
University of California Los Angeles	January 2008
Washington University	January 2008
Rice University	December 2007
Rutgers University	December 2007
Michigan State University	December 2007

### **COURSES TAUGHT**

SIRS scores from 0 (outstanding) to 5 (poor)

<b><i>Fall 2008</i></b>	CEM 913	Semiconductor Photoelectrochemistry <i>mean overall SIRS score: N/A</i>
<b><i>Fall 2009</i></b>	CEM 811	Inorganic Chemistry <i>mean overall SIRS score: 1.4</i>
	CEM 918	Inorganic Seminar
<b><i>Spring 2010</i></b>	CEM 918	Inorganic Seminar
<b><i>Fall 2010</i></b>	CEM 913	The Chemistry and Physics of Solar Energy Conversion <i>mean overall SIRS score: 0.65</i>
<b><i>Spring 2011</i></b>	CEM 913	Energy Sciences <i>mean overall SIRS score: 0.15</i>
<b><i>Fall 2011</i></b>	CEM 181H	General Chemistry, Honors <i>mean overall SIRS score: 1.5</i>
	CEM 918	Inorganic Seminar
<b><i>Spring 2012</i></b>	CEM 420	Independent Research
	CEM 918	Inorganic Seminar
<b><i>Fall 2012</i></b>	CEM 181H	General Chemistry, Honors <i>mean overall SIRS score: 1.2</i>
<b><i>Spring 2013</i></b>	CEM 913	The Chemistry and Physics of Solar Energy Conversion <i>mean overall SIRS score: 0.26</i>
<b><i>Fall 2013</i></b>	CEM 181H	General Chemistry, Honors <i>mean overall SIRS score: 0.9</i>
	CEM 400H	Honors Work
<b><i>Spring 2014</i></b>	CEM 999	Doctoral Dissertation Research

<i>Summer 2014</i>	CEM 999	Doctoral Dissertation Research
<i>Fall 2014</i>	CEM 181H	General Chemistry, Honors <i>mean overall SIRS score: 1.2</i>
	CEM 999	Doctoral Dissertation Research
<i>Spring 2015</i>	CEM 400H	Honors Work
	CEM 999	Doctoral Dissertation Research
<i>Summer 2015</i>	CEM 999	Doctoral Dissertation Research
<i>Fall 2015</i>	CEM 420	Independent Research
	CEM 913	Energy Conversion Processes in Inorganic Materials
	CEM 918	Inorganic Seminar
	CEM 999	Doctoral Dissertation Research
<i>Spring 2016</i>	CEM 311	Inorganic Chemistry <i>mean overall SIRS score: 2.4</i>
	CEM 918	Inorganic Seminar
	CEM 999	Doctoral Dissertation Research
<i>Summer 2016</i>	CEM 999	Doctoral Dissertation Research
<i>Fall 2016</i>	CEM 420	Independent Research
	CEM 918	Inorganic Seminar
	CEM 999	Doctoral Dissertation Research
<i>Spring 2017</i>	CEM 913	Energy Conversion Processes in Inorganic Materials <i>mean overall SIRS score: 0.5</i>
	CEM 918	Inorganic Seminar
	CEM 999	Doctoral Dissertation Research
<i>Fall 2017</i>	CEM 999	Doctoral Dissertation Research
<i>Spring 2018</i>	CEM 420	Independent Research
	CEM 812	Advanced Inorganic Chemistry II <i>mean overall SIRS score: 0.7</i>
	CEM 999	Doctoral Dissertation Research
<i>Spring 2019</i>	CEM 913	Energy Conversion Processes in Inorganic Materials <i>mean overall SIRS score:</i>
	CEM 999	Doctoral Dissertation Research
<i>Spring 2020</i>	CEM 311	Inorganic Chemistry <i>mean overall SIRS score: 1.1</i>

	CEM 999	Doctoral Dissertation Research
<b>Fall 2020</b>	CEM 311	Inorganic Chemistry <i>mean overall SIRS score: 1.3</i>
	CEM 999	Doctoral Dissertation Research
<b>Spring 2021</b>	CEM 913	Energy Conversion Processes in Inorganic Materials <i>mean overall SIRS score: N/A</i>
	CEM 999	Doctoral Dissertation Research
<b>Fall 2021</b>	CEM 311	Inorganic Chemistry <i>mean overall SIRS score: N/A</i>
<b>Fall 2022</b>	CEM 181H	General Chemistry, Honors
<b>Fall 2023</b>	CEM 181H	General Chemistry, Honors

**ADVISING** *Graduated 14 PhD students*

**Current Graduate Students** *Expected Graduation*

Eric Firestone	Fall 2023
Chuan-Pin Chen	Fall 2023
Samhita Kaushik	Spring 2024
Soumik Das	Spring 2024
Oluwafemi Abubakar	Spring 2026
Xiaoyin Zhang	Spring 2026
Muhammad Abubakar	Spring 2027
Chellammal Rajendran	Spring 2027

**Former Graduate Students**

Austin Raithel	Ph.D. Winter 2021
Prabodha Balapuwaduge	MS Spring 2022
Parisa Shadabipour	Ph.D. Summer 2020
Shane Jackowski	MS Spring 2020
Yujue Wang	Ph.D. Fall 2019 Chemist at Intel
Faezeh Habib Zadeh	Ph.D. Spring 2019 Postdoc with Berlinguette Group UBC
Hamed Najafabadi	Ph.D. Summer 2018

	Chemist at Tokyo Electron
Josh Baillargeon	Ph.D. Winter 2018 Chemist at Tokyo Electron
Yuan Gao	Ph.D. Summer 2017
Dhritabrata Mandal	Ph.D. Summer 2017 Engineer at Intel
Daniel Little	Ph.D. Spring 2017 Assistant Professor, Ohio Dominican University
Yuling Xie	Ph.D. Fall 2015 Senior Analytical Chemist, Avomeen
Omid Zandi	Ph.D. Fall 2015 Research Scientist/Technology Developer at Tokyo Electron
Kelley Young	Ph.D. Spring 2015 Teaching Professor at Notre Dame
Ben Klahr	Ph.D. Spring 2013 Research Analyst, CNA Corporation
Jesse Ondersma	Ph.D. Fall 2012 Chemistry Team Leader at Intertek

***Former Postdoctoral Researchers***

Dr. Suzanne Miller	05/2020 – 02/2023
Dr. Tea Yon Kim	03/2018 – 05/2021
Dr. Chenjia Mi	09/2019 – 06/2022
Dr. Geletu Qing	03/2017 – 03/2019
Dr. Qiong Wang	01/2016 – 08/2017
Dr. Arianna Savini	04/2014 – 05/2016
Dr. Jorge Rossero	06/2014 – 05/2015
Dr. Suraj Soman	12/2011 – 03/2014
Dr. Jason Thornton	10/2012 – 11/2013
Dr. Reenamole Georgekutty	3/15/2010 – 3/14/2012

***Undergraduate Students***

N/A



### ***Former Undergraduate Students***

Emily Kochan	Spring 2017, Spring 2018
Abe Schon	Summer 2015, Summer 2016, Summer 2017
Dillon Edwards	Fall 2013 – Spring 2016
Travis Belknap	Summer 2016
Evan Lipsitze	Spring 2015
Brad Yurgens	Spring 2012 – Spring 2014
Stephanie Schmidt	Spring 2012 – Fall 2013
Christopher Tempas	Fall 2011 – Spring 2012
Trevor Steil	Spring 2011
Justin McComb	Spring 2010
Hali Sobczak	Spring 2009 – Fall 2010

### ***High School Students***

Anthony Shinn	6/1/2013 – 10/1/2014
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### ***Graduate Student Guidance Committees (students in other groups)***

Shruthi T. Kumar Raj, 2016 –	Lisa Janes, 2016 –
Karl Nielsen, 2016 –	Mona Ashtiani, 2016 –
Jonathan Yarranton, 2014 –	Michael Esch, 2015 –
Yang Chen, 2014 – 2016	Kelley Aldrich, 2014 –
Zhihui Liu, 2013 –	Xiaoran Zhang, 2013 –
Monica Carey, 2013 –	Shannon Kraemer, 2012 – 2016
Mersedeh Saniepay, 2012 – 2018	Chumpung Jiang, 2012 – 2017
Bin Guo, 2012 – 2016	Stephen Baumler, 2011 – 2017
Jeffrey Sayen, 2011 – 2014	Poulami Dutta, 2011 – 2016
Yan Zhu, 2010 –	Yueli Liu, 2010 – 2015
Behnaz Ghaffari, 2010 – 2017	Greg Spahlinger, 2009 – 2014
Jenny Miller, 2009 – 2018	Eileen Dixon, 2008 – 2015
Colin Blakely, 2009 – 2013	Shaun Bruno, 2009 – 2013
Yo-Yuan Cheng, 2008 –	Seth Hogg 2008 – 2013
Allison Brown, 2005 – 2013	Jon Kiel, 2005 – 2010
Hua Shao, 2004 – 2009	Lisa Harlow, 2006 – 2014

**UNIVERSITY  
SERVICE**

- Chair of Faculty Advisory Committee (FAC) 2022 – 2023
- Chair of Inorganic Chemistry faculty search committee, 2022
- Faculty Senator, 2021 – present
- Faculty Council, 2021 – present
- College of Natural Science, *ad hoc* committee to increase transparency and DEI considerations and COVID-19 impact on promotion, reappointment and tenure, 2021 – 2022
- Department Chair search committee member, 2019 – 2020
- College of Natural Science Associate Dean search committee member, 2019
- Rogerson Endowed Professorship in Chemical Engineering search committee member, 2019–2020
- Diversity, Equity, Inclusion Committee member 2019–2020
- Chair of Inorganic Chemistry faculty search committee, 2017–2018
- Director Core-CM; 2018–2022
- Served on Office of the Vice President for Research and Graduate Studies SPG review panels; 2011, 2020, 2021
- Inorganic Seminar Coordinator; 2009–2010, 2011–2012, 2013–2017
- NSF panel discussion with grant consultant Heidi Smith-Parker 2017
- Chair Advisory Committee; 2008–2010, 2013–2016
- Department Chair search committee member, 2015–2016
- Graduate Admissions committee; 2009 – 2011, 2013 – 2017
- Reappointment and Promotions committee; 2013
- University Appeals Board; 2009–present
- Education Policy committee; 2011–2013
- Core-CM Seminar co-organizer; fall 2013, spring 2017
- University Planning Discussion, 2/2012
- MSU representative at Graduate School Forum at the Philadelphia Section of the ACS

**PROFESSIONAL  
OUTREACH**

- Co-organizer of “Photocatalysts, Photoelectrochemical Cells, and Solar Fuels 14” ECS symposium; Honolulu, HI
- 2023 Review board member of CHASE, a DOE solar fuels hub

- Organizer of 2020 International Conference on Solar Fuels; NanoGe  
Barcelona, Spain
- Organizer of “Electrocatalysis for Sustainable Energy” symposium  
2020 ACS Regional Meeting, CERM, in Columbus Ohio  
\*cancelled due to COVID-19
- Organizer of 2014 International Conference on New Advances in  
Materials Research for Solar Fuels Production; Montreal, CA
- Associate Editor, ACS Applied Materials and Interfaces, 2017 -  
present
- ACS Local Section Chair; 1/2010 – 1/2011
- Presented in a featured discussion panel, Michigan State University  
Science Festival, 4/19/2015
- NSF Reviewer and Panelist:  
Small Business Innovation Research, Photovoltaics  
Phase I, 2010 & 2011 and Phase II, 2012  
CHE – Macromolecular / Supramolecular / Nanochemistry, 2009  
CHE – Chemical Synthesis, 2012  
CBET – Electrocatalysis, 2014  
CHE – Chemical Catalysis, 2014  
CHE – Chemical Catalysis, 2015  
CBET – Electrocatalysis, 2019
- ARMY *ad hoc* reviewer of multiple proposals
- DOE BES *ad hoc* Reviewer, 2014 – present
- Invited Reviewer for the Israel Strategic Alternative Energy  
Foundation, 2012
- Invited Reviewer for Research Corporation, 2012 & 2013
- Invited Reviewer for Canada Research Chairs Program 2014
- Invited Reviewer for Polish National Science Center 2015
- Invited Reviewer for Kentucky Science & Engineering Foundation,  
2016
- Guest editor for International Journal of Photoenergy; 2011
- Founder and host of the MSU Science Café 2010-12
- Reviewer of >200 articles for multiple top-tier journals including  
Science, Nature, Nature Materials, Nature Chemistry JACS,  
Chemical Science, Energy and Environmental Science, ACS  
Nano, Nanoletters, etc.

**PROFESSIONAL  
AFFILIATIONS**

American Chemical Society  
Materials Research Society  
Society for Electroanalytical Chemistry  
Electrochemical Society  
Inter-American Photochemical Society