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Talia Loewen, Ph.D.

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Professional Profile

Dr. Loewen is an inorganic chemist by training, specializing in air-free synthetic small molecule synthesis, characterization, and electrochemistry. She is experienced with numerous characterization techniques including FTIR, GC-MS, CT, NMR, UV/Vis, and single molecule X-Ray diffractometry.

Dr. Loewen has also applied electrochemical techniques such as cyclic voltammetry, differential pulse voltammetry, and controlled potential and controlled current electrolysis to assess catalyst performance for energy storage applications.

At Exponent, she leverages her fundamental electrochemistry knowledge and characterization experience to address problems in multiple industries, including energy storage systems, where she assesses the quality, performance, and failure of batteries for a broad spectrum of applications. She also supports a variety of consumer product industries by using analytical techniques to identify contaminants and evaluate chemical contributions to the failures of polymeric materials.

Prior to joining Exponent, Dr. Loewen developed in situ FTIR spectroelectrochemical methods for detecting highly reactive catalytic intermediates, and studied fundamental catalyst structure-property relationships to gain deep mechanistic understanding of selective electrocatalytic CO2 reduction.

Academic Credentials & Professional Honors

Ph.D., Chemistry, University of California, Davis, 2019

B.A., Chemistry, Williams College, 2012

B.A., Anthropology, Williams College, 2012

Publications

Loewen, N. D.; Pattanayak, S.; Herber, R.; Fettinger, J. C.; Berben, L. A. “Quantification of the Electrostatic Effect on Redox Potential by Positive Charges in a Catalyst Microenvironment” J. Phys. Chem. Lett. 2021, 12, 3066-3073

Berben, L. A.; Loewen, N. D. “Group 7 and 8 Catalysts for Electrocatalytic CO2 conversion”. In Comprehensive Coordination Chemistry, Vol. III; Parkin, G., Ed.; Elsevier, 2021; pp 742-773

Loewen, N. D.; Berben, L. A. “Secondary Coordination Sphere Design to Modify Transport of Protons and CO2” Inorg. Chem. 2019, 58, 16849 - 16857

Berben, L. A.; Loewen, N. D. “Control of Substrates Beyond the Catalyst Active Site” ACS Cent. Sci. 2019, 5, 1485-1487

Loewen, N. D.*; Taheri, A.*; Cluff, D. B.; Berben, L. A. “Considering a Possible Role for [H-Fe4N(CO)12]2- in Selective Electrocatalytic CO2 Reduction to Formate by [Fe4N(CO)12]-” Organometallics 2018, 37, 1087-1220 (Selected for cover article) * equal contributions

Loewen, N. D.; Neelakantan, T.; Berben, L. A. “Renewable Formate from C-H Bond Formation with CO2: Using Iron Carbonyl Clusters as Electrocatalysts” Acc. Chem. Res. 2017, 50, 2362-2370

Loewen, N. D.; Thompson, E. J.; Kagan, M.; Banales, C. L.; Myers, T. W.; Fettinger, J. C.; Berben, L. A. “A Pendant Proton Shuttle on [Fe4N(CO)12]- Alters Product Selectivity in Formate vs. H2 Production via the Hydride [H-Fe4N(CO)12]-” Chem. Sci. 2016, 7, 2728-2735

Ghiassi, K. B.; Walters, D. T.; Aristov, M. N.; Loewen, N. D.; Berben, L. A.; Rivera, M.; Olmstead, M. M.; Balch, A. L. “Formation of a Stable Complex, RuCl2(S2CPPh3)(PPh3)2, Containing an Unstable Zwitterion from the Reaction of RuCl2(PPh3)3 with Carbon Disulfide” Inorg. Chem. 2015, 54, 4565-4573

Presentations

Loewen, N. D.; Taheri, A. T.; Berben, L. A. "Exploring new reactivities of [Fe4N(CO)12]-". Organometallic Chemistry Gordon Research Seminar, 2018. Oral Presentation.

Loewen, N. D.; Taheri, A. T.; Carr, C. R.; Berben, L. A. “Directing CO2 reduction towards commodity fuels: Mechanistic insights from ligand design.” International Solar Fuels Conference 2, 2017. Poster presentation.

Loewen, N. D.; Berben, L. A. “Selective H2 or formate production from CO2 and water: Mechanistic insights achieved from ligand design”. 253rd ACS National Meeting, 2017. Oral presentation.

Loewen, N. D.; Thompson, E. J.; Kagan, M.; Myers, T. W.; Fettinger, J. C.; Berben, L. A. “Selective substrate activation by functionalized iron carbonyl clusters: CO2 vs H+ reduction.” Metallocofactors Gordon Research Conference, 2016. Poster presentation.

Loewen, N. D.; Thompson, E. J.; Kagan, M.; Banales, C. L.; Myers, T. W.; Fettinger, J. C.; Berben, L. A. “Electrocatalytic H2 production is favored over formate production by including a proton shuttle on [Fe4N(CO)12]-.” 251st ACS National Meeting, 2016. Oral presentation.

Loewen, N. D.; Kagan, M.; Thompson, E. J.; Myers, T. W.; Berben, L. A. “Electrocatalytic proton and CO2 reduction using a series of iron carbonyl clusters.” 248th ACS National Meeting, 2014. Poster presentation.