

Molly MacInnes

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Education

Oberlin College

Bachelor of Arts in chemistry received in *May 2013*

GPA: 3.53/4.00

GPA in major: 3.50/4.00

Graduated with honors

Advisor: Dr. Jesse Rowsell

Thesis: *Progress Toward the Synthesis of New Organosulfonate Complexes from the Commodity Chemical H-Acid for the Assembly of Microporous Frameworks*

University of Michigan

Ph.D. program (chemistry) *September 2015 – present*

GPA: 4.00/4.00

Advisors: Dr. habil. Nicolai Lehnert and Dr. Stephen Maldonado

Thesis: *Molecular Materials for Electrochemical Energy Conversion and Storage*

Skills

Laboratory: Inert atmosphere glovebox, Schlenk line, electrochemistry and photoelectrochemistry, Raman and micro-Raman spectroscopies, thermogravimetric analysis (TGA), column chromatography, mass spectrometry (MS), atomic force microscopy (AFM), scanning electron microscopy (SEM), x-ray photoelectron spectroscopy (XPS), Rigaku PXRD, Varian and Bruker NMR spectroscopy, IR spectroscopy, UV-Vis spectroscopy

Software: Microsoft Office (Word, Excel, Powerpoint), Origin, Adobe Illustrator, CasaXPS, CH Instruments software, Anasys Studio, Gwyddion, CasaXPS, DigiElch, database research (esp. Scifinder, Cambridge Structural Database, Web of Knowledge)

Language: English (first language), German (intermediate, B2 level)

Employment

Graduate Student Instructor at the University of Michigan *Sept. 2015 – April 2017*

Taught discussion (recitation) sections for an undergraduate general chemistry course and taught an undergraduate organic laboratory and an introductory chemistry laboratory

Substitute teacher in Michigan Public Schools (K-12) *Feb. 2015 – June 2015*

Worked as a substitute teacher for grades kindergarten through 12th in the public schools of Calhoun and Eaton counties of Michigan

Chemistry instructor at the Interlochen Arts Academy *Sept. 2014 – Dec. 2014*

Taught high school and AP-level chemistry to students in 10th-12th grades for one semester as a maternity leave substitute

Chemistry tutor at Oberlin College *Feb. 2012 – May 2013*

Tutored students in general and organic chemistry courses, one-on-one and in groups

Leadership and Volunteer Experience

Graduate Employee Organization chemistry steward *Feb. 2018 – present*

Acted as a representative for the chemistry department in the graduate student labor union at the University of Michigan (University of Michigan GEO). As a steward, I attended

biweekly meetings, organized events, promoted membership within the department, and ran new chemistry graduate student orientation presentations for the union.

F.E.M.M.E.S. after school events coordinator *April 2017 – present*
F.E.M.M.E.S. is a group at the University of Michigan that organizes capstone events at the university and after school events at regional elementary schools in which 4th and 5th grade girls participate in demos and activities relating to STEM.

Karle Symposium organizing committee *Feb. – August 2017*
University of Michigan annual chemistry symposium designed and run by graduate students. Was a member of the publicity subcommittee for one year.

F.E.M.M.E.S. volunteer *Oct. 2016 – March 2017*
Volunteered at the capstone events hosted at U of M

Science Olympiad Coach, Potions division *Feb. 2016 – May 2016*
Martin Luther King Junior Elementary School, Ann Arbor, MI
Grades 4-5

Treasurer of the Chemistry Majors Committee (Oberlin College) *Sept. 2012 – May 2013*
Vice president of the Oberlin College Equestrian Team *Sept. 2012 – May 2013*
Secretary of the Oberlin College Equestrian Team *Sept. 2011 – May 2012*

Laboratory and Research Experience

University of Michigan graduate student researcher *Sept. 2015 – present*
- Electrochemistry and photoelectrocatalysis, specifically for proton reduction using gallium phosphide and silicon as semiconductor electrodes and molecular cobalt catalysts.
- Carbon surfaces, esp. reduced graphene oxide and graphene oxide synthesis, characterization, and functionalization.

DAAD RISEpro intern with BASF SE in Ludwigshafen, Germany *July 2013 – Dec. 2013*
- Organic synthetic chemistry research for organic photovoltaics, specifically hole transport materials

Senior honors project in chemistry *Sept. 2012 – May 2013*
- Yearlong laboratory research project concluding with a written thesis, presentation, and defense. Research involved synthetic inorganic chemistry probing four-coordinate boron centers

SULI Fellowship intern at Los Alamos National Laboratory *Summer 2011 and Summer 2012*
- Two consecutive summer internships involving inorganic synthesis of lanthanide and uranyl coordination compounds.
- Trained in air-sensitive and nuclear chemistry
- Worked under Stosh Kozimor in the Chemistry Division

Teaching assistant for chemistry laboratory class at Oberlin College *Feb. 2011 – May 2011*
- Taught introductory chemistry lab. Graded lab reports, prepped labs, monitored and helped students during class.

Chemistry laboratory assistant at Oberlin College *Sept. 2010 – Dec. 2010*
- Prepared solutions and equipment for laboratory classes

Presentations

“Molecular catalyst grafting to electrode surfaces using RGO thin films.” Poster presentation at Ohio Inorganic Weekend, Ohio University in Athens, OH *November 2018*

“Catalyst immobilization on electrode surfaces using RGO thin films.” Poster presentation at the Karle Symposium, University of Michigan, Ann Arbor, MI *August 2018*

- “Molecular immobilization on carbon materials.” Oral presentation at the 3rd Molecules and Materials for Artificial Photosynthesis conference in Cancun, Mexico *March 2018*
- “Heterogeneous photoelectrocatalytic proton reduction at a modified gallium phosphide surface.” Poster presentation at Ohio Inorganic Weekend, The Ohio State University *November 2017*
- “Graphitic surfaces for small molecule functionalization of semiconductors.” Poster presentation at the national American Chemical Society conference, Washington DC *August 2017*
- “Insights into the reduction of graphene oxide and its use as an electrode coating.” Oral presentation at the Karle Symposium, University of Michigan, Ann Arbor, MI *August 2017*
- “Graphitic surfaces for small molecule functionalization of semiconductors.” Poster presentation at the American Vacuum Society Michigan Chapter symposium, University of Michigan, Ann Arbor, MI *May 2017*
- “Graphitic surfaces for small molecule functionalization of semiconductors.” Poster presentation at the Detroit Electrochemical Society Section poster session, Arbor Brewing Company, Ypsilanti, MI *May 2017*
- “Graphitic thin films for small molecule functionalization of semiconductor surfaces.” Oral presentation at Albion College, Albion, MI *December 2016*
- “Graphitic surfaces for small molecule functionalization of semiconductors.” Poster presentation at Ohio Inorganic Weekend, University of Akron, Ohio *November 2016*
- “Graphitic surfaces for small molecule functionalization of semiconductors.” Poster presentation at the Karle Symposium, University of Michigan, Ann Arbor, MI *July 2016*
- Department seminar presentation at BASF *October 2013*
Oral presentation of internship research to the OPV and OLED chemistry research departments at BASF.
Presented in German.
- “Progress Toward the Synthesis of New Organosulfonate Complexes from the Commodity Chemical H-Acid for the Assembly of Microporous Frameworks.” Honors defense at Oberlin College, Oberlin, OH *May 2013*
Defended thesis to a chemist from an outside institution
- “Dithiophosphinates as an approach to the separation of actinides and lanthanides.” Oral presentation at the national American Chemical Society conference in New Orleans *April 2013*
- “Progress Toward the Synthesis of New Organosulfonate Complexes from the Commodity Chemical H-Acid for the Assembly of Microporous Frameworks.” Oral presentation at the Cleveland Chapter of the ACS Meeting in Miniature, Cleveland State University, Cleveland, OH *February 2013*
- “Dithiophosphinates as an approach to the separation of actinides and lanthanides.” Poster presentation at the Los Alamos National Laboratory summer student symposium *August 2012*

Awards and Recognition

- Poster presentation award at the University of Michigan Karle Symposium *August 2018*
- Short talk award at the 3rd Molecules and Materials for Artificial Photosynthesis conference *March 2018*
- Student talk award at the University of Michigan Karle Symposium *August 2017*
- National Science Foundation Graduate Research Fellowship awardee *April 2017*
- Poster presentation award at the University of Michigan Karle Symposium *July 2016*
- ACS Undergraduate Award in Inorganic Chemistry *June 2013*
- Graduated with honors from Oberlin College *May 2013*

American Chemical Society recognized bachelor's degree in chemistry May 2013
Oberlin College award for inorganic chemistry May 2013
Member of Sigma Xi May 2013 – present
Cleveland Section of the American Chemical Society Meeting in Miniature oral presentation award March 2013
Los Alamos National Laboratory Summer Student Symposium poster presentation award for the chemistry division August 2012

Publications

- Lancaster, M.; Mow, R.; Liu, J.; Cheek, Q.; **MacInnes, M. M.**; Al-Jassim, M.; Deutsch, T.; Young, J.; Maldonado, S. "Protection of GaInP₂ Photocathodes by Direct Photoelectrodeposition of MoS_x Thin Films." *ACS Appl. Mater. Interfaces*. Manuscript in review.
- MacInnes, M. M.**; Cousineau, B. R.; Youngs, S. M.; Sinniah, K.; Reczek, J. J.; Maldonado, S. "Discovery of Unusually Stable Organic-Radical Species through Hierarchical Supramolecular Design." *Angew. Chem. Int. Ed.* Manuscript in review.
- Hlynchuk, S.; **MacInnes, M. M.**; and Maldonado, S. "Sensitization of p-GaP by physisorbed triarylmethane dyes." *J. Phys. Chem.* **2018**, 122, 20073-20082
- MacInnes, M. M.**; Hlynchuk, S.; Acharya, S.; Lehnert, N.; Maldonado, S., "Reduction of graphene oxide thin films by cobaltocene and decamethylcobaltocene." *ACS Appl. Mater. Inter.*, **2018**, 10, 2004-2015.
- Eady, S. C.; **MacInnes, M. M.**; Lehnert, N. "Immobilized Co-bis(benzenedithiolate) complexes: exceptionally active heterogeneous electrocatalysts for dihydrogen production from mildly acidic aqueous solutions." *Inorg. Chem.*, **2017**, 56, 11654-11667
- Eady, S. C.; **MacInnes, M. M.**; Lehnert, N. "A smorgasbord of carbon: electrochemical analysis of cobalt-bis(benzenedithiolate) complex adsorption and electrocatalytic activity on diverse graphitic supports." *ACS Appl. Mater. Interfaces*, **2016**, 8, 23624-23634
- Olson, A. C.; Keith, J. M.; Batista, E. R.; Boland, K. S.; Daly, S. R.; Kozimor, S. A.; **MacInnes, M. M.**; Martin, R. L.; Scott, B. L. "Using solution- and solid-state S K-edge X-ray absorption spectroscopy with density functional theory to evaluate M-S bonding for MS₄²⁻ (M=Cr, Mo, W) dianions." *Dalton Trans.*, **2014**, 43, 17283-17295
- Boland, K. S.; Hobart, D. E.; Kozimor, S. A.; **MacInnes, M. M.**; Scott, B.L. "The coordination chemistry of trivalent lanthanides (Ce, Nd, Sm, Eu, Gd, Dy, Yb) with diphenyldithiophosphinate anions." *Polyhedron*, **2014**, 67, 540-548
- Spencer, L. P.; Yang, P.; Minasian, S. G.; Jilek, Robert E.; Batista, E. R.; Boland, K. S.; Boncella, J. M.; Conradson, S.D.; Clark, D.L.; Hayton, T.W.; Kozimor, S.A.; Martin, R.L.; **MacInnes, M. M.**; Olson, A.C.; Scott, B.L.; Shuh, D.K.; Wilkerson, M.P. "Tetrahalide Complexes of the [U(NR₂)]²⁺: Synthesis, Theory, and Chlorine K-Edge X-ray Spectroscopy." *J. Amer. Chem. Soc.*, **2013**, 135, 2279
- Daly, S. R.; Klaehn, J. R.; Boland, K. S.; Kozimor, S. A.; **MacInnes, M. M.**; Peterman, D. R.; Scott, B. L. "NMR Spectroscopy and Spectral Characterization of Dithiophosphinate Ligands Relevant to Minor Actinide Extraction Processes." *Dalton Trans.*, **2012**, 41, 2163