

# Luyao Ma

2574 Stone Rd. Ann Arbor, MI 48105 | 734-355-1563 | maluyao@umich.edu

---

## Skill Highlights

- Extensive training in materials and analytical chemistry with 8 publications in peer-review journals
- Expertise in electrochemistry with focuses on electrodeposition techniques and battery design
- Strong teamwork and leadership skills cultivated through collaborations and extracurricular activities

## Education

**University of Michigan, PhD in Materials Chemistry, Ann Arbor, MI** **2012-March 2017 (Expected)**

- Cumulative GPA 3.6/4.0

**Nanjing University, Bachelor of Science in Chemistry, Nanjing, China** **2008-2012**

- Cumulative GPA 4.3/5.0 (top 25%);

**National Cheng Kung University, International Exchange Student Program, Tainan, Taiwan** **2009-2010**

- GPA 3.7/4.0 (top 5%)

## Research Experience

**University of Michigan, Department of Chemistry, Graduate Student Research Assistant** **2013-Present**

**Supervisor:** Prof. Stephen Maldonado

- Developed electrochemical processes that reduce production temperature of semiconductor nanowires by 300 °C
- Worked across labs to established a process that integrates Ge microwires directly into Li-ion battery platform
- Mentored 3 undergraduate students to develop nanosphere lithography methods for sub-100 nm patterning

**University of Michigan, Department of Chemistry, Rotation Graduate Student** **2012**

**Supervisor:** Prof. Bart Bartlett

- Synthesized tunnel-structure MnO<sub>2</sub> to be used as cathode material for rechargeable Mg-ion battery

**Nanjing University, National Laboratory of Microstructures, Undergraduate Research Fellow** **2010-2012**

**Supervisor:** Prof. Yi Shi

- Collaborated with teams to fabricate graphene-based materials which increase Li-ion battery capacity threefold

## Technical Skills

- Characterized the morphology, chemical composition and crystallinity of nanomaterials using electron microscopy techniques including **SEM, TEM, STEM, EDS** and **EBSD**
- Analyzed the crystallographic and spectroscopic properties of electrodeposited materials using **XRD** and **Raman**
- Investigated the surface morphology and chemistry of materials using **AFM, XPS** and **Auger** spectroscopy
- Conducted cyclic voltammetry (**CV**) and electrodeposition experiments to test redox properties of precursors and grow covalent semiconductor materials

## Publications

1. **Ma, L.**; Fahrenkrug, E.; Gerber, E.; Venable, F.; Crowe, A. J.; Bartlett, B. M.; Maldonado, S., "High-Performance Polycrystalline Ge Microwire Film Anodes for Li Ion Batteries", *ACS Energy Lett.*, **2017**, *2*, 238-243.
2. **Ma, L.**; Lee, S.; DeMuth, J.; Maldonado, S., "Direct Electrochemical Deposition of Crystalline Silicon Nanowires at T ≥ 60° C", *RSC Adv.*, **2016**, *6*, 78818-78825.
3. DeMuth, J.; **Ma, L.**; Fahrenkrug E.; Maldonado, S., "Electrochemical Liquid-Liquid-Solid Deposition of Crystalline Gallium Antimonide", *Electrochim. Acta*, **2016**, *197*, 353-361.
4. **Ma, L.**; Gu, J.; Fahrenkrug, E.; Maldonado, S., "Electrochemical Liquid-Liquid-Solid Deposition of Crystalline Ge Nanowires as a Function of Ga Nanodroplet Size", *J. Electrochem. Soc.*, **2014**, *161*, 7, D3044-D3050.

# Luyao Ma

2574 Stone Rd. Ann Arbor, MI 48105 | 734-355-1563 | maluyao@umich.edu

---

5. Zheng, M.; Qiu, D.; Zhao, B.; **Ma, L.**; Wang, X.; Lin, Z.; Pan, L.; Zheng, Y.; Shi, Y., "Mesoporous iron oxide directly anchored on a graphene matrix for lithium-ion battery anodes with enhanced strain accommodation", *RSC Adv.*, **2013**, *3*, 699-703.
6. Qiu, D.; **Ma, L.**; Zheng, M.; Lin, Z.; Zhao, B.; Wen, Z.; Hu, Z.; Pu, L.; Shi, Y., "MnO nanoparticles anchored on graphene nanosheets via in situ carbothermal reduction as high-performance anode materials for lithium-ion batteries", *Mater. Lett.*, **2012**, *84*, 9-12.
7. Wang, K.; Geng Z.; Zheng, M.; **Ma, L.**; Ma, X.; Wang, Z., "Controllable Fabrication of Coordination Polymer Particles (CPPs): A Bridge between Versatile Organic Building Blocks and Porous Copper-Based Inorganic Materials", *Cryst. Growth Des.*, **2012**, *12*, 5606-5614.
8. Shen, C.; **Ma, L.**; Zheng, M.; Zhao, B.; Qiu, D.; Pan, L.; Cao, J.; Shi, Y., "Synthesis and electrochemical properties of graphene-SnS<sub>2</sub> nanocomposites for lithium-ion batteries", *J. Solid State Electrochem.*, **2012**, *16*, 1999-2004.

## Presentation Highlights

- **Karle Research Symposium**, Ann Arbor, MI **2016**  
Ge Microwire Li-ion Battery Anode Prepared by the ec-LLS Process (Poster, **recipient of PPG Poster Award**)
- **The International Chemical Congress of Pacific Basin Societies (Pacifichem)**, Honolulu, HI **2015**  
Electrodeposition of crystalline Si nanowires at low temperatures (Poster)
- **Michigan Green Chemistry & Engineering Conference**, Ann Arbor, MI **2015**  
Direct Electrodeposition of Nanostructured Si at Low Temperatures (Oral, **greenUp invited speaker**)
- **ECS and SMEQ Joint International Meeting**, Cancun, Mexico **2014**  
Template-Assisted Electrochemical Liquid-Liquid-Solid Deposition of Crystalline Ge Nanowires (Oral)

## Awards

- ◆ **Department of Chemistry Winter Term Fellowship (1 recipient per group)** **2016**
- ◆ **Rackham Graduate Student Research Grants** **2015**
- ◆ **Hersbit Chemical Corporation Scholarship (1 recipient/20 applicants)** **2009**
- ◆ **People's Scholarship for Outstanding Academic Performance (top 20%)** **2008**

## Case Study Experience

- Dow Case Study, Participant**, Ann Arbor, Michigan **2016**
  - Presented feasible solutions to a plant fouling issue in the palladium catalyzed telomerization of butadiene
  - Communicated with Dow scientists and engineers frequently during case study to gain insight into industrial research
- McKinsey Insight Asia Pacific Program, Participant** (30 participants/500 applicants), Chicago, Illinois **2016**
  - Solved a tech-transfer case using problem solving loop and issue trees for qualitative and quantitative analysis
  - Conducted case study in teams under the guidance of McKinsey consultants and cultivated a business acumen

## Outreach & Leadership Experience

- Chemistry Aligned with Life & Career at UofM (CALC|UM), Student Organizer**, Ann Arbor, Michigan **2015-present**
  - Collaboratively organized seminars and workshops aiming at improving students' 'soft' skills
  - Inspired students to learn about industry careers by coordinating presentations by alumni speakers
- Nanjing University Summer Volunteer Program, Team Leader**, Nanjing, China **2009**
  - Led a ten-person team to investigate Cancer Villages in China by interviewing patients and analyzing contaminants
  - Co-authored the report about the effect of carcinogen in groundwater from industrial waste on rural population