

Maxwell D. Radin

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University of California, Santa Barbara
Materials Department
Santa Barbara, CA 93106

EDUCATION

University of Michigan, Ann Arbor

PhD, Physics (2014)

GPA: 4.0 (4.3 system)

Advisor: Prof. Donald J. Siegel (Mechanical Engineering)

Dissertation: *First-principles and continuum modeling of charge transport in Li-O₂ batteries*

University of California, Irvine

Bachelor of Science, Physics, *magna cum laude* (June 2009)

GPA: 3.9 (4.0 system)

Regent's Scholarship (2005-2009)

Campuswide Honors Program (2005-2009)

Coursera

- *Data Visualization and Communication with Tableau* (Duke University, 2016)
- *Introduction to UI Design* (University of Minnesota, 2017)
- *User Research and Design* (University of Minnesota, 2017)

APPOINTMENTS

Postdoctoral Scholar

Materials Department, University of California, Santa Barbara

November 2014 to present

Advisor: Prof. Anton Van der Ven

- Used first-principles simulations to study the physics of Li-ion battery materials, published in four first-author articles.
- Implemented new features for modeling electronic and vibrational degrees of freedom in the Clusters Approach to Statistical Mechanics software package (Python/C++).

Computational Chemistry and Materials Science Summer School Intern

Lawrence Livermore National Laboratory

June to August 2012

Advisors: Dr. Brandon Wood and Dr. Tadashi Ogitsu

- Developed a formalism for modeling how quantum effects influence the performance of electric double-layer capacitors.

PUBLICATIONS

18. **M.D. Radin**, and A. Van der Ven. **Chem. Mater.** In press. *Simulating charge, spin, and orbital ordering: application to Jahn-Teller distortions in layered transition-metal oxides*. Manuscript available upon request.
17. D. Samuel, C. Steinhäuser, J.G. Smith, A. Kaufman, **M.D. Radin**, J. Naruse, H. Hiramatsu, and D.J. Siegel. **ACS Appl. Mater. Interfaces**. DOI: 10.1021/acsami.7b15547 [Ion Pairing and Diffusion in Magnesium Electrolytes Based on Magnesium Borohydride](#).
16. **M.D. Radin**, J. Alvarado, Y. Shirley Meng, A. Van der Ven. **Nano Lett.** DOI: 10.1021/acs.nanolett.7b03989. [Role of crystal symmetry in the reversibility of stacking-sequence changes in layered intercalation electrodes](#).
15. **M.D. Radin**, S. Hy, M. Sina, C. Fang, H. Liu, J. Vinckeviciute, M. Zhang, M.S. Whittingham, Y.S. Meng, A. Van der Ven (2017), **Adv. Energy Mater.** 160288. [Narrowing the Gap Between Theoretical and Practical Capacities in Li-ion Layered Oxide Cathode Materials](#).
14. J. Vinckeviciute, **M.D. Radin**, A. Van der Ven (2016). **Chem. Mater.** 28, 8640-8650. [Stacking-sequence changes and Na ordering in layered intercalation materials](#).
13. **M.D. Radin**, A. Van der Ven (2016). **Chem. Mater.** 28, 7898-7904. [Stability of Prismatic and Octahedral Coordination in Layered Oxides and Sulfides Intercalated with Alkali and Alkaline-Earth Metals](#).
12. N.M. Trease, I.D. Seymour, **M.D. Radin**, H. Liu, H. Liu, S. Hy, N. Chernova, P. Parikh, A. Devaraj, K.M. Wiaderek, P.J. Chupas, K.W. Chapman, M.S. Whittingham, Y.S. Meng, A. Van der Ven, C.P. Grey (2016). **Chem. Mater.** 28, 8170-8180. [Identifying the Distribution of Al³⁺ in LiNi_{0.8}Co_{0.15}Al_{0.05}O₂](#).
11. **M.D. Radin**, and C.W. Monroe, D.J. Siegel (2015). **J. Phys. Chem. Lett.** 6, 3017-3022. [Impact of Space-Charge Layers on Sudden Death in Li/O₂ Batteries](#).
10. **M.D. Radin**, T. Ogitsu, J. Biener, M. Otani, B.C. Wood (2015). **Phys. Rev. B** 91, 125415. [Capacitive charge storage at an electrified interface investigated via direct first-principles simulations](#).
9. N. Kumar, **M.D. Radin**, B.C. Wood, T. Ogitsu, D.J. Siegel (2015). **J. Phys. Chem. C** 119, 9050-9060. [Surface-Mediated Solvent Decomposition in Li-Air Batteries: Impact of Peroxide and Superoxide Surface Terminations](#).
8. **M.D. Radin**, D.J. Siegel (2015). [Non-aqueous metal-oxygen batteries: past, present, and future](#). In *Rechargeable Batteries: Materials, Technologies and New Trends*, Springer, Z. Zhang and S. Zhang (eds.)
7. **M.D. Radin**, C.W. Monroe, D.J. Siegel (2014). **Chem. Mater.** 27, 839-847. [How dopants can enhance charge transport in Li₂O₂](#).
6. F. Tian, **M.D. Radin**, D.J. Siegel (2014). **Chem. Mater.** 26, 2952-2959. [Enhanced charge transport in amorphous Li₂O₂](#).

5. J. Nanda, S.K. Martha, W.D. Porter, H. Wang, N.J. Dudney, **M.D. Radin**, D.J. Siegel (2014). **J. Power Sources** 251, 8-13. [Thermophysical properties of LiFePO₄ cathodes with carbonized pitch coatings and organic binders: Experiments and first-principles modeling.](#)
4. **M.D. Radin**, D.J. Siegel (2013). **Energy Environ. Sci.** 6, 2370-2379. [Charge transport in lithium peroxide: Relevance for rechargeable metal-air batteries.](#)
3. **M.D. Radin**, F. Tian, D.J. Siegel (2012). **J. Mater. Sci.** 47, 7564-7570. [Electronic structure of Li₂O₂ {0001} surfaces.](#)
2. **M.D. Radin**, J.F. Rodriguez, F. Tian, and D.J. Siegel (2012). **J. Am. Chem. Soc.** 134, 1093-1103. [Lithium Peroxide Surfaces Are Metallic, While Lithium Oxide Surfaces Are Not.](#) M. Troy; G. Chanan, S. Michaels; R. Bartos, G. Bothwell, A. Give'on, R. Hein, M.D. Radin; J. Roberts, J.M. Rodgers, L.M. Scherr, B.-J. Seo, D. Zimmerman. (2008). **Proc. SPIE** 7012. [A conceptual design for the Thirty Meter Telescope alignment and phasing system.](#)

AWARDS

- ProQuest Distinguished Dissertation Award (2015).
- 1st place, Univ. of Michigan Energy Institute Symposium Poster Session (2013).
- Honorable mention NSF Graduate Research Fellowship Program (2011).
- UC Irvine Chancellor's Award for Excellence in Undergraduate Research (2009).
- UC Irvine Dept. of Physics Herbert H. Chen Award (2009).

PRESENTATIONS

12. **2017 Materials Research Society (MRS) Fall Meeting.** *Method for Modeling Spin, Orbital and Charge Ordering and Application to Jahn-Teller Distortions in Layered Battery Materials.* Nov. 26-Dec. 1, 2017, Boston, MA.
11. **Southern California Electrochemical Energy Storage Alliance.** *The coupling between mechanics and intercalation chemistry in layered battery materials.* Oct. 24, 2017, Santa Barbara, CA.
10. **U.S. Dept. of Energy 2017 EFRC-Hub-CMS PI Meeting.** *The Materials Physics of Lithium (De)intercalation in Layered Oxide Cathodes.* July 24-25, 2017, Washington, D.C.
9. **Southern California Electrochemical Energy Storage Alliance.** *Trends in layered intercalation compounds: insights from atomistic simulation.* Oct. 14, 2016, Santa Barbara, CA.
8. **Telluride Science Research Center Workshop: Interfacial Chemistry and Charge Transfer for Energy Storage and Conversion (invited).** *Effective Hamiltonians for double layers at crystalline interfaces.* July 25-29, 2016, Telluride, CO.

7. **228th Electrochemical Society (ECS) Meeting.** *Mesoscale Modeling of Phase Transformations in Layered Intercalation Materials.* Oct. 11-15, 2015, Phoenix, AZ.
6. **2016 Materials Research Society (MRS) Fall Meeting.** *High-Throughput Analysis of Layered Oxide and Sulfide Battery Materials.* Nov. 27-Dec. 2, 2016, Boston, MA.
5. **246th American Chemical Society (ACS) National Meeting & Exposition.** *First-principles Modeling of Charge Transport in Li-air Batteries.* Sept. 8-12, 2013, Indianapolis, IN.
4. **2012 Materials Research Society (MRS) Fall Meeting & Exhibit.** *First-principles Modeling of Charge Transport in Li-air Batteries.* Nov. 25-30, 2012 Boston, MA.
American Physical Society (APS) March Meeting. *First-principles modeling of Li-air battery materials.* March 21-25, 2011, Dallas, TX.
3. **17th U.S. National Congress on Theoretical & Applied Mechanics.** *Charge transport in lithium peroxide: relevance for rechargeable metal-air batteries.* June 15-20, 2014, East Lansing, MI.
2. **U.S.-China Clean Energy Research Center - Clean Vehicle Consortium Annual Meeting.** *First-Principles Modeling of Li-air Batteries.* Aug. 28, 2012, Ann Arbor, MI.
1. **Distinguished Faculty and Graduate Student Seminar.** *First-principles modeling of Li-air battery materials.* Aug. 3, 2011, Ann Arbor, MI.

SERVICE AND MENTORSHIP

- Reviewed manuscripts for materials-chemistry related journals.
 - Journal of the American Chemical Society
 - Chemistry of Materials
 - Energy and Environmental Science
 - npj Computational Materials
 - Advanced Materials
 - ACS Applied Materials & Interfaces
 - Energies
 - Journal of Molecular Structure
- Mentored a PhD student at UC Santa Barbara, who published her calculations in a first-author paper with a second first-author paper in preparation.
- Volunteered to judge for Santa Barbara County Science Fair (2016, 2017).
- Mentored an undergraduate student through the University of Michigan Summer Undergraduate Research in Engineering program.
- Mentored a high-school student through the Michigan Mentorship Program (2010).
- Volunteered for the University of Michigan Physics Olympiad (2010).
- Engaged in outreach through the UC Irvine Physics Roadshow.

OTHER ACTIVITIES

- Developed Atom 3D, an Android app for visualizing crystals and molecules with 21,000 downloads.
- Developed VASPLAB, an open-source MATLAB library analyzing quantum chemistry calculations with 1,600 downloads.
- Contributed scientific content to crowd-sourced platforms such as Wikipedia, Chemistry Stack Exchange, and Quora.