

Emily V. Carino, Ph.D

Materials Scientist

Electrochemical Discovery Laboratory
Joint Center for Energy Storage Research
Argonne National Laboratory
Web: www.jcesr.org/edl

9700 South Cass Avenue
Lemont, IL 60439
email: ecarino@anl.gov
phone: (617)767-1948

Formal Education and Appointments

- 2016 -** Argonne National Laboratory
Materials Scientist
- 2013-2016** Massachusetts Institute of Technology, Department of Chemical Engineering
Postdoctoral Associate

Advisor: Fikile R. Brushett, Ph.D.
- 2012-2013** Synchrotron Catalysis Consortium at Brookhaven National Laboratory
User Support at NSLS beamlines X18A, X18B, X19A
- 2006-2011** University of Texas at Austin, Department of Chemistry
Ph.D. in Analytical Chemistry
“Underpotential Deposition as a Synthetic and Characterization Tool for Core/Shell Dendrimer-Encapsulated Nanoparticles”

Advisor: Richard M. Crooks, Ph.D.
- 2002-2006** University of Massachusetts, Amherst
B.S. in Kinesiology
Minor in Chemistry

Awards

2014 Director’s Call, *Metal Anode Stability Within Hydrodynamic Conditions*, Joint Center for Energy Storage Research

Teaching Interests

General Chemistry, Analytical Chemistry, Electrochemistry, Materials Characterization

Professional Activities

- Peer Review for Journals: *Langmuir*, *Chem. Mater.*
- Peer Review for Funding Agencies: ARPA-e
- Professional Organizations: Member of the American Chemical Society

Outreach and Service

- National Suicide Prevention Lifeline – Volunteer (2015 -)
- Path to Professorship Workshop – Planning Team (2014)

Publications

1. **Carino, E.V.**; Staszak-Jirkovsky, J.; Assary, R.S.; Curtiss, L.; Brushett, F.R.; Markovic, N.M. “Directing the stability of organic active materials for redox flow batteries via electrochemically-mediated Li⁺ coordination” *Submitted* (October 2015)
2. **Carino, E.V.**; Disendruck, C.E.; Moore, J.S.; Curtiss, L.A.; Assary, R.S.; Brushett, F.R. “BF₃-promoted electrochemical properties of quinoxaline in propylene carbonate.” *RSC Adv.*, **2015**, 5, 18822-18831.
3. **Carino, E.V.**; Kim, H.Y.; Crooks, R.M.; Henkelman, G. “Site-selective Cu deposition at Pt dendrimer-encapsulated nanoparticles: Correlating theory with experiment.” *J. Am. Chem. Soc.* **2012**, 134, 4153–4162
4. Patlolla, A.; **Carino, E.V.**; Ehrlich, S. N.; Stavitski, E.; Frenkel, A. I., “Application of Operando XAS, XRD, and Raman Spectroscopy for Phase Speciation in Water Gas Shift Reaction Catalysts.” *ACS Catal.* **2012**, 2, 2216-2223.
5. **Carino, E.V.**; Crooks, R.M. “Characterization of Pt@Cu (core@shell) dendrimer-encapsulated nanoparticles by underpotential deposition.” *Langmuir*, **2011**, 27, 4227-4235.
6. Myers, V. S.; Weir, M. G.; **Carino, E.V.**; Yancey, D. F.; Pande, S.; Crooks, R. M., Dendrimer-encapsulated nanoparticles: New synthetic and characterization methods and catalytic applications. *Chem. Sci.* **2011**, 2, 1632-1646.
7. Yancey, D. F.; **Carino, E.V.**, Crooks, R.M. “Electrochemical synthesis and electrocatalytic properties of Au@Pt dendrimer-encapsulated nanoparticles.” *J. Am. Chem. Soc.*, **2010**, 132, 10988–10989.
8. **Carino, E.V.**; Knecht, M.R.; Crooks, R.M. “Quantitative analysis of the stability of Pd dendrimer-encapsulated nanoparticles.” *Langmuir*, **2009**, 25, 10279–10284.

Journal contributions in progress:

1. **Carino, E.V.**, Newman, D.J.; Connell, J.G.; Markovic, N.M.; Brushett, F.R. “Early-stage degradation of glassy carbon electrodes in non-aqueous electrolytes.” (Planned Submission March 2016)
2. **Carino, E.V.**, Barton, J.L.; Carney, T.J.; Brushett, F.R. “Improving Li anode stability during high rate cycling using a flowing electrolyte.” (Planned Submission in June 2016)
3. **Carino, E.V.**; Barton, J.L.; Helal, A.; Chiang, Y.-M.; and Brushett, F.R. “Mass transport and hydrodynamic properties of highly concentrated molecular melts for redox-flow batteries.” (Planned submission in June 2016)

Meetings and Presentations

1. “Directing the Stability of Organic Active Materials for RFBs via Electrochemically-Mediated Li⁺ Coordination” 250th Meeting of the ACS, Boston, MA, 2015 (Oral)
2. “Electrochemically Active Organic Molecules for Non-Aqueous Redox Flow Batteries.” Gordon Research Conference on Batteries, Ventura, CA, 2014. (Poster)
3. “Investigation of Redox-Active Organic Molecules for Non-Aqueous Flow Batteries.” Materials Research Society Fall Meeting, Boston, MA, 2013. (Oral presentation)
4. 4th International Congress on Operando Spectroscopy. Brookhaven National Laboratory, Upton, NY, 2012. (Attendee)
5. Gordon Research Conference on Electrodeposition, Biddeford, ME, 2012. (Attendee)
6. “Site-specific Cu deposition at Pt dendrimer-encapsulated nanoparticles.” Annual Workshop on Electrochemistry, Center for Electrochemistry, University of Texas, Austin, 2011. (Poster)
7. “Advanced topics in XAFS data modeling.” Brookhaven National Laboratory, Upton, NY, 2010. (Attendee)
8. “Underpotential-deposition (UPD) as a synthetic route to core/shell nanoparticles in the 1-3 nm size range.” 1st Student Potters Lodge Meeting on Electrochemistry, Blue Mountain Lake, NY, September, 2010. (Oral presentation)
9. “The potential-mediated synthesis of core/shell dendrimer-encapsulated nanoparticles.” Gordon Research Conference on Electrochemistry, Ventura, CA, 2010. (Poster)

Research Interests

- Electroanalytical method development for energy and engineering applications
- Physical chemistry and physical electrochemistry
- Interfacial and surface-directed growth of nanomaterials on templates or complex structures
- Electrodeposition and electrochemical modification of surfaces
- X-ray spectroscopy of condensed matter and interfaces

Professional References

Prof. Richard M. Crooks

Professor of Chemistry, University of Texas at Austin
crooks@cm.utexas.edu

Prof. Fikile R. Brushett

Professor of Chemical Engineering, Massachusetts Institute of Technology
brushett@mit.edu

Dr. George Crabtree

Director of the Joint Center for Energy Storage Research, Argonne National Laboratory
crabtree@anl.gov