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MONICA S. EBERT, Ph.D.
SENIOR TECHNOLOGIST & TEAM LEADER

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Monica Ebert is a Materials Science Engineer whose graduate studies were focused on sodium ion battery materials synthesis, battery fabrication and testing. Her background includes work in the porcelain enamel industry with expertise in coatings, accelerated corrosion, exposure testing, and failure analysis of metals, ceramics, and coatings. She performed required testing/reporting for environmental permitting and maintained necessary certifications for porcelain enamel tanks through the National Sanitary Foundation (NSF). She is proficient in standard interpretation and testing per ISO, ASTM, NSF, and AWWA.

Monica received her Ph.D. in Materials Science and Engineering from Illinois Institute of Technology. Her dissertation focused on developing a dendrite free sodium ion battery with increased power density and cyclic stability by synthesizing Prussian blue analogue cathode materials and pairing them with a liquid metal anode. She also utilized structural defect control of materials to improve the cycle life of a sodium ion battery. She received her M.Sc. in Materials Science at the University of Connecticut where she synthesized and investigated metal oxide coated graphene for electrochemical capacitors. Her B.S. is in Biochemistry with Minors in Math and Physics. During her time at Southern Connecticut State University, she worked as a student researcher and prepared nano specimens of complex oxide materials.

Areas of Specialization

Lab & Industrial Services
Instrumentation and Data Acquisition
Sample Preparation (metallographic, porcelain enamel, semiconductor materials)
Material Characterization (XRD, FTIR, DSC, TGA, SEM/EDS, TEM, BET)
Materials Synthesis (sol-gel, hydrothermal, coprecipitation, and solid-state methods)
Coatings (Metallic and Inorganic, Epoxy)
Corrosion Testing and Failure Analysis of Materials
Material Compatibility and Selection
Energy Storage and Battery Testing
Safety

Education

Ph.D., Materials Science & Engineering, Illinois Institute of Technology, 2015
M.Sc., Materials Science, University of Connecticut, 2012
B.S., Biochemistry, Minors in Mathematics & Physics, Southern Connecticut State University, 2009

Professional Affiliations

American Ceramic Society
Member, 2020-Present
ASTM International, B08-12
Subcommittee member, 2018-Present
Porcelain Enamel Institute
Member, 2017-2023 (2019: Vice Chair; 2020-2022: Chairman)

Positions Held

Engineering Systems Inc., Aurora, Illinois
Senior Technologist, January 2024 to Present

CST Storage, DeKalb, Illinois
Materials Science & Coatings Engineer, September 2017-December 2023

Weber-Stephen Products, LLC, Palatine, Illinois
Materials Science Engineer/Metallurgist, September 2015-September 2017

Southern Connecticut State University, New Haven, Connecticut
CRISP Nanocharacterization Facility Manager, May 2009-August 2010

Publications/Presentations

Journal Publications:

L. Shaw, **M. Sawicki**, A. Ortiz, M. Luo, "Structural-Defect-Controlled Electrochemical Performance of Sodium Ion Batteries with $NaCrO_2$ Cathodes," *ChemElectroChem*, **4**, 3222-3230 (2017).

M. Ashuri, Q. He, Y. Liu, K. Zhang, S. Emani, **M. Sawicki,** J. Shamie, L. Shaw, "Hollow Silicon Nanospheres Encapsulated with a Thin Carbon Shell: An Electrochemical Study," *Electrochimica Acta*, **215**, 126-141 (2016)

M. Sawicki and L. Shaw, "Advances and Challenges of Sodium Ion Batteries as Post Lithium Ion Batteries," *RSC Advances*, **5**, 53129-53154 (2015).

C. Wang, **M. Sawicki**, J. Kaduk and L. Shaw, "Roles of Processing, Structural Defects and Ionic Conductivity in Electrochemical Performance of $Na_3MnCO_3PO_4$ Cathode Material," *J. Electrochem. Soc.*, **162**, A1601-A1609 (2015).

C. Wang, **M. Sawicki,** S. Emani, C. Liu, and L. Shaw, "$Na_3MnCO_3PO_4$ – A High Capacity, Multi-Electron Transfer Redox Cathode Material for Sodium Ion Batteries," *Electrochimica Acta*, **161**, 322-328 (2015).

M. Sawicki, K. Crosby, L. Li, and L. Shaw, "Sintering of hydroxyapatite," Ceram. Trans., **237**, 83-89 (2012).

L. Li, K. Crosby, **M. Sawicki,** L. Shaw and Y. Wang, **"**Effects of Surface Roughness of Hydroxyapatite on Cell Attachment and Proliferation," *J. Biotechnol. Biomater.*, **2:150** (2012).

L. Li, K. Crosby, **M. Sawicki**, L. Shaw, Y. Wang, "A comparative study of cell behaviors of hydroxyapatite and Ti-6Al-4V," *Ceram. Trans.*, **237**, 239-247 (2012).

D. Su, Q. Meng, C. A. F. Vaz, M.-G. Han, Y. Segal, F. J. Walker, M. Sawicki, C. Broadbridge, and C. H. Ahn, "Origin of 90 degree domain wall pinning in $Pb(Zr_{0.2}Ti_{0.8})O_3$ heteroepitaxial thin films*," Applied Physics Letters,* **99** (10), 102902, (2011).

A.M. Kolpak, F.J. Walker, J.W. Reiner, Y. Segal, D. Su, M. Sawicki, C.C. Broadbridge, Z. Zhang, Y. Zhu, C.H. Ahn, S. Ismail-Beigi, "Interface-induced Polarization and Inhibition of Ferroelectricity in epitaxial $SrTiO_3$/Si," *Phys. Rev. Lett.*, **105**, 217601 (2010).

D. P. Kumah, J. W. Reiner, Y. Segal, A. M. Kolpak, Z. Zhang, D. Su, Y. Zhu, M. S. Sawicki, C. C. Broadbridge, C. H. Ahn and F. J. Walker, "The atomic structure and polarization of strained SrTiO3/Si," Applied Physics Letters **97**, 251902 (2010).

D. Su, B. Yang, N. Jiang, **M. Sawicki**, C. Broadbridge, M. Couillard, J. W. Reiner, F. J. Walker, C. H. Ahn, Y. Zhu, "Valence Electron Energy-Loss Spectroscopy of Ultrathin $SrTiO_3$ Films Grown on Silicon (100) Single Crystal" *Appl. Phys. Lett.* **96**, 121914 (2010).

D. Su, M. Couillard, **M. Sawicki**, C. Broadbridge, Y. Zhu, "Low Loss EELS Study of the Ultrathin $SrTiO_3$ Film Grown on the Single Si Crystal" *Microscopy and Microanalysis.* **15**, 1040-1041 (2009).

Technical Presentations:

M. Sawicki and L. Shaw, "Composite Prussian Blue Analogues Utilized as Cathode Materials in a Sodium Ion Battery," 227th ECS Meeting, May 24-28, 2015, Chicago, IL.

M. Ashuri, Q. He, K. Zhang, S. Emani, **M. Sawicki**, J. Shamie, and L. Shaw, "Reversible Lithium Storage in Carbon Encapsulated Hollow Silicon Nanospheres," 227th ECS Meeting, May 24-28, 2015, Chicago, IL.

M. Ashuri, Q. He, K. Zhang, S. Emani, **M. Sawicki**, J. Shamie, L. Shaw, "Core-Shell Silicon Nanoparticles with Different Coatings as Future Anode Material for Lithium-Ion Batteries," Materials Science and Technology Proceedings 2015, October 4-8, 2015, Columbus, OH.

M. Ashuri, Q. He, K. Zhang, S. Emani, **M. Sawicki**, J. Shamie, L. Shaw, "Reversible Lithium Storage in Carbon Encapsulated Hollow Silicon Nanospheres," 227th ECS Meeting, May 24-28, 2015, Chicago, IL.

C. Wang, **M. Sawicki,** S. Emani, C. Liu, and L. Shaw, "On the Capacity and Cycle Stability of $Na_3MnCO_3PO_4$ – A High Capacity, Multi-Electron Transfer Redox Cathode Material for Sodium Ion Batteries," 227th ECS Meeting, May 24-28, 2015, Chicago, IL.

C. Wang, J. Kaduk, **M. Sawicki**, and L. Shaw, "$Na_3MnCO_3PO_4$ – A Multi-Electron Transfer Redox Cathode Material for Sodium Ion Batteries," Invited Presentation at *Nanostructured Materials for Rechargeable Batteries and for Supercapacitors III,* TMS Annual Meeting, March 15-19, 2015, Orlando, FL.

M. Sawicki and L. Shaw, "$NaCrO_2$-based Batteries: Effects of Processing," 226th Meeting of the Electrochemical Society, October 5-10, 2014, Cancun, Mexico.

Q. He, M. Ashuri, K. Zhang, S. Emani, **M. Sawicki**, J. Shamie, L. Shaw, "Synthesis of Carbon-Coated Hollow Silicon Nanospheres for Lithium-Ion Battery Application," Materials Science and Technology Proceedings 2014, October 12-16, 2014, Pittsburgh, PA.

M. Ashuri, Q. He, K. Zhang, S. Emani, **M. Sawicki**, J. Shamie, L. Shaw, "Hollow Silicon Nanospheres as Next Generation Lithium-Ion Battery Anodes," Materials Science and Technology Proceedings 2014, October 12-16, 2014, Pittsburgh, PA.

M. Sawicki and L. Shaw, "Processing Effects on Sodium-Ion Batteries with $NaCrO_2$ Cathodes," presented at the meeting of Chicago Section of the American Chemical Society, June 19, 2014.

C. Wang, J. Kaduk, **M. Sawicki**, and L. Shaw, "$Na_3MnCO_3PO_4$ – A Multi-Electron Transfer Redox Cathode Material for Sodium Ion Batteries," presented at the meeting of Chicago Section of the American Chemical Society, June 19, 2014.

L. Shaw, **M. Sawicki**, and J. Shamie, "Studies of Cathodes and Anodes for a New-Generation Na-ion Batteries," TMS 143rd Annual Meeting & Exhibition, February 16-20, 2014, San Diego, CA.

M. Sawicki, J. Shamie and L. Shaw, "$NaNi_{0.5}Mn_{0.5}O_2$ for Na-ion Batteries: Effects of Synthesis Conditions," Materials Science and Technology Proceedings 2013, October 27-31, 2013, Montreal, Canada.

K. Crosby, **M. Sawicki**, L. Shaw, C. Estournes, "Composite Ti-6Al-4V + Hydroxyapatite Biomedical Implant Materials via Spark Plasma Sintering," Materials Science and Technology Proceedings 2012, October 7-11, 2012, Pittsburgh, PA.

L. Li, K. Crosby, **M. Sawicki**, L. Shaw, and Y. Wang, "Effects of Surface Roughness of Hydroxyapatite on Cell Attachment and Proliferation," Materials Science and Technology Proceedings 2012, October 7-11, 2012, Pittsburgh, PA.

M. Sawicki, K. Crosby, L. Li, L. Shaw and Y. Wang, "Sintering and Bioactivities of Hydroxyapatite," Materials Science and Technology Proceedings 2011, October 16 – 20, 2011, Columbus, OH.

L. Li, K. Crosby, **M. Sawicki**, L. Shaw, and Y. Wang, "Characterization and Design of the HA-Ti Composite Surface for Ti-Based Implants," Materials Science and Technology Proceedings 2011, October 16 – 20, 2011, Columbus, OH.

M. Sawicki, C. Vaz, J. Hoffman, D. Su, C. Broadbridge. "Automated Specimen Preparation of Complex Oxide Materials for Scanning Transmission Electron Microscopy (STEM) Analysis," Connecticut Microelectronics and Optoelectronics Consortium, April 7, 2010, Storrs, CT.

J. Reiner, A. Kolpak, F. Walker, S. Ismail-Beigi, C. Ahn, **M. Sawicki**, C. Broadbridge, D. Su, Y. Zhu, "Interface Transformations of $SrTiO_3$ During Growth on Si (100)," American Physical Society, APS March Meeting 2010, March 15-19, 2010, abstract #Q24.004

M. Sawicki, P. Munhutu, J. Daponte, C. Broadbridge, A. Lehman, T. Sadowski, E. Garcia, C. Heyden, L. Mirabelle, P. Benjamin, "Computer Assisted Analysis of Microscopy Images," SPIE Proceedings, January 2009, Vol.7243

F. J. Walker, J. W. Reiner, A. M. Kolpak, Y. Segal, Z. Zhang, D. Su, Y. Zhu, **M. Sawicki**, C. Broadbridge, S. Ismail-Beigi, C. H. Ahn, "Interface Structure Determination of Crystalline Oxides on

Silicon using Synchrotron X-Ray Diffraction" *American Physical Society,* 2009 APS March Meeting, March 16-20, 2009, abstract #X12.015.

M. Sawicki, C. C. Broadbridge, F. Walker, A. Lehman and G. Lehman, "Specimen Preparation of Complex Oxide Semiconductor Devices" presented at the Connecticut Symposium of Microelectronics and Optoelectronics, April 8, 2008, Storrs, CT.

J. DaPonte, T. Sadowski, C. Broadbridge, P. Munhutu, A. Lehman, D. Krishnamoorthy, E. Garcia, **M. Sawicki**, C. Heyden, L. Mirabelle, P. Benjamin, "Characterization of nanoparticles by computer imaging particle analysis," SPIE Proceedings 2007, Volume 6768, 676807

J. DaPonte, T. Sadowski, C. Broadbridge, D. Day, A. Lehman, D. Krishna, L. Marinella, P. Munhutu, **M. Sawicki**, **"**Comparison of thresholding techniques on nanoparticle images," SPIE Proceedings 2007, Volume 6575, 65750L

J. DaPonte, T. Sadowski, C. Broadbridge, D. Day, A. Lehman, D. Krishna, L. Marinella, P. Munhutu, **M. Sawicki**, "Application of particle analysis to transmission electron microscopy (TEM)," SPIE Proceedings 2007, Volume 6575, 65750H

M. Sawicki, T. Sadowski, D. Day, A. Lehman, J. DaPonte and C. C. Broadbridge, "Imaging processing effects on nanoparticle measurements using TEM" presented at Connecticut Microelectronics and Optoelectronics Consortium, Yale University, New Haven, CT.