

Steve W. Martin

Department of Materials Science and Engineering, Iowa State University

Professional Preparation

B.A. Chemistry (ACS accredited), Capital University, Columbus, Ohio, 1980

Ph.D. Physical Chemistry, Purdue University, 1986

Appointments

2009–present Anson Marston Distinguished Professor in Engineering, Department of Materials Science and Engineering, Iowa State University

2006–present University Professor, Department of MSE, Iowa State University

1995–2006 Professor, Department of MSE, Iowa State University

1990–1995 Associate Professor, Department of MSE, Iowa State University

1986–1990 Assistant Professor, Department of MSE, Iowa State University

Research Interests

New thin film solid electrolytes for batteries, new anodes and cathodes for batteries, battery research; glass formation, processing, structure, properties and dynamics; ionic transport; relaxations in glass; synthesis, processing, structure, and characterization of anode, electrolyte, and cathode materials for lithium and sodium batteries;

Professional Honors and Affiliations (Most Recent)

US Chair, 1st Joint International Meeting of the German Society of Glass Technology (DGG) and the Glass & Optical Materials Division Annual Meeting, Aachen, Germany, ISU Sigma XI Chapter President (2011), Alfred R. Cooper Distinguished Lecturer in Glass Science (2010), MSE Department Excellence in Teaching Award, 2010, Distinguished Professor, ISU-MSE Department (2009), University Professor, ISU-MSE Department (2006), George W. Morey Award for Excellence in Glass Research, American Ceramic Society (2008), MSE Excellence in Research Award, ISU-MSE Department (2005), Chalmers University of Technology, Göteborg, Sweden, 175th Jubilee Professor, Department of Applied Physics (2004), Faculty Recognition for Teaching Award, ISU Honors Program (2003); Faculty Recognition for Teaching Award, ISU Student Activities Center (2003); MSE Excellence in Service Award, ISU – MSE Department (2003); Fellow of the American Ceramic Society (2002)

Member, Keramos, Professional Ceramic Engineering Fraternity; Member and Secretary (2007-2008), Treasure (2008-2009), Vice-Chair (2009-2010), Chair (2010-2011), American Ceramic Society, Glass Division; Member and Secretary (1993), Treasurer (1994), Vice-President (1995), and President (1996), Ceramic Education Council; Member, Electrochemical Society; Member, Materials Research Society; Member, American Association of Engineering Educators;

Synergistic Activities

1. Faculty Advisor to the ISU Gaffers Guild, a Glass blowing club that trains students in the art, science, and engineering of glass blowing. This glass studio is also used for informal science education to 3,000+ K-12-College-gray participants each year through glass blowing demonstrations, more than 50,000 informal learners have been reached over more than 20+ years of demonstrations
2. PI for an NSF REU Site: Materials Education and Research on Far-From-Equilibrium Materials, Structures, Properties, and Processing,” NSF-DMR 075523, '08-'11.
3. Faculty organizer for seven Multi-University Graduate Web-based courses on “Advanced Vitreous State,” that have been offered 2005-2013. Recently expanded to include international students, faculty lecturer for the NSF New Functionality in Glass IMI “Winter School on Glass,” China, 2010.
4. Regular course instructor for Glass Science and Engineering at ISU, teaching glass science and engineering to more than 500 students over 20+ years.
5. Regular contributor to Encyclopedia Britannica “Glass,” a long entry describing the nature, types, uses, and properties of glass to the general public.

Publications - Closely Related (out of more than 190)

1. Seo, Inseok, Martin, Steve W., "X-ray Photoelectron Spectroscopy Study of Lithium Thio-Germanate Thin Films," RSC Advances, Vol. 1, no. 3, pps. 511-517, 2011.
2. Seo, Inseok, Martin, Steve W., "Preparation and characterization of Fast Ion Conducting Lithium Thio-Germanate Thin-Films Grown by RF Magnetron Sputtering," Journal of Electrochemical Society, Vol. 158, no. 5, pps. A456-A470, 2011.
3. Seo, Inseok, Martin, Steve W., "Structural Properties of Lithium Thio-Germanate Thin Film Electrolytes Grown by RF Magnetron Sputtering," Inorganic Chemistry, Vol. 50, no. 6, pps. 2143 - 2150, 2011.
4. Seo, Inseok, Martin, Steve W., "Fast Lithium Ion Conducting Solid State Thin-Film Electrolytes Based on Lithium Thio-Germanate Materials," Acta Materialia, Vol. 59, no. 4, pps. 1839 – 1846, 2011.
5. Seo, Inseok, Martin, Steve W., "Preparation and Characterization of Fast Ion Conducting Lithium Thio-Germanate Thin-Film Grown by RF magnetron sputtering," Electrochemical Society Transactions, Vol. 28, no. 11, pps. 287 - 297, 2010.

Publications – Significant Other

6. Christensen, Randilynn, Olson, Garrett, Martin, Steve W., "Ionic Conductivity of Mixed Glass Former $0.35 \text{Na}_2\text{O} + 0.65 [\text{xB}_2\text{O}_3 + (1-\text{x})\text{P}_2\text{O}_5]$ Glasses," The Journal of Physical Chemistry B, Vol. 117, no. 51, pp 16577–16586, 2013.
7. Storek, Michael, Böhmer, Roland, Martin, Steve W., Larink, Dirk, Eckert, Hellmut, "NMR and conductivity studies of the mixed glass former effect in lithium borophosphate glasses," Journal of Chemical Physics, Vol. 137, pps. 124507-124512, 2012.
8. Christensen, Randilynn, Byer, Jennifer, Olson, Garrett, Martin, Steve W., "The Glass Transition Temperature of Mixed Glass Former $0.35\text{Na}_2\text{O} + 0.65[\text{xB}_2\text{O}_3 + (1-\text{x})\text{P}_2\text{O}_5]$ Glasses," Journal of Non-Crystalline Solids, Vol. 358, no. 4, pps. 826-831, 2012.
9. Christensen, Randilynn, Byer, Jennifer, Olson, Garrett, Martin, Steve W., "The Densities of Mixed Glass Former $0.35 \text{Na}_2\text{O} + 0.65 [\text{xB}_2\text{O}_3 + (1-\text{x})\text{P}_2\text{O}_5]$ Glasses Related to the Atomic Fractions and Volumes of Short Range Structures," Journal of Non-Crystalline Solids, Vol. 358, no. 3, pps. 583–589, 2012.
10. Schuch, Michad, Muller, Christian, Maass Philipp, and Martin, Steve W., "Mixed Barrier Model for the Mixed Glass Former Effect in Ion Conducting Glasses," Physical Review Letters, Vol. 102, no. 14, pps. 145902/1 – 145902/4, 2009

Collaborators

Ananda Shastri (Minnesota-Moorhead), Michael Vogel (Darmstadt), Francisco Munoz (Madrid), Steve Feller (Coe College), Himanshu Jain (Lehigh), John Ballato (Clemson), Valeri Petkov (Central Michigan), Ruediger Dieckmann (Cornell), David Sidebottom (Creighton), Dick Brow (MST), William West (JPL), Roland Bohmer (Dortmund), Helmut Eckert (Muenster), Philipp Maass (Osnabruck)

Graduate and Postdoctoral Advisers

Dr. C. Austen Angell (Arizona State University)

Graduate and Advised

Ph.D. Emma White ('14), Deborah Watson ('17), Brittany Curtis ('18), Josh Roth ('18), Christian Bischoff, Randilynn Christensen, Inseok Seo, Wenlong Yao, Hang Yang Yuen, Youngsik Kim, Jason Saienga, Chad Martindale, Qiang Mei, Benjamin Meyer, Jeremy Schrooten, Cho, Jaephil, James Hudgens, Grant, Sheila, Patel, Hitendra K., Julia Sills, **M.S.**, Bryce Campbell, Youngsik Kim, Jacob Sutherland, Michael Shirk, Thirachai Nithipathrat, Joe Kincs, **Post-Doctoral**, Yunhua Xu, Christian Bischoff, Osama Gaballa, Hao Liu, Randilynn Christensen, Inseok Seo, Wenlong Yao, Brito Ferreira, Steven A. Poling, Annamalai Karthikeyan, Jeremy Schrooten, Renaud Belin, Tomoko Akai, Abdelouahed Soufiane, Wancheng Zhou