

CURRICULUM VITAE

Eric A. Stach

Department of Materials Science and Engineering
Laboratory for Research on the Structure of Matter
Singh Center for Nanotechnology
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EMPLOYMENT

Department of Materials Science and Engineering, University of Pennsylvania
Professor, 2017 – present

Chief Technology Officer and Co-founder, Hummingbird Scientific, 2004 to present

- Nanotechnology firm which develops and sells advanced scientific instrumentation for nanoscale manipulation and characterization

Electron Microscopy Group, Center for Functional Nanomaterials, Brookhaven National Laboratory, 2010 to 2017

Group Leader
Scientist

- In charge of a ~\$2.25M direct/year research effort at a Department of Energy National User Facility
- Managed a group of 8-10 staff, post-doctoral and student researchers, as well as oversaw the activity of 100-125 external users per year
- Research focused on catalytic nanomaterials for energy conversion, solid-state materials for energy storage, earth-abundant materials for solar energy, the fundamentals of nanoscale crystal growth and the development of novel experimental methods for *in situ* and *operando* characterization
- Special Assistant for *Operando* Initiative, Coordinating the “Operando Initiative” portfolio at Brookhaven, one of the Laboratory’s six Critical Outcomes. 2015-2017

Department of Materials Science and Engineering, Stony Brook University Adjunct
Professor, 2015 to 2018

School of Materials Engineering, Purdue University

Adjunct Professor, 2010 to 2016

Professor, Appointed 2010

Associate Professor (with tenure), 2007 to 2010

Associate Professor (without tenure), 2005 to 2007

- Procured and managed the outcomes of a ~\$1M/year research portfolio, including supervision of graduate and post-doctoral researchers
- Taught classes at the undergraduate and graduate level on electrical, optical and magnetic properties of materials, materials processing and advanced materials characterization

Program Leader, Metals Program, 2003 to 2004

Materials Sciences Division, Lawrence Berkeley National Laboratory

- Directed the Division's Metals Program, focusing on correlated experimental and theoretical studies of the fundamental mechanisms of mechanical deformation.

Materials Staff Scientist, 1998 to 2002

National Center for Electron Microscopy, Lawrence Berkeley National Laboratory

- Directed the Center's efforts in the development of *in-situ* transmission electron microscopy techniques.

EDUCATION

Doctor of Philosophy in Materials Science and Engineering - 1998

University of Virginia, Charlottesville, VA

Dissertation: *In-situ transmission electron microscopy studies of dislocation / defect interactions in SiGe / Si heterostructures.*

Dissertation Advisor: Robert Hull, presently Senior Associate Vice Provost of Research and Professor in the Department of Materials Science and Engineering, Rensselaer Polytechnic Institute

Co-advisor: Rudolf M. Tromp, IBM Watson Research Center and Leiden University

Masters of Business Administration - 2018

State University of New York, Stony Brook, NY

Masters of Science in Materials Science and Engineering - 1994

University of Washington, Seattle, WA

Thesis: *Mechanisms for thermal stress relaxation in a model metallic film / ceramic substrate system.*

Bachelor of Science in Engineering - 1992

Mechanical Engineering and Materials Science

Duke University, Durham, NC

HONORS AND AWARDS

ISI Highly Cited Researcher, "Cross Field", 2018

Fellow, American Physical Society, Class of 2017

Fellow, Microscopy Society of America, Class of 2013

Microscopy Society of America's Eli F. Burton (Young Scientist) Award - 2009

University Faculty Scholar, Purdue University - 2009-2010

Reinhardt Schumann, Jr. Undergraduate Teaching Award, School of Materials Engineering - 2009

Purdue College of Engineering "Early Career Research Excellence Award" - 2007

Outstanding Performance Award - Lawrence Berkeley National Laboratory - 2001.

Winner - Best Poster (Physical Sciences) - Microscopy and Microanalysis Meeting - 2000.

Winner – Micrograph Competition – Microscopy and Microanalysis Meeting – 2000.
 IBM Cooperative Fellowship, 1997 – IBM Mentor: Rudolf M. Tromp
 Graduate Student Award (Silver Medal) – Materials Research Society Spring Meeting – 1997.

TEACHING

UNIVERSITY OF PENNSYLVANIA

SEMESTER	COURSE NUMBER	TITLE	EVALUATION (OUT OF 4.0)
Instructor/class			
Spring 2020	MSE 610	Transmission Electron Microscopy and Crystalline Imperfections	3.9 / 3.9
Fall 2019	ENGR 101	Introduction to Engineering	3.7 / 3.7
Spring 2019	MSE 610	Transmission Electron Microscopy and Crystalline Imperfections	3.9 / 3.7
Fall 2018	ENGR 101	Introduction to Engineering	3.4 / 2.8
Fall 2017	MSE 610	Transmission Electron Microscopy and Crystalline Imperfections	3.8 / 3.4
Average:			3.7 / 3.5

PURDUE UNIVERSITY – 2005 – 2010

SEMESTER	COURSE	TITLE	EVALUATION (OUT OF 5.0)
Instructor/class			
Spring 2010	MSE 640	Transmission Electron Microscopy and Crystalline Imperfections	4.9 / 4.8
Fall 2009	MSE 697	Advanced Transmission Electron Microscopy	4.9 / 4.6
Fall 2009	MSE 582	Transmission Electron Microscopy Skills	4.9 / 4.9
Spring 2009	MSE 640	Transmission Electron Microscopy and Crystalline Imperfections	4.8 / 4.4
Spring 2009	MSE 270	Atomistic Materials Science	4.5 / 3.9
Fall 2008	MSE 370	Electrical, Optical & Magnetic Properties of Materials	4.3 / 4.0
Spring 2008	MSE 640	Transmission Electron Microscopy and Crystalline Imperfections	4.9 / 4.4
Spring 2008	MSE 270	Atomistic Materials Science	4.3 / 4.0

Fall 2007	MSE 548	Deposition Processing	4.2 / 4.2
Spring 2007	MSE 640	Transmission Electron Microscopy and Crystalline Imperfections	5.0 / 4.9
Fall 2007	MSE 370	Electrical, Optical & Magnetic Properties of Materials	4.9 / 4.3
Fall 2007	MSE 335	Materials Characterization Laboratory	4.8 / 4.0
Spring 2006	MSE 640	Transmission Electron Microscopy and Crystalline Imperfections	5.0 / 4.8
Fall 2006	MSE 370	Electrical, Optical & Magnetic Properties of Materials	4.9 / 4.3
Fall 2006	MSE 582	Transmission Electron Microscopy Skills	4.3 / 4.3
Spring 2005	MSE 640	Transmission Electron Microscopy and Crystalline Imperfections	4.9 / 4.3
Average:			4.7 / 4.4

FUNDED PROGRAMS AND PROPOSALS At University of Pennsylvania:

Principal Investigator, MRI: Acquisition of a Dual Beam Focused Ion Beam / Scanning Electron Microscope for Research and Education, National Science Foundation, \$799,000, 2018

Principal Investigator, Quantifying the Coarsening Kinetics of Supported Metal Nanoparticles Using Time-resolved Electron Microscopy, Data Analytics and Simulations, National Science Foundation, \$539,832, 2018 – 2020.

Principal Investigator, Operando Electron Microscopy of Catalyst and Energy Storage Materials, BASF Corporation, \$125,000, 2019; \$140,000, 2020

Co-Principal Investigator, Real Time Quantification of Diffusion and Alloying in Atomically Thin Capillaries, National Science Foundation, \$450,000 (\$225,000 to Stach), 2019 - 2021

Co-Principal Investigator, Post-CMOS Compatible Aluminum Scandium Nitride Ferroelectric Field Effect Transistor Memories, \$751, 950, DARPA, 2020 - 2021

Co-Principal Investigator, “Integrated Mesoscale Architectures for Sustainable Catalysis”, an Energy Frontier Research Center, Department of Energy, \$638,900, 2018 – 2022.

At Brookhaven:

Co-Principal Investigator, Center for Mesoscale Transport Properties, Energy Frontier Research Center, approx. \$20M to Stony Brook University, responsible for \$125,000/yr., 2014-2018

Principal Investigator, Laboratory Directed Research and Development, “Correlative microscopy, spectroscopy, and diffraction with a micro-reactor”, \$567,900 total funds, 2014-2016

At Purdue University:

Principal Investigator, “Honda Research Collaboration”, \$105,000, 2010.

Principal Investigator, “Honda Research Collaboration”, \$110,000, 2009.

Co-Principal Investigator, DOE Energy Frontier Research Center “Institute for Atomically-Efficient Chemical Transformations”, \$18M total funds, responsible for \$430,000, 2009-2011

Principal Investigator, “GOALI: Quantifying growth mechanisms in semiconductor nanowires using real time transmission electron microscopy”, Electronic and Photonic Materials Program, Division of Materials Research, NSF. FY2009-2011, \$700,000 total funds to Purdue.

Principal Investigator, “Improving the growth of large-scale nanotube synthesis via heterogeneous modeling”, P.C. Krause, Inc., \$51,000, 2008-2009

Principal Investigator, “Investigate the mechanical behavior of composite rubbers at the nanoscale”, Sandia National Laboratory, \$50,000, 2008-2009.

Co-investigator, “Center for the prediction of reliability, integrity and survivability of microsystems”, DOE NNSA, approx. \$18M, 2008-2013.

Co-investigator, “Nanoscale optical antenna array for controlled, massively parallel manufacturing of nanowire devices”, DARPA, \$4,325,000 2008 – 2012.

Co-investigator, “Nano-Tungsten for ITER Diverter Plate”, Materials Modification, Inc., \$250,000 (responsible for \$125,000), 2008-2010

Co-investigator, “Low temperature, lead-free nanosolder for microelectronics”, NSF STTR Phase I, \$68,400, 2007-2008.

Principal Investigator, “Understanding the development of chirality during the growth of carbon nanotubes”, Short Term Innovative Research program, Army Research Office, FY2007-2008. \$50,000 to Purdue

Co-investigator, “GOALI: Nanoparticle-enabled printing of large-area electronic hierarchical systems”, Civil, Mechanical and Manufacturing Innovation, National Science Foundation, FY2007-2009, \$490,000 to Purdue.

Principal Investigator, “Quantifying growth mechanisms in semiconductor nanowires using real time transmission electron microscopy”, Electronic Materials Program, Division of Materials Research, NSF. FY2007-2009. \$580,000 total funds to Purdue.

Co-investigator, “Chirality and Growth Mechanisms of Carbon Nanotubes using *In-Situ* TEM”, Air Force Research Laboratory – “Laboratory Director’s Funds”, FY 2006. \$55,000 total award, \$50,000 to Purdue

Co-investigator, “Low-cost substrates for high-performance nanorod array LEDs”, DOE Solid-State Lighting Initiative, Core Technologies, FY 2006 – 2009, approx. \$900,000 total award

Principal investigator – “Measurement of elastic strain in quantum dots”, NIST, FY2006, \$24,500.

Co-investigator – “Development of a quantitative nanoindenter for in-situ transmission electron microscopy” – DOE Phase II SBIR to the Hysitron Corporation, FY2006. \$750,000 total funds, \$20k to Purdue. Project awarded an R&D 100 award and SBIR TibbettsAward in 2006.

Principal investigator – “Understanding the development of chirality during the growth of carbon nanotubes” – Purdue Research Foundation, FY 2005-2006, \$ 13,800.

At Lawrence Berkeley National Laboratory

Program Leader – Metals Program, Materials Sciences Division. A multi-investigator program funded by the DOE, FY2004 – 2005. \$595,000 / yr. total funds.

Principal Investigator – DOE funded program in “Experimental Nanomechanics”, FY 2003 – 2004. \$60,000/yr.

Principal Investigator – LBNL funded “Laboratory Directed Research and Development” Project “A MEMS ‘Test Kit’ for Structure – Mechanical Property Relationships at the Nanoscale”, FY 2003. \$85,000 total funds.

Co-investigator – DOE funded “Transmission Electron Aberration-corrected Microscope (TEAM) - A cooperative proposal for a national project to develop the next generation electron microscope” FY 2003-2008. Total funds approx. \$25,000,000 over 5 years. Specific responsibilities included column integration and site stability for the final instrument.

Co-investigator – DOE funded “Center for Synthesis and Processing of Carbon-Based Nanostructured Materials”. FY 2001-2004. \$27,500/yr.

PROFESSIONAL SERVICE

External Service

Secretary, Board of Directors, Materials Research Society, 2017-2019

Chair, External Advisory Board, Canadian Centre for Electron Microscopy Advisory Committee, McMaster University, 2018 to present.

Member, External Advisory Committee, Solid Phase Processing Science (SPPSi) Research Initiative, Pacific Northwest National Laboratory, 2018 – present.

BESAC Subcommittee Community Workshop - BES 40th Anniversary Program, January, 2018

Panel Chair, “Workshop on Next Generation Energy Storage”, Department of Energy Basic Energy Sciences Basic Research Needs Workshop, Gaithersburg, MD, March, 2017

Selected to Department of Energy Oppenheimer Science and Energy Leadership Program, 2017

Member, Stony Brook University Department of Materials Science and Chemical Engineering Advisory Board, 2016 to present.

Member, Center for Nanoscale Materials, Ultrafast Electron Microscopy Advisory Committee, 2017 – present.

Member, External Advisory Board, NSF Science and Technology Center Science and Technology Center on Real-Time Functional Imaging (“STROBE”), 2017 to present.

Member, External Advisory Board, NSF Center on Data-Enabled Science and Engineering of Atomic Structure, North Carolina State University, 2016 to present

Member, External Advisory Board, Canadian Centre for Electron Microscopy Advisory Committee, McMaster University, 2014 to 2018.

Plenary presentation, “Workshop on Basic Research Needs for Innovation and Discovery of Transformative Experimental Tools: Solving Grand Challenges in the Energy Sciences”, Department of Energy Basic Energy Sciences Basic Research Needs Workshop, Gaithersburg, MD, June, 2016.

Panel Chair, Committee of Visitors (COV) for the Materials Sciences and Engineering (MSE) Division in the Department of Energy’s (DOE) Office of Basic Energy Sciences (BES), 2015

Member, Board of Directors, Materials Research Society, 2013-2015.

Plenary presentation, “Future Directions of Electron Scattering and Diffraction”, Department of Energy Basic Energy Sciences Basic Research Needs Workshop Gaithersburg, MD, February, 2014.

Member, National User Facility Organization Steering Committee, 2008-2009.

User’s Executive Committee, National Center for Electron Microscopy, Chair, 2007 to 2009, Past-Chair, 2010.

Member, Steering Committee, Electron Microscopy Center, Argonne National Laboratory, 2005 to 2010

Member, IEEE’s Technical Committee on Nanomaterials, 2007 to 2010.

Invited Contributor, “Future Science Needs and Opportunities for Electron Scattering”, Department of Energy Basic Energy Sciences Basic Research Needs Workshop, Gaithersburg, MD, March, 2007.

Steering Committee member – ORNL SHaRE microscopy user facility. FY2001-2003.

Member & Short Course Organizer, Education Committee, Microscopy Society of America, 2005 to 2008

Member, Electron Diffraction Subcommittee, International Centre for Diffraction Data, 2003-2005.

Editorships

Editorial Board, Nature Scientific Data, 2016 - present.

Principal Editor, Journal of Materials Research, 2012 – 2016.

Associate Editor, Nanomaterials, Nanoscale Research Letters, 2006 – 2008

Editorial Board, Nanoscale Research Letters, 2005 – 2008.

Workshop Organization

Co-organizer, Autonomous Research for Materials Development Workshop, University of Pennsylvania, September, 2019

Co-chair, “Big, Smart and Deep Data”, Microscopy and Microanalysis 2017, St. Louis, August, 2017

International Scientific Advisory Committee, “Seventh Workshop on Nucleation and Growth Mechanisms of Single Wall Carbon Nanotubes”, 2017

Session Chair, “In situ and environmental microscopy of material reactions and processes”, International Microscopy Congress, 2014.

Co-organizer, “Characterization of Energy Materials In-Situ and Operando”, Fall 2013 Materials Research Society Meeting.

Organizing Committee, JCESR Grand Challenge Science and Characterization Workshop, May 2013.

Co-organizer, “Frontiers of in-situ transmission electron microscopy”, NIST, Gaithersburg, MD, April 2013.

Co-organizer, “Watching atoms move: from structures to dynamics to mesoscale processes” AAAS 2013 Annual Meeting

International Scientific Advisory Committee, “Sixth Workshop on Nucleation and Growth Mechanisms of Single Wall Carbon Nanotubes”

Meeting Co-chair, Fall 2012 Materials Research Society Meeting.

Co-organizer, “Carbon nanotubes and related materials”, American Physical Society “March Meeting”, Spring 2012

Co-organizer, “Electron Microscopy in Gases and Liquids”, Microscopy and Microanalysis Meeting, 2012
Symposium Chair, “In-situ Electron Microscopy”, Frontiers of Electron Microscopy in Materials Science, Fall 2011.

Co-organizer, “In-situ Electron Microscopy”, Microscopy and Microanalysis, 2009

Co-organizer, User’s Meeting, Molecular Foundry / National Center for Electron Microscopy, November, 2008.

Co-organizer, “Harnessing the growth of quantum dots: from fundamentals to applications”, Fall 2006 Materials Research Society Meeting.

Co-organizer, “Visualizing and measuring mechanical behavior”, Microscopy and Microanalysis, 2006.

Co-organizer, “Mechanisms of Deformation in Brittle Materials”, Fall 2005 Materials Research Society Meeting.

Co-organizer, “Advances in In-situ Electron Microscopy: Techniques and Applications”, Microscopy and Microanalysis, 2005.

Co-organizer, “Focused Ion Beam Microscopy”, Scanning 2005.

Co-organizer, “Imaging Atomic-scale Mechanics, Chemistry and Structure with Electron Microscopy”, Fall 2004 Materials Research Society Meeting.

Co-organizer, “Focused Ion Beam Microscopy”, Scanning 2004.

Organizer, “Focused Ion Beam Microscopy”, Scanning 2003.

Co-organizer, "Problem Solving with *In-situ* Electron Microscopy", Microscopy and Microanalysis 2002 Meeting.

Co-organizer, “Current Issues in Heteroepitaxial Growth: Stress Relaxation and Self-assembly” Fall 2001 Materials Research Society Meeting.

Co-organizer, “EM at the Frontier”, Naval Research Lab, Stennis Space Center, November 2000.

UNIVERSITY SERVICE

At the University of Pennsylvania

Member, Ad Hoc Senate Committee on the Institutional Response to the Climate Emergency, 2020 to present

Chair, Faculty Search Committee, Department of Materials Science and Engineering, 2019

Faculty Search Committee, Department of Materials Science and Engineering, 2019

Undergraduate Curriculum Review Committee, Sub-chair “Freshman Year Experience”, 2019

Faculty Chair, Nanoscale Characterization Facility, Singh Center for Nanotechnology, 2018 to present

Alternate, Faculty Personnel Committee, School of Engineering and Applied Science, 2018 to present

Faculty Search Committee, Department of Materials Science and Engineering, 2018

At Purdue University

Director, Purdue Electron Microscopy Consortium, Purdue University, 2008 – 2010

Director, School of Materials Engineering’s Microstructural Analysis Facility, 2008 – 2010

Scientific Director, Electron Microscopy Center, Birck Nanotechnology Center, Purdue University, 2006 – 2010

Member, Faculty Search Committee, School of Materials Engineering, 2009 – 2010 Member, College of Engineering Strategic Plan Committee, 2009.

Member, Higher Learning Commission Accreditation Review Committee, 2007 – 2010

Member, Internal Advisory Committee, Birck Nanotechnology Center, 2009 – 2010

Member, Senior Faculty Search Committee, School of Materials Engineering, 2008 – 2009

Co-Chair, Birck Nanotechnology Center Policies & Procedures Committee, 2006 – 2009

Member, Undergraduate Education Committee, School of Materials Engineering, 2006 – 2010

Member, College Research Committee, College of Engineering, 2005 – 2007

Member, Advanced Materials for Manufacturing Sub-Committee, Advanced Materials and Manufacturing Cluster Hire Search Committee, 2005.

Mentor, Fall 2005 MGMT 691W “Projects in Entrepreneurship” class project, Purdue University School of Management,

Mentor, Spring 2005 MGMT 691W “Projects in Entrepreneurship” class project, Purdue University School of Management,

Faculty Mentor, Midwest Crossroads Alliance for Graduate Education and Professoriate, Purdue University, 2005 – 2010

INDUSTRIAL EMPLOYMENT

J. H. Fletcher and Company, Huntington, WV - Summers of 1988 - 1992

Design Engineer: Design of coal mining machinery utilizing both Finite Element Analysis and Computer Aided Design. Assisted in development of several new machine prototypes. Extensive experience in mechanical component and systems design.

SOCIETY MEMBERSHIPS

Materials Research Society

Microscopy Society of America

American Physical Society

American Association for the Advancement of Science

Union of Concerned Scientists

PUBLICATIONS

[Web of Science](#): ~ 32,000 citations, h-index of 67, m-index of 2.8

[Google Scholar](#): > 41,000 citations, h-index of 79, i10-index of 292.

Books, Book Chapters, and Editorships:

- B1. Co-editor, with Thomas Walther, Rafal Dunin-Borkowski and Jean-Luc Rouviere, Focus Issue: Aberration Corrected Transmission Electron Microscopy, Journal of Materials Research, Journal of Materials Research, Vol. **32**, Issue 5, 2017.
- B2. Co-editor, with Scott Mixture, Bryan Huey and Vanessa K. Peterson, Focus Issue: In-situ and operando characterization of materials, Journal of Materials Research, Vol. **30**, Issue 3, 2015
- B3. Co-editor, with Paulo Ferreira and Kazutaka Mitsuishi, “In-situ Transmission Electron Microscopy”, Materials Research Society Bulletin, Vol. 33, Issue 2, 2008.
- B4. *In situ nanoindentation in a transmission electron microscope*; Andrew Minor, Eric A. Stach and J.W. Morris, Jr., in Dislocations in Solids, vol. 13, ed. by F.R.N. Nabarro and J.P. Hirth.
- B5. Electron Microscopy of Molecular and Atom-Scale Mechanical Behavior, Chemistry and Structure; edited by D. Martin, D.A. Muller, E.A. Stach, P. Midgley, Proceedings of the Materials Research Society, Volume 839, 2005.
- B6. Current Issues in Heteroepitaxial Growth -- Stress Relaxation and Self Assembly; edited by E.A. Stach, E. Chason, R. Hull and S.M. Bader, Proceedings of the Materials Research Society, Volume 696, 2002. Principal editor.
- B7. Guest Editor – “Problem Solving using *In-situ* Transmission Electron Microscopy”, Microscopy and Microanalysis, Volume 7(6), November / December 2001.
- B8. *Strain accommodation and relief in SiGe / Si heteroepitaxy*; book chapter by R. Hull and E.A. Stach in Thin Films: Heteroepitaxial Systems volume 15 of Directions in Condensed Matter Physics, edited by A. W. Liu and M. B. Santo, World Scientific Publishing Co., Inc., Rivers Edge, NJ, 1999.

Invited Review / Opinion Articles

- IR1. *Order in one dimension*, Eric A. Stach, Nature Materials, **18**, 4-6, 2019

- IR2. *Current status and future directions for in situ transmission electron microscopy*; Mitra L. Taheri, Eric A. Stach, Ilke Arslan, P. A. Crozier, Bernd C. Kabius, Thomas LaGrange, Andrew M. Minor, Seiji Takeda, Mihaela Tanase, Jakob B. Wagner, Renu Sharma *Ultramicroscopy* 170 (2016) 86-95.
- IR3. *Comparative in operando studies in heterogeneous catalysis: Atomic and electronic structural features in the hydrogenation of ethylene over supported Pd and Pt catalysts*, U. Jung, A. Elsen, Y. Li, J. G. Smith, M. W. Small, E. A. Stach, A. I. Frenkel, R. G. Nuzzo, *ACS Catalysis (Perspective)*, **5**, 1539-1551, 2015.
- IR4. *Critical review: Effects of complex interactions on structure and dynamics of supported metal catalysts*, A.I. Frenkel, M.W. Cason, A. Elsen, U. Jung, M.W. Small, R.G. Nuzzo, F.D. Vila, J.J. Rehr, E.A. Stach, and J.C. Yang, *J. Vac. Sci. Tech A*, **32** (2), 020801, 2014.
- JVST A Top 10 Most Cited Articles Published in 2014
- IR5. *Electron tomography: seeing atoms in three dimensions*, Ilke Arslan and Eric A. Stach, *Nature Mat.*, **11**, 911, 2012.
- IR6. *Real time transmission electron microscopy*; Eric A. Stach, *Materials Today*, Special Microscopy Issue, 51-58, December 2008.
- IR7. *Further considerations on high-cycle fatigue of micron-scale polycrystalline silicon*; D.H. Alsem, C.L. Muhlstein, E.A. Stach and R.O. Ritchie, *Scripta Materialia*, **59**, 931-935, 2008.
- IR8. *Nanotubes reveal their true strength*; Eric Stach, *Nature Nanotechnology*, **3**(10), 586-587, 2008.
- IR9. *Visualizing the behavior of dislocations - seeing is believing*, Ian M. Robertson, Paulo J. Ferreira, Gerhard Dehm, Robert Hull and Eric A. Stach, *Materials Research Society Bulletin*, **33**, 122-131, 2008.
- IR10. *Mechanisms for fatigue of micron-scale silicon structural films*, D.H. Alsem, O.N. Pierron, E.A. Stach, C.L. Muhlstein and R.O. Ritchie, *Advanced Engineering Materials*, **9**(1-2), 15-30, 2007.
- IR11. *In situ nanoindentation in the TEM*, O.L. Warren, Z. Shan; S.A.S. Asif, E.A. Stach, J.W. Morris, Jr., and A.M. Minor, *Materials Today*, **10**(4), 59-60, 2007.
- IR12. *Dislocations in semiconductors*; E.A. Stach and R. Hull, review article in *Encyclopedia of Materials: Science and Technology*, ed. K.H.J. Jurgen Bushow, R.W. Cahn, M.C. Flemings, B. Ilschner, E.J. Kramer and S. Mahajan, Pergamon Press, Amsterdam, 2001.
- IR13. *Equilibrium and metastable strained layer semiconductor heterostructures*; R. Hull and E.A. Stach; *Current Opinion in Solid State and Materials Science*, **1**(1), 21-8, 1996.

Refereed Journal Articles

- J1. P. Kumar, J.P. Horwath, A.C. Foucher, C.C. Price, N. Acero, V.B. Shenoy, E.A. Stach, D. Jariwala, Direct visualization of out-of-equilibrium structural transformations in atomically thin chalcogenides, *npj 2D Materials and Applications* 4(1) (2020) 1-10.
- J2. Mao, X.; Foucher, A.; Montini, T.; Stach, E.A.; Fornasiero, P.; Gorte, R., Epitaxial and Strong Support Interactions between Pt and LaFeO₃ Films Stabilize Pt Dispersion. *J. Am. Chem. Soc.* **2020**, 142, 10373.
- J3. R. Rao, J. Carpena-Núñez, N.T. Dee, D. Zakharov, J.A. Boscoboinik, E.A. Stach, A.J. Hart, B. Maruyama, Maximization of carbon nanotube yield by solid carbon-assisted dewetting of iron catalyst films, *Carbon* 165 (2020) 251.

- J4. F. Bertella, C.W. Lopes, A.C. Foucher, G. Agostini, P. Concepción, E.A. Stach, A. Martínez, Insights into the promotion with Ru of Co/TiO₂ Fischer-Tropsch catalysts: An in situ spectroscopic study, *ACS Catalysis* **11** (2020) 6042.
- J5. Luneau, M.; Guan, E. J.; Chen, W.; Foucher, A. C.; Marcella, N.; Shirman, T.; Verbart, D. M. A.; Aizenberg, J.; Aizenberg, M.; Stach, E. A.; Madix, R. J.; Frenkel, A. I.; Friend, C. M., Enhancing catalytic performance of dilute metal alloy nanomaterials. *Comm. Chem.* **2020**, *3* (1), 9.
- J6. Hwang, S.; Stach, E. A., Using in situ and operando methods to characterize phase changes in charged lithium nickel cobalt aluminum oxide cathode materials. *J. Phys. D-Appl. Phys.* **2020**, *53* (11), 14.
- J7. Modi, G., Stach, E. A., & Agarwal, R. (2020). Low Power Switching through Disorder and Carrier Localization in Bismuth Doped Germanium Telluride Phase Change Memory Nanowires. *ACS Nano*, *14*, 2162-2171.
- J8. Deysler, G.; Shuck, C. E.; Hantanasirisakul, K.; Frey, N. C.; Foucher, A. C.; Maleski, K.; Sarycheva, A.; Shenoy, V. B.; Stach, E. A.; Anasori, B.; Gogotsi, Y., Synthesis of Mo₄VC₄ MAX Phase and Two-Dimensional Mo₄VC₄ MXene with Five Atomic Layers of Transition Metals. *ACS Nano* **2020**, *14* (1), 204-217.
- J9. Guan, E. J.; Foucher, A. C.; Marcella, N.; Shirman, T.; Luneau, M.; Head, A. R.; Verbart, D. M. A.; Aizenberg, J.; Friend, C. M.; Stacchiola, D.; Stach, E. A.; Frenkel, A. I., New Role of Pd Hydride as a Sensor of Surface Pd Distributions in Pd-Au Catalysts. *ChemCatChem* **2020**, *12* (3), 717-721.
- J10. Pepin, P. A.; Lee, J. D.; Foucher, A. C.; Murray, C. B.; Stach, E. A.; Vohs, J. M., The Influence of Surface Platinum Deposits on the Photocatalytic Activity of Anatase TiO₂ Nanocrystals. *The Journal of Physical Chemistry C* **2019**, *123* (16), 10477-10486.
- J11. Mao, X.; Foucher, A.; Stach, E. A.; Gorte, R. J., A Study of Support Effects for CH₄ and CO Oxidation over Pd Catalysts on ALD-Modified Al₂O₃. *Catalysis Letters* **2019**, *149* (4), 905-915.
- J12. Glachman, N.; Geller, N.; Shea, A.; Verret, V. A.; Karki, K.; Rodriguez-Manzo, J.; Salmon, N. J.; Asem, D. H.; Jariwala, D.; Stach, E., Development of a Method to Characterize Active Sites in Photocatalysis using operando Transmission Electron Microscopy. *Microscopy and Microanalysis* **2019**, *25* (S2), 1444-1445.
- J13. Lee, J. D.; Jishkariani, D.; Zhao, Y.; Najmr, S.; Rosen, D.; Kikkawa, J. M.; Stach, E. A.; Murray, C. B., Tuning the Electrocatalytic Oxygen Reduction Reaction Activity of Pt-Co Nanocrystals by Cobalt Concentration with Atomic-Scale Understanding. *ACS Applied Materials & Interfaces* **2019**, *11* (30), 26789-26797.
- J14. Manfrinato, V. R.; Camino, F. E.; Stein, A.; Zhang, L. H.; Lu, M.; Stach, E. A.; Black, C. T., Patterning Si at the 1 nm Length Scale with Aberration-Corrected Electron-Beam Lithography: Tuning of Plasmonic Properties by Design. *Adv. Funct. Mater.* **2019**, *29* (52), 9.
- J15. Zugic, B.; van Spronsen, M. A.; Heine, C.; Montemore, M. M.; Li, Y. Y.; Zakharov, D. N.; Karakalos, S.; Lechner, B. A. J.; Crumlin, E.; Biener, M. M.; Frenkel, A. I.; Biener, J.; Stach, E. A.; Salmeron, M. B.; Kaxiras, E.; Madix, R. J.; Friend, C. M., Evolution of steady-state material properties during catalysis: Oxidative coupling of methanol over nanoporous Ag_{0.03}Au_{0.97}. *J. Catal.* **2019**, *380*, 366-374.
- J16. Dee, N. T.; Li, J. J.; White, A. O.; Jacob, C.; Shi, W. B.; Kidambi, P. R.; Cui, K. H.; Zakharov, D. N.; Jankovic, N. Z.; Bedewy, M.; Chazot, C. A. C.; Carpena-Nunez, J.; Maruyama, B.; Stach, E. A.; Plata, D. L.; Hart, A. J., Carbon-assisted catalyst pretreatment enables straightforward synthesis of high-density carbon nanotube forests. *Carbon* **2019**, *153*, 196-205.

- J17. Fu, M. S.; Yao, Z. P.; Ma, X.; Dong, H.; Sun, K.; Hwang, S.; Hu, E. Y.; Gan, H.; Yao, Y.; Stach, E. A.; Wolverton, C.; Su, D., Expanded lithiation of titanium disulfide: Reaction kinetics of multi-step conversion reaction. *Nano Energy* **2019**, *63*, 8.
- J18. Carpena-Nunez, J.; Boscoboinik, J. A.; Saber, S.; Rao, R.; Zhong, J. Q.; Maschmann, M. R.; Kidambi, P. R.; Dee, N. T.; Zakharov, D. N.; Hart, A. J.; Stach, E. A.; Maruyama, B., Isolating the Roles of Hydrogen Exposure and Trace Carbon Contamination on the Formation of Active Catalyst Populations for Carbon Nanotube Growth. *ACS Nano* **2019**, *13* (8), 8736-8748.
- J19. Meng, Q. P.; Xu, G. Y.; Xin, H. L.; Stach, E. A.; Zhu, Y. M.; Su, D., Quantification of Charge Transfer at the Interfaces of Oxide Thin Films. *J. Phys. Chem. A* **2019**, *123* (21), 4632-4637.
- J20. Li, J.; Hwang, S.; Guo, F. M.; Li, S.; Chen, Z. W.; Kou, R. H.; Sun, K.; Sun, C. J.; Gan, H.; Yu, A. P.; Stach, E. A.; Zhou, H.; Su, D., Phase evolution of conversion-type electrode for lithium ion batteries. *Nature Communications* **2019**, *10*, 10.
- J21. Zhang, Q.; Yue, S. Y.; Quilty, C. D.; Li, J.; Zou, S. H.; Stach, E. A.; Dooryhee, E.; Takeuchi, K. J.; Takeuchi, E. S.; Wong, S. S.; Marschilok, A. C., Impact of Synthesis Method on Phase Transformations of Layered Lithium Vanadium Oxide upon Electrochemical (De)lithiation. *J. Electrochem. Soc.* **2019**, *166* (4), A771-A778.
- J22. Zhao, Z. B.; Singh, A.; Chesin, J.; Armitage, R.; Wildeson, I.; Deb, P.; Armstrong, A.; Kisslinger, K.; Stach, E. A.; Gradecak, S., Cathodoluminescence as an effective probe of carrier transport and deep level defects in droop-mitigating InGaN/GaN quantum well heterostructures. *Appl. Phys. Express* **2019**, *12* (3), 5.
- J23. Panciera, F.; Tersoff, J.; Gamalski, A. D.; Reuter, M. C.; Zakharov, D.; Stach, E. A.; Hofmann, S.; Ross, F. M., Surface Crystallization of Liquid Au-Si and Its Impact on Catalysis. *Adv. Mater.* **2019**, *31* (5), 7.
- J24. Vishnubhotla, S. B.; Chen, R. M.; Khanal, S. R.; Li, J.; Stach, E. A.; Martini, A.; Jacobs, T. D. B., Quantitative measurement of contact area and electron transport across platinum nanocontacts for scanning probe microscopy and electrical nanodevices. *Nanotechnology* **2019**, *30* (4), 10.
- J25. Li, J.; Meng, Q. P.; Zhang, Y. M.; Peng, L. L.; Yu, G. H.; Marschilok, A. C.; Wu, L. J.; Su, D.; Takeuchi, K. J.; Takeuchi, E. S.; Zhu, Y. M.; Stach, E. A., Size-dependent kinetics during non-equilibrium lithiation of nano-sized zinc ferrite. *Nature Communications* **2019**, *10*, 8.
- J26. Lin, C.; Jang, J. B.; Zhang, L.; Stach, E. A.; Gorte, R. J., Improved Coking Resistance of "Intelligent" Ni Catalysts Prepared by Atomic Layer Deposition. *ACS Catalysis* **2018**, *8* (8), 7679-7687.
- J27. Liu, D.; Li, Y.; Kottwitz, M.; Yan, B.; Yao, S.; Gamalski, A.; Grolimund, D.; Safonova, O. V.; Nachtegaal, M.; Chen, J. G.; Stach, E. A.; Nuzzo, R. G.; Frenkel, A. I., Identifying Dynamic Structural Changes of Active Sites in Pt-Ni Bimetallic Catalysts Using Multimodal Approaches. *ACS Catalysis* **2018**, *8* (5), 4120-4131.
- J28. Karki, K.; Wu, L. J.; Ma, Y.; Armstrong, M. J.; Holmes, J. D.; Garofalini, S. H.; Zhu, Y. M.; Stach, E. A.; Wang, F., Revisiting Conversion Reaction Mechanisms in Lithium Batteries: Lithiation-Driven Topotactic Transformation in FeF₂. *J. Am. Chem. Soc.* **2018**, *140* (51), 17915-17922.
- J29. Yan, B. H.; Wu, Q. Y.; Cen, J. J.; Timoshenko, J.; Frenkel, A. I.; Su, D.; Chen, X. Y.; Paris, J. B.; Stach, E.; Orlov, A.; Chen, J. G. G., Highly active subnanometer Rh clusters derived from Rh-doped SrTiO₃ for CO₂ reduction. *Appl. Catal. B-Environ.* **2018**, *237*, 1003-1011.
- J30. Rao, R.; Pint, C. L.; Islam, A. E.; Weatherup, R. S.; Hofmann, S.; Meshot, E. R.; Wu, F. Q.; Zhou, C. W.; Dee, N.; Amama, P. B.; Carpena-Nunez, J.; Shi, W. B.; Plata, D. L.; Penev, E. S.; Yakobson, B. I.;

- Balbuena, P. B.; Bichara, C.; Futaba, D. N.; Noda, S.; Shin, H. M.; Kim, K. S.; Simard, B.; Mirri, F.; Pasquali, M.; Fornasiero, F.; Kauppinen, E. I.; Arnold, M.; Cola, B. A.; Nikolaev, P.; Arepalli, S.; Cheng, H. M.; Zakharov, D. N.; Stach, E. A.; Zhang, J.; Wei, F.; Terrones, M.; Geohagan, D. B.; Maruyama, B.; Maruyama, S.; Li, Y.; Adams, W. W.; Hart, A. J., Carbon Nanotubes and Related Nanomaterials: Critical Advances and Challenges for Synthesis toward Mainstream Commercial Applications. *ACS Nano* **2018**, *12* (12), 11756-11784.
- J31. Zhu, M. H.; Li, B.; Jehng, J. M.; Sharma, L.; Taborda, J.; Zhang, L. H.; Stach, E.; Wachs, I. E.; Wu, Z. L.; Baltrusaitis, J., Molecular structure and sour gas surface chemistry of supported K₂O/WO₃/Al₂O₃ catalysts. *Appl. Catal. B-Environ.* **2018**, *232*, 146-154.
- J32. Singh, N.; Arthur, T. S.; Tutusaus, O.; Li, J.; Kisslinger, K.; Xin, H. L. L.; Stach, E. A.; Fan, X. D.; Mohtadi, R., Achieving High Cycling Rates via In Situ Generation of Active Nanocomposite Metal Anodes. *ACS Appl. Energ. Mater.* **2018**, *1* (9), 4651-4661.
- J33. Zhang, X.; Bruck, A. M.; Zhu, Y.; Peng, L. L.; Li, J.; Stach, E.; Zhu, Y. M.; Takeuchi, K. J.; Takeuchi, E. S.; Marschilok, A. C.; Yu, G. H., Probing enhanced lithium-ion transport kinetics in 2D holey nanoarchitected electrodes. *Nano Futures* **2018**, *2* (3), 11.
- J34. Camino, F. E.; Manfrinato, V. R.; Stein, A.; Zhang, L. H.; Lu, M.; Stach, E. A.; Black, C. T., Single-Digit Nanometer Electron-Beam Lithography with an Aberration-Corrected Scanning Transmission Electron Microscope. *J. Vis. Exp.* **2018**, (139), 7.
- J35. Lin, C.; Jang, J. B.; Zhang, L. H.; Stach, E. A.; Gorte, R. J., Improved Coking Resistance of "Intelligent" Ni Catalysts Prepared by Atomic Layer Deposition. *Acs Catalysis* **2018**, *8* (8), 7679-7687.
- J36. Zou, L. F.; Saidi, W. A.; Lei, Y. K.; Liu, Z. Y.; Li, J.; Li, L.; Zhu, Q.; Zakharov, D.; Stach, E. A.; Yang, J. C.; Wang, G. F.; Zhou, G. W., Segregation induced order-disorder transition in Cu(Au) surface alloys. *Acta Mater.* **2018**, *154*, 220-227.
- J37. Chen, X. B.; Wu, D. X.; Zou, L. F.; Yin, Q. Y.; Zhang, H. L.; Zakharov, D. N.; Stach, E. A.; Zhou, G. W., In situ atomic-scale observation of inhomogeneous oxide reduction. *Chem. Commun.* **2018**, *54* (53), 7342-7345.
- J38. Phivilay, S. P.; Roberts, C. A.; Gamalski, A. D.; Stach, E. A.; Zhang, S. R.; Nguyen, L.; Tang, Y.; Xiong, A. K.; Puzos, A. A.; Tao, F. F.; Domen, K.; Wachs, I. E., Anatomy of a Visible Light Activated Photocatalyst for Water Splitting. *Acs Catalysis* **2018**, *8* (7), 6650-6658.
- J39. Liu, D. Y.; Li, Y. Y.; Kottwitz, M.; Yan, B. H.; Yao, S. Y.; Gamalski, A.; Grolimund, D.; Safonova, O. V.; Nachtegaal, M.; Chen, J. G. G.; Stach, E. A.; Nuzzo, R. G.; Frenkel, A. I., Identifying Dynamic Structural Changes of Active Sites in Pt-Ni Bimetallic Catalysts Using Multimodal Approaches. *Acs Catalysis* **2018**, *8* (5), 4120-4131.
- J40. Yue, S. Y.; Li, J.; Wang, L.; Haider, B.; Stach, E. A.; Tong, X.; Wong, S. S., Synthesis, Structural Characterization, and Growth Mechanism of Li_{1+x}V₃O₈ Submicron Fibers for Lithium-Ion Batteries. *Cryst. Growth Des.* **2018**, *18* (4), 2055-2066.
- J41. Wang, L.; Bock, D. C.; Li, J.; Stach, E. A.; Marschilok, A. C.; Takeuchi, K. J.; Takeuchi, E. S., Synthesis and Characterization of CuFe₂O₄ Nano/Submicron Wire-Carbon Nanotube Composites as Binder-free Anodes for Li-Ion Batteries. *Acs Applied Materials & Interfaces* **2018**, *10* (10), 8770-8785.
- J42. Wu, Q. Y.; Yan, B. H.; Cen, J. J.; Timoshenko, J.; Zakharov, D. N.; Chen, X. Y.; Xin, H. L. L.; Yao, S. Y.; Parise, J. B.; Frenkel, A. I.; Stach, E. A.; Chen, J. G. G.; Orlov, A., Growth of Nanoparticles with Desired Catalytic Functions by Controlled Doping-Segregation of Metal in Oxide. *Chem. Mat.* **2018**, *30* (5), 1585-1592.

- J43. Wang, L.; Zhang, Y.; Guo, H.; Li, J.; Stach, E. A.; Tong, X.; Takeuchi, E. S.; Takeuchi, K. J.; Liu, P.; Marschilok, A. C.; Wong, S. S., Structural and Electrochemical Characteristics of Ca-Doped "Flower-like" Li₄Ti₅O₁₂ Motifs as High-Rate Anode Materials for Lithium-Ion Batteries. *Chem. Mat.* **2018**, *30* (3), 671-684.
- J44. Liu, L. C.; Zakharov, D. N.; Arenal, R.; Concepcion, P.; Stach, E. A.; Corma, A., Evolution and stabilization of subnanometric metal species in confined space by in situ TEM. *Nature Communications* **2018**, *9*, 10.
- J45. Liu, Q.; Liu, Y. D.; Yang, F.; He, H.; Xiao, X. H.; Ren, Y.; Lu, W. Q.; Stach, E.; Xie, J., Capacity Fading Mechanism of the Commercial 18650 LiFePO₄-Based Lithium-Ion Batteries: An in Situ Time-Resolved High-Energy Synchrotron XRD Study. *ACS Applied Materials & Interfaces* **2018**, *10* (5), 4622-4629.
- J46. Nguyen, L.; Hashimoto, T.; Zakharov, D. N.; Stach, E. A.; Rooney, A. P.; Berkels, B.; Thompson, G. E.; Haigh, S. J.; Burnett, T. L., Atomic-Scale Insights into the Oxidation of Aluminum. *ACS Applied Materials & Interfaces* **2018**, *10* (3), 2230-2235.
- J47. Yin, Q. Y.; Gao, F.; Gu, Z. Y.; Wang, J. R.; Stach, E. A.; Zhou, G. W., In situ imaging of the soldering reactions in nanoscale Cu/Sn/Cu and Sn/Cu/Sn diffusion couples. *J. Appl. Phys.* **2018**, *123* (2), 9.
- J48. Peng, L. L.; Fang, Z. W.; Li, J.; Wang, L.; Bruck, A. M.; Zhu, Y.; Zhang, Y. M.; Takeuchi, K. J.; Marschilok, A. C.; Stach, E. A.; Takeuchi, E. S.; Yu, G. H., Two-Dimensional Hole Nanoarchitectures Created by Confined Self-Assembly of Nanoparticles via Block Copolymers: From Synthesis to Energy Storage Property. *ACS Nano* **2018**, *12* (1), 820-828.
- J49. Zou, L. F.; Yang, C. M.; Lei, Y. K.; Zakharov, D.; Wiezorek, J. M. K.; Su, D.; Yin, Q. Y.; Li, J.; Liu, Z. Y.; Stach, E. A.; Yang, J. C.; Qi, L.; Wang, G. F.; Zhou, G. W., Dislocation nucleation facilitated by atomic segregation. *Nature Materials* **2018**, *17* (1), 56-+.
- J50. Dou, J.-H.; Sun, L.; Ge, Y.; Li, W.; Hendon, C. H.; Li, J.; Gul, S.; Yano, J.; Stach, E. A.; Dincă, M., Signature of Metallic Behavior in the Metal-Organic Frameworks M₃(hexaiminobenzene)₂ (M = Ni, Cu). *J. Am. Chem. Soc.* **2017**, *139* (39), 13608-13611.
- J51. Zugic, B.; Wang, L.; Heine, C.; Zakharov, D. N.; Lechner, B. A. J.; Stach, E. A.; Biener, J.; Salmeron, M.; Madix, R. J.; Friend, C. M., Dynamic restructuring drives catalytic activity on nanoporous gold-silver alloy catalysts. *Nature Materials* **2017**, *16* (5), 558-564.
- J52. Han, B.; Stoerzinger, Kelsey A.; Tileli, V.; Gamalski, Andrew D.; Stach, Eric A.; Shao-Horn, Y., Nanoscale structural oscillations in perovskite oxides induced by oxygen evolution. *Nature Materials* **2017**, *16* (1), 121-126.
- J53. Zou, L. F.; Li, J.; Zakharov, D.; Saidi, W. A.; Stach, E. A.; Zhou, G. W., Atomically Visualizing Elemental Segregation-Induced Surface Alloying and Restructuring. *J. Phys. Chem. Lett.* **2017**, *8* (24), 6035-6040.
- J54. Dou, J. H.; Sun, L.; Ge, Y. C.; Li, W.; Hendon, C. H.; Li, J.; Gul, S.; Yano, J. K.; Stach, E. A.; Dinca, M., Signature of Metallic Behavior in the Metal-Organic Frameworks M₃(hexaiminobenzene)₂ (M = Ni, Cu). *J. Am. Chem. Soc.* **2017**, *139* (39), 13608-13611.
- J55. Mistry, H.; Choi, Y. W.; Bagger, A.; Scholten, F.; Bonifacio, C. S.; Sinev, I.; Divins, N. J.; Zegkinoglou, I.; Jeon, H. S.; Kisslinger, K.; Stach, E. A.; Yang, J. C.; Rossmeisl, J.; Roldan Cuenya, B., Enhanced Carbon Dioxide Electroreduction to Carbon Monoxide over Defect-Rich Plasma-Activated Silver Catalysts. *Angew. Chem.-Int. Edit.* **2017**, *56* (38), 11394-11398.

- J56. Sun, L.; Liao, B. L.; Sheberla, D.; Kraemer, D.; Zhou, J. W.; Stach, E. A.; Zakharov, D.; Stavila, V.; Talin, A. A.; Ge, Y. C.; Allendorf, M. D.; Chen, G.; Leonard, F.; Dinca, M., A Microporous and Naturally Nanostructured Thermoelectric Metal-Organic Framework with Ultralow Thermal Conductivity. *Joule* **2017**, *1* (1), 168-177.
- J57. Islam, A. E.; Zakharov, D. N.; Carpena-Nunez, J.; Hsiao, M. S.; Drummy, L. F.; Stach, E. A.; Maruyama, B., Atomic level cleaning of poly-methyl-methacrylate residues from the graphene surface using radiolized water at high temperatures. *Appl. Phys. Lett.* **2017**, *111* (10), 5.
- J58. Zhao, S.; Li, Y. Y.; Liu, D. Y.; Liu, J.; Liu, Y. M.; Zakharov, D. N.; Wu, Q. Y.; Orlov, A.; Gewirth, A. A.; Stach, E. A.; Nuzzo, R. G.; Frenkel, A. I., Multimodal Study of the Speciations and Activities of Supported Pd Catalysts During the Hydrogenation of Ethylene. *J. Phys. Chem. C* **2017**, *121* (34), 18962-18972.
- J59. Zou, L. F.; Li, J.; Zakharov, D.; Stach, E. A.; Zhou, G. W., In situ atomic-scale imaging of the metal/oxide interfacial transformation. *Nature Communications* **2017**, *8*, 8.
- J60. Carpena-Nunez, J.; Boscoboinik, J.; Saber, S.; Zhong, J. Q.; Stach, E.; Zakharov, D.; Maruyama, B., Using ambient pressure-photoelectron spectroscopy as a diagnostic tool for carbon nanotube growth. *Abstr. Pap. Am. Chem. Soc.* **2017**, *254*, 2.
- J61. Li, Y. Y.; Zhao, S.; Liu, D. Y.; Orlov, A.; Nuzzo, R.; Stach, E.; Frenkel, A., Multi-modal operando investigations of activities and phase transformations of supported Pd nanocatalysts during ethylene hydrogenation reaction. *Abstr. Pap. Am. Chem. Soc.* **2017**, *254*, 1.
- J62. Orlov, A.; Wu, Q. Y.; Yan, B. H.; Cen, J. J.; Frenkel, A.; Stach, E.; Xin, H. L.; Chen, J. G., Controlling size of Rh nanoparticles produced by doping-segregation method and tuning them for catalytic CO₂ conversion. *Abstr. Pap. Am. Chem. Soc.* **2017**, *254*, 1.
- J63. Wu, Q. Y.; Yan, B. H.; Cen, J. J.; Stach, E.; Frenkel, A.; Chen, J. G.; Orlov, A., Developing new catalytic application of doping-segregation method for selective CO₂ conversion. *Abstr. Pap. Am. Chem. Soc.* **2017**, *254*, 1.
- J64. Manfrinato, V. R.; Stein, A.; Zhang, L. H.; Nam, C. Y.; Yager, K. G.; Stach, E. A.; Black, C. T., Aberration-Corrected Electron Beam Lithography at the One Nanometer Length Scale. *Nano Lett.* **2017**, *17* (8), 4562-4567.
- J65. Wu, T.; Alharbi, A.; You, K. D.; Kisslinger, K.; Stach, E. A.; Shahrjerdi, D., Experimental Study of the Detection Limit in Dual-Gate Biosensors Using Ultrathin Silicon Transistors. *ACS Nano* **2017**, *11* (7), 7142-7147.
- J66. Liu, Y. D.; Liu, Q.; Xin, L.; Liu, Y. Z.; Yang, F.; Stach, E. A.; Xie, J., Making Li-metal electrodes rechargeable by controlling the dendrite growth direction. *Nat. Energy* **2017**, *2* (7), 10.
- J67. Hwang, S.; Meng, Q. P.; Chen, P. F.; Kisslinger, K.; Cen, J. J.; Orlov, A.; Zhu, Y. M.; Stach, E. A.; Chu, Y. H.; Su, D., Strain Coupling of Conversion-type Fe₃O₄ Thin Films for Lithium Ion Batteries. *Angew. Chem.-Int. Edit.* **2017**, *56* (27), 7813-7816.
- J68. Shi, Y.; Zhang, J.; Bruck, A. M.; Zhang, Y. M.; Li, J.; Stach, E. A.; Takeuchi, K. J.; Marschilok, A. C.; Takeuchi, E. S.; Yu, G. H., A Tunable 3D Nanostructured Conductive Gel Framework Electrode for High-Performance Lithium Ion Batteries. *Adv. Mater.* **2017**, *29* (22), 8.
- J69. Zhang, Q.; Bruck, A. M.; Bock, D. C.; Li, J.; Sarbada, V.; Hull, R.; Stach, E. A.; Takeuchi, K. J.; Takeuchi, E. S.; Marschilok, A. C., Visualization of structural evolution and phase distribution of a lithium vanadium oxide (Li_{1.1}V₃O₈) electrode via an operando and in situ energy dispersive X-ray diffraction technique. *Phys. Chem. Chem. Phys.* **2017**, *19* (21), 14160-14169.

- J70. Liu, H.; Wolf, M.; Karki, K.; Yu, Y. S.; Stach, E. A.; Cabana, J.; Chapman, K. W.; Chupas, P. J., Intergranular Cracking as a Major Cause of Long-Term Capacity Fading of Layered Cathodes. *Nano Lett.* **2017**, *17* (6), 3452-3457.
- J71. Zugic, B.; Wang, L. C.; Heine, C.; Zakharov, D. N.; Lechner, B. A. J.; Stach, E. A.; Biener, J.; Salmeron, M.; Madix, R. J.; Friend, C. M., Dynamic restructuring drives catalytic activity on nanoporous gold-silver alloy catalysts. *Nature Materials* **2017**, *16* (5), 558-+.
- J72. Guler, U.; Zemlyanov, D.; Kim, J.; Wang, Z. X.; Chandrasekar, R.; Meng, X. G.; Stach, E.; Kildishev, A. V.; Shalaev, V. M.; Boltasseva, A., Plasmonic Titanium Nitride Nanostructures via Nitridation of Nanopatterned Titanium Dioxide. *Adv. Opt. Mater.* **2017**, *5* (7), 6.
- J73. Ayoola, H.; Bonifacio, C.; Zhu, Q.; Kas, J.; Kisslinger, K.; Su, D.; Stach, E.; Rehr, J.; Al-Saidi, W.; Yang, J., Atomic structure of the Pt/ γ -Al₂O₃ interface through a combined experiment and theory approach: A model catalyst study. *Abstr. Pap. Am. Chem. Soc.* **2017**, 253, 2.
- J74. Li, Y. Y.; Zhao, S.; Liu, D. Y.; Nuzzo, R.; Stach, E.; Frenkel, A., Multi-modal operando investigations of activities and phase transformations of supported Pd nanocatalysts during ethylene hydrogenation reaction. *Abstr. Pap. Am. Chem. Soc.* **2017**, 253, 1.
- J75. Orlov, A.; Wu, Q. Y.; Cen, J. J.; Ridge, C.; Lindsay, M.; Zhao, S.; Zakharov, D.; Stach, E.; Connors, E.; Tong, X.; Su, D., Development of a new generation of stable, tunable, and catalytically active nanoparticles produced by the helium nanodroplet deposition method. *Abstr. Pap. Am. Chem. Soc.* **2017**, 253, 2.
- J76. Stach, E., Watching catalysts work: Using environmental transmission electron microscopy to understand nanotube growth. *Abstr. Pap. Am. Chem. Soc.* **2017**, 253, 1.
- J77. Stach, E.; Li, Y. Y.; Zhao, S.; Gamalski, A.; Zakharov, D.; Tappero, R.; Chen, J. G.; Nuzzo, R.; Frenkel, A., Characterizing working catalysts with correlated electron and photon probes. *Abstr. Pap. Am. Chem. Soc.* **2017**, 253, 1.
- J78. Luo, S.; Barrio, L.; Nguyen-Phan, T. D.; Vovchok, D.; Johnston-Peck, A. C.; Xu, W. Q.; Stach, E. A.; Rodriguez, J. A.; Senanayake, S. D., Importance of Low Dimensional CeOx Nanostructures in Pt/CeOx-TiO₂ Catalysts for the Water-Gas Shift Reaction. *J. Phys. Chem. C* **2017**, *121* (12), 6635-6642.
- J79. Zhang, Q.; Brady, A. B.; Pelliccione, C. J.; Bock, D. C.; Bruck, A. M.; Li, J.; Sarbada, V.; Hull, R.; Stach, E. A.; Takeuchi, K. J.; Takeuchi, E. S.; Liu, P.; Marschilok, A. C., Investigation of Structural Evolution of Li_{1.1}V₃O₈ by In Situ X-ray Diffraction and Density Functional Theory Calculations. *Chem. Mat.* **2017**, *29* (5), 2364-2373.
- J80. Yin, Q. Y.; Gao, F.; Wang, J. R.; Gu, Z. Y.; Stach, E. A.; Zhou, G. W., Length-dependent melting behavior of Sn nanowires. *J. Mater. Res.* **2017**, *32* (6), 1194-1202.
- J81. Walther, T.; Dunin-Borkowski, R. E.; Rouviere, J. L.; Stach, E. A., ABERRATION CORRECTED TRANSMISSION ELECTRON MICROSCOPY. *J. Mater. Res.* **2017**, *32* (5), 911-911.
- J82. Yin, Q. Y.; Gao, F.; Gu, Z. Y.; Wang, J. R.; Stach, E. A.; Zhou, G. W., Interface dynamics in one-dimensional nanoscale Cu/Sn couples. *Acta Mater.* **2017**, *125*, 136-144.
- J83. Zhang, H. L.; Karki, K.; Huang, Y. Q.; Whittingham, M. S.; Stach, E. A.; Zhou, G. W., Atomic Insight into the Layered/Spinel Phase Transformation in Charged LiNi_{0.80}Co_{0.15}Al_{0.05}O₂ Cathode Particles. *J. Phys. Chem. C* **2017**, *121* (3), 1421-1430.
- J84. Zhang, Q.; Kercher, A. K.; Veith, G. M.; Sarbada, V.; Brady, A. B.; Li, J.; Stach, E. A.; Hull, R.; Takeuchi, K. J.; Takeuchi, E. S.; Dudney, N. J.; Marschilok, A. C., Lithium Vanadium Oxide

- (Li_{1.1V3O8}) Coated with Amorphous Lithium Phosphorous Oxynitride (LiPON): Role of Material Morphology and Interfacial Structure on Resulting Electrochemistry. *J. Electrochem. Soc.* **2017**, *164* (7), A1503-A1513.
- J85. Han, B. H.; Stoerzinger, K. A.; Tileli, V.; Gamalski, A. D.; Stach, E. A.; Shao-Horn, Y., Nanoscale structural oscillations in perovskite oxides induced by oxygen evolution. *Nature Materials* **2017**, *16* (1), 121-126.
- J86. Wang, L.; Li, Y. R.; Li, J.; Zou, S. H.; Stach, E. A.; Takeuchi, K. J.; Takeuchi, E. S.; Marschilok, A. C.; Wong, S. S., Correlating Preparative Approaches with Electrochemical Performance of Fe₃O₄-MWNT Composites Used as Anodes in Li-Ion Batteries. *ECS J. Solid State Sci. Technol.* **2017**, *6* (6), M3122-M3131.
- J87. Zhang, Q.; Bruck, A. M.; Bock, D. C.; Li, J.; Stach, E. A.; Takeuchi, E. S.; Takeuchi, K. J.; Marschilok, A. C., Energy Dispersive X-ray Diffraction (EDXRD) of Li_{1.1V3O8} Electrochemical Cell. *MRS Adv.* **2017**, *2* (7), 401-406.
- J88. Stach, E. A.; Li, J.; Xin, H.; Zakharov, D.; Kwon, Y. H.; Reichmanis, E., Combining post-specimen aberration correction and direct electron detection to image molecular structure in liquid crystal polymers. *Microscopy and Microanalysis* **2016**, *22*, 1924.
- J89. Han, L.; Meng, Q.; Wang, D.; Zhu, Y.; Wang, J.; Du, X.; Stach, E. A.; Xin, H. L., Interrogation of bimetallic particle oxidation in three dimensions at the nanoscale. *Nature Communications* **2016**, *7* (1), 13335.
- J90. Mistry, H.; Varela, A. S.; Bonifacio, C. S.; Zegkinoglou, I.; Sinev, I.; Choi, Y.-W.; Kisslinger, K.; Stach, E. A.; Yang, J. C.; Strasser, P., Highly selective plasma-activated copper catalysts for carbon dioxide reduction to ethylene. *Nature communications* **2016**, *7*, 12123.
- J91. Han, L. L.; Meng, Q. P.; Wang, D. L.; Zhu, Y. M.; Wang, J.; Du, X. W.; Stach, E. A.; Xin, H. L., Interrogation of bimetallic particle oxidation in three dimensions at the nanoscale. *Nature Communications* **2016**, *7*, 9.
- J92. Lewis, C. S.; Li, Y. R.; Wang, L.; Li, J.; Stach, E. A.; Takeuchi, K. J.; Marschilok, A. C.; Takeuchi, E. S.; Wong, S. S., Correlating Titania Nanostructured Morphologies with Performance as Anode Materials for Lithium-Ion Batteries. *ACS Sustain. Chem. Eng.* **2016**, *4* (12), 6299-6312.
- J93. Balakrishnan, V.; Bedewy, M.; Meshot, E. R.; Pattinson, S. W.; Polsen, E. S.; Laye, F.; Zakharov, D. N.; Stach, E. A.; Hart, A. J., Real-Time Imaging of Self-Organization and Mechanical Competition in Carbon Nanotube Forest Growth. *ACS Nano* **2016**, *10* (12), 11496-11504.
- J94. Yohe, S. L.; Choudhari, H. J.; Mehta, D. D.; Dietrich, P. J.; Detwiler, M. D.; Akatay, C. M.; Stach, E. A.; Miller, J. T.; Delgass, W. N.; Agrawal, R.; Ribeiro, F. H., High-pressure vapor-phase hydrodeoxygenation of lignin-derived oxygenates to hydrocarbons by a PtMo bimetallic catalyst: Product selectivity, reaction pathway, and structural characterization. *J. Catal.* **2016**, *344*, 535-552.
- J95. Liu, J.; Amit, Y.; Li, Y. Y.; Plonka, A. M.; Ghose, S.; Zhang, L. H.; Stach, E. A.; Banin, U.; Frenkel, A. I., Reversed Nanoscale Kirkendall Effect in Au-InAs Hybrid Nanoparticles. *Chem. Mat.* **2016**, *28* (21), 8032-8043.
- J96. Cordeiro, M. A. L.; Leite, E. R.; Stach, E. A., Controlling the Formation and Structure of Nanoparticle Superlattices through Surface Ligand Behavior. *Langmuir* **2016**, *32* (44), 11606-11614.
- J97. Taheri, M. L.; Stach, E. A.; Arslan, I.; Crozier, P. A.; Kabius, B. C.; LaGrange, T.; Minor, A. M.; Takeda, S.; Tanase, M.; Wagner, J. B.; Sharma, R., Current status and future directions for in situ transmission electron microscopy. *Ultramicroscopy* **2016**, *170*, 86-95.

- J98. Saha, B.; Saber, S.; Stach, E. A.; Kvam, E. P.; Sands, T. D., Understanding the Rocksalt-to-Wurtzite phase transformation through microstructural analysis of (Al,Sc)N epitaxial thin films. *Appl. Phys. Lett.* **2016**, *109* (17), 5.
- J99. Karki, K.; Huang, Y. Q.; Hwang, S.; Gamalski, A. D.; Whittingham, M. S.; Zhou, G. W.; Stach, E. A., Tuning the Activity of Oxygen in LiNi_{0.8}Co_{0.15}Al_{0.05}O₂ Battery Electrodes. *Acs Applied Materials & Interfaces* **2016**, *8* (41), 27762-27771.
- J100. House, S. D.; Bonifacio, C. S.; Grieshaber, R. V.; Li, L.; Zhang, Z. F.; Ciston, J.; Stach, E. A.; Yang, J. C., Statistical analysis of support thickness and particle size effects in HRTEM imaging of metal nanoparticles. *Ultramicroscopy* **2016**, *169*, 22-29.
- J101. Li, J.; He, K.; Meng, Q. P.; Li, X.; Zhu, Y. Z.; Hwang, S.; Sun, K.; Gan, H.; Zhu, Y. M.; Mo, Y. F.; Stach, E. A.; Su, D., Kinetic Phase Evolution of Spinel Cobalt Oxide during Lithiation. *ACS Nano* **2016**, *10* (10), 9577-9585.
- J102. Luria, J.; Kutes, Y.; Moore, A.; Zhang, L. H.; Stach, E. A.; Huey, B. D., Charge transport in CdTe solar cells revealed by conductive tomographic atomic force microscopy. *Nat. Energy* **2016**, *1*, 6.
- J103. Hwang, S.; Kim, S. Y.; Chung, K. Y.; Stach, E. A.; Kim, S. M.; Chang, W., Determination of the mechanism and extent of surface degradation in Ni-based cathode materials after repeated electrochemical cycling. *APL Mater.* **2016**, *4* (9), 7.
- J104. Cordeiro, M. A. L.; Leite, E.; Stach, E., Tailoring of oxide nanoparticle superstructures through deposition method, temperature and ligand behavior. *Abstr. Pap. Am. Chem. Soc.* **2016**, *252*, 1.
- J105. Li, Y. Y.; Zhao, S.; Nuzzo, R.; Stach, E.; Frenkel, A., Studying structural evolution of working catalysts with correlated X-ray and electron probes. *Abstr. Pap. Am. Chem. Soc.* **2016**, *252*, 1.
- J106. Luo, S.; Senanayake, S.; Thuyduong, N. P.; Vovchok, D.; Barrio, L.; Johnston-Peck, A.; Xu, W. Q.; Stach, E.; Rodriguez, J., Formation of Ceria nanostructure on TiO₂ nanoparticles: In situ study of synthesis, reduction of ceria supported on TiO₂ and WGS reaction activity. *Abstr. Pap. Am. Chem. Soc.* **2016**, *252*, 2.
- J107. Phivilay, S.; Roberts, C.; Gamalski, A.; Stach, E.; Zhang, S. R.; Nguyen, L.; Xiong, A. L.; Puretzky, A.; Tao, F.; Domen, K.; Wachs, I., Anatomy of a visible light activated photocatalyst for splitting of water. *Abstr. Pap. Am. Chem. Soc.* **2016**, *252*, 2.
- J108. Wu, Q. Y.; Ridge, C. J.; Zhao, S.; Zakharov, D.; Cen, J. J.; Tong, X.; Connors, E.; Su, D.; Stach, E. A.; Lindsay, C. M.; Orlov, A., Development of a New Generation of Stable, Tunable, and Catalytically Active Nanoparticles Produced by the Helium Nanodroplet Deposition Method. *J. Phys. Chem. Lett.* **2016**, *7* (15), 2910-2914.
- J109. Zhai, Y. M.; DuChene, J. S.; Wang, Y. C.; Qiu, J. J.; Johnston-Peck, A. C.; You, B.; Guo, W. X.; DiCiaccio, B.; Qian, K.; Zhao, E. W.; Ooi, F.; Hu, D. H.; Su, D.; Stach, E. A.; Zhu, Z. H.; Wei, W. D., Polyvinylpyrrolidone-induced anisotropic growth of gold nanoprisms in plasmon-driven synthesis. *Nature Materials* **2016**, *15* (8), 889-+.
- J110. Cama, C. A.; Pelliccione, C. J.; Brady, A. B.; Li, J.; Stach, E. A.; Wang, J. J.; Wang, J.; Takeuchi, E. S.; Takeuchi, K. J.; Marschilok, A. C., Redox chemistry of a binary transition metal oxide (AB₂O₄): a study of the Cu²⁺/Cu⁰ and Fe³⁺/Fe⁰ interconversions observed upon lithiation in a CuFe₂O₄ battery using X-ray absorption spectroscopy. *Phys. Chem. Chem. Phys.* **2016**, *18* (25), 16930-16940.
- J111. Hobbs, R. G.; Manfrinato, V. R.; Yang, Y. J.; Goodman, S. A.; Zhang, L. H.; Stach, E. A.; Berggren, K. K., High-Energy Surface and Volume Plasmons in Nanopatterned Sub-10 nm Aluminum Nanostructures. *Nano Lett.* **2016**, *16* (7), 4149-4157.

- J112. Bedewy, M.; Viswanath, B.; Meshot, E. R.; Zakharov, D. N.; Stach, E. A.; Hart, A. J., Measurement of the Dewetting, Nucleation, and Deactivation Kinetics of Carbon Nanotube Population Growth by Environmental Transmission Electron Microscopy. *Chem. Mat.* **2016**, *28* (11), 3804-3813.
- J113. Mistry, H.; Varela, A. S.; Bonifacio, C. S.; Zegkinoglou, I.; Sinev, I.; Choi, Y. W.; Kisslinger, K.; Stach, E. A.; Yang, J. C.; Strasser, P.; Roldan Cuenya, B., Highly selective plasma-activated copper catalysts for carbon dioxide reduction to ethylene. *Nature Communications* **2016**, *7*, 8.
- J114. He, K.; Zhang, S.; Li, J.; Yu, X. Q.; Meng, Q. P.; Zhu, Y. Z.; Hu, E. Y.; Sun, K.; Yun, H.; Yang, X. Q.; Zhu, Y. M.; Gan, H.; Mo, Y. F.; Stach, E. A.; Murray, C. B.; Su, D., Visualizing non-equilibrium lithiation of spinel oxide via in situ transmission electron microscopy. *Nature Communications* **2016**, *7*, 9.
- J115. Gamalski, A. D.; Tersoff, J.; Stach, E. A., Atomic Resolution in Situ Imaging of a Double-Bilayer Multistep Growth Mode in Gallium Nitride Nanowires. *Nano Lett.* **2016**, *16* (4), 2283-2288.
- J116. Garrick, T. R.; Diao, W. J.; Tengco, J. M.; Stach, E. A.; Senanayake, S. D.; Chen, D. A.; Monnier, J. R.; Weidner, J. W., The Effect of the Surface Composition of Ru-Pt Bimetallic Catalysts for Methanol Oxidation. *Electrochim. Acta* **2016**, *195*, 106-111.
- J117. Johnston-Peck, A. C.; Winterstein, J. P.; Roberts, A. D.; DuChene, J. S.; Qian, K.; Sweeny, B. C.; Wei, W. D.; Sharma, R.; Stach, E. A.; Herzing, A. A., Oxidation-state sensitive imaging of cerium dioxide by atomic-resolution low-angle annular dark field scanning transmission electron microscopy. *Ultramicroscopy* **2016**, *162*, 52-60.
- J118. Nguyen-Phan, T. D.; Liu, Z. Y.; Luo, S.; Gamalski, A. D.; Vovchok, D.; Xu, W. Q.; Stach, E. A.; Polyansky, D. E.; Fujita, E.; Rodriguez, J. A.; Senanayake, S. D., Unraveling the Hydrogenation of TiO₂ and Graphene Oxide/TiO₂ Composites in Real Time by in Situ Synchrotron X-ray Powder Diffraction and Pair Distribution Function Analysis. *J. Phys. Chem. C* **2016**, *120* (6), 3472-3482.
- J119. DuChene, J. S.; Williams, B. P.; Johnston-Peck, A. C.; Qiu, J. J.; Gomes, M.; Amilhau, M.; Bejleri, D.; Weng, J. N.; Su, D.; Huo, F. W.; Stach, E. A.; Wei, W. D., Elucidating the Sole Contribution from Electromagnetic Near-Fields in Plasmon-Enhanced Cu₂O Photocathodes. *Adv. Energy Mater.* **2016**, *6* (1), 10.
- J120. Jeong, S.; Lee, J.; Kim, H. C.; Hwang, J. Y.; Ku, B. C.; Zakharov, D. N.; Maruyama, B.; Stach, E. A.; Kim, S. M., Direct observation of morphological evolution of a catalyst during carbon nanotube forest growth: new insights into growth and growth termination. *Nanoscale* **2016**, *8* (4), 2055-2062.
- J121. Zhang, R. H.; Cho, S.; Lim, D. G.; Hu, X. Y.; Stach, E. A.; Handwerker, C. A.; Agrawal, R., Metal-metal chalcogenide molecular precursors to binary, ternary, and quaternary metal chalcogenide thin films for electronic devices. *Chem. Commun.* **2016**, *52* (28), 5007-5010.
- J122. Chou, Y. C.; Panciera, F.; Reuter, M. C.; Stach, E. A.; Ross, F. M., Nanowire growth kinetics in aberration corrected environmental transmission electron microscopy. *Chem. Commun.* **2016**, *52* (33), 5686-5689.
- J123. Li, Y.; Zakharov, D.; Zhao, S.; Tappero, R.; Jung, U.; Elsen, A.; Baumann, P.; Nuzzo, R. G.; Stach, E. A.; Frenkel, A. I., Complex structural dynamics of nanocatalysts revealed in Operando conditions by correlated imaging and spectroscopy probes. *Nature Communications* **2015**, *6* (1), 7583.
- J124. Sheets, E. J.; Yang, W. C.; Balow, R. B.; Wang, Y.; Walker, B. C.; Stach, E. A.; Agrawal, R., An in situ phosphorus source for the synthesis of Cu₃P and the subsequent conversion to Cu₃PS₄ nanoparticle clusters. *J. Mater. Res.* **2015**, *30* (23), 3710-3716.

- J125. Gamalski, A. D.; Tersoff, J.; Kodambaka, S.; Zakharov, D. N.; Ross, F. M.; Stach, E. A., The Role of Surface Passivation in Controlling Ge Nanowire Faceting. *Nano Lett.* **2015**, *15* (12), 8211-8216.
- J126. Zhao, S.; Li, Y. Y.; Stavitski, E.; Tappero, R.; Crowley, S.; Castaldi, M. J.; Zakharov, D. N.; Nuzzo, R. G.; Frenkel, A. I.; Stach, E. A., Operando Characterization of Catalysts through use of a Portable Microreactor. *ChemCatChem* **2015**, *7* (22), 3683-3691.
- J127. Sabnis, K. D.; Akatay, M. C.; Cui, Y. R.; Sollberger, F. G.; Stach, E. A.; Miller, J. T.; Delgass, W. N.; Ribeiro, F. H., Probing the active sites for water-gas shift over Pt/molybdenum carbide using multi-walled carbon nanotubes. *J. Catal.* **2015**, *330*, 442-451.
- J128. Nguyen-Phan, T. D.; Luo, S.; Liu, Z. Y.; Gamalski, A. D.; Tao, J.; Xu, W. Q.; Stach, E. A.; Polyansky, D. E.; Senanayake, S. D.; Fujita, E.; Rodriguez, J. A., Striving Toward Noble-Metal-Free Photocatalytic Water Splitting: The Hydrogenated-Graphene-TiO₂ Prototype. *Chem. Mat.* **2015**, *27* (18), 6282-6296.
- J129. He, K.; Lin, F.; Zhu, Y. Z.; Yu, X. Q.; Li, J.; Lin, R. Q.; Nordlund, D.; Weng, T. C.; Richards, R. M.; Yang, X. Q.; Doeff, M. M.; Stach, E. A.; Mo, Y. F.; Xin, H. L.; Su, D., Sodiation Kinetics of Metal Oxide Conversion Electrodes: A Comparative Study with Lithiation. *Nano Lett.* **2015**, *15* (9), 5755-5763.
- J130. Luo, S.; Phan, T. D. N.; Johnston-Peck, A.; Barrio, L.; Sallis, S.; Arena, D.; Kundu, S.; Xu, W. Q.; Piper, L.; Stach, E.; Polyansky, D.; Fujita, E.; Senanayake, S.; Rodriguez, J., Hierarchical heterogeneity at the CeO_x-TiO₂ interface: Growth, electronic and geometric structure, and the photocatalytic water splitting activity of oxide on oxide nanostructures. *Abstr. Pap. Am. Chem. Soc.* **2015**, *250*, 2.
- J131. Stach, E.; Li, Y. Y.; Zhao, S.; Zakharov, D.; Tappero, R.; Nuzzo, R.; Frenkel, A., Characterizing working catalysts with correlated electron and photon probes. *Abstr. Pap. Am. Chem. Soc.* **2015**, *250*, 2.
- J132. Zhao, S.; Li, Y. Y.; Wu, Q. Y.; Orlov, A.; Stach, E.; Frenkel, A.; Nuzzo, R., Effect of reaction induced nanoparticle restructuring on coke deposition as probed by operando spectroscopy and microscopy. *Abstr. Pap. Am. Chem. Soc.* **2015**, *250*, 2.
- J133. Panciera, F.; Chou, Y. C.; Reuter, M. C.; Zakharov, D.; Stach, E. A.; Hofmann, S.; Ross, F. M., Synthesis of nanostructures in nanowires using sequential catalyst reactions. *Nature Materials* **2015**, *14* (8), 820-+.
- J134. Hwang, S.; Kim, S. M.; Bak, S. M.; Kim, S. Y.; Cho, B. W.; Chung, K. Y.; Lee, J. Y.; Stach, E. A.; Chang, W., Using Real-Time Electron Microscopy To Explore the Effects of Transition-Metal Composition on the Local Thermal Stability in Charged Li(x)Ni(y)Mn(z)Co(1-y-z)O(2) Cathode Materials. *Chem. Mat.* **2015**, *27* (11), 3927-3935.
- J135. Li, Y.; Zakharov, D.; Zhao, S.; Tappero, R.; Jung, U.; Elsen, A.; Baumann, P.; Nuzzo, R. G.; Stach, E. A.; Frenkel, A. I., Complex structural dynamics of nanocatalysts revealed in Operando conditions by correlated imaging and spectroscopy probes. *Nature Communications* **2015**, *6*, 6.
- J136. Tiano, A. L.; Papaefthymiou, G. C.; Lewis, C. S.; Han, J.; Zhang, C.; Li, Q.; Shi, C. Y.; Abeykoon, A. M. M.; Billinge, S. J. L.; Stach, E.; Thomas, J.; Guerrero, K.; Munayco, P.; Munayco, J.; Scorzelli, R. B.; Burnham, P.; Viescas, A. J.; Wong, S. S., Correlating Size and Composition-Dependent Effects with Magnetic, Mossbauer, and Pair Distribution Function Measurements in a Family of Catalytically Active Ferrite Nanoparticles. *Chem. Mat.* **2015**, *27* (10), 3572-3592.

- J137. Agarwal, R.; Zakharov, D. N.; Krook, N. M.; Liu, W. J.; Berger, J. S.; Stach, E. A.; Agarwal, R., Real-Time Observation of Morphological Transformations in II-VI Semiconducting Nanobelts via Environmental Transmission Electron Microscopy. *Nano Lett.* **2015**, *15* (5), 3303-3308.
- J138. Miskin, C. K.; Yang, W. C.; Hages, C. J.; Carter, N. J.; Joglekar, C. S.; Stach, E. A.; Agrawal, R., 9.0% efficient Cu₂ZnSn(S,Se)(4) solar cells from selenized nanoparticle inks. *Prog. Photovoltaics* **2015**, *23* (5), 654-659.
- J139. Wu, F. Z.; Wang, H. H.; Raghothamachar, B.; Dudley, M.; Chung, G.; Zhang, J.; Thomas, B.; Sanchez, E. K.; Mueller, S. G.; Hansen, D.; Loboda, M. J.; Zhang, L. H.; Su, D.; Kisslinger, K.; Stach, E., Characterization of V-shaped Defects in 4H-SiC Homoepitaxial Layers. *J. Electron. Mater.* **2015**, *44* (5), 1293-1299.
- J140. Chou, N. H.; Zakharov, D.; Stach, E.; Harutyunyan, A., Chemical synthesis and High temperature structural stability of monodisperse ruthenium nanostructures. *Abstr. Pap. Am. Chem. Soc.* **2015**, *249*, 1.
- J141. DuChene, J.; Williams, B.; Johnston-Peck, A.; Qiu, J. J.; Su, D.; Stach, E.; Wei, W. D., Plasmon-enhanced Cu₂O photocathodes for solar water splitting. *Abstr. Pap. Am. Chem. Soc.* **2015**, *249*, 1.
- J142. Sweeny, B.; Qian, K.; DuChene, J.; Qiu, J. J.; Johnston-Peck, A.; Su, D.; Stach, E.; Wei, W., Plasmon-driven CO oxidation in Au-SrTiO₃ nanostructures at room temperature. *Abstr. Pap. Am. Chem. Soc.* **2015**, *249*, 1.
- J143. Zhai, Y. M.; DuChene, J.; Wang, Y. C.; Johnston-Peck, A.; DiCiaccio, B.; Qian, K.; Zhao, E.; Qiu, J. J.; Ooi, F.; Hu, D. H.; Su, D.; Stach, E.; Zhu, Z. H.; Wei, W., Plasmon-driven growth of gold nanoprisms with implications for photocatalysis. *Abstr. Pap. Am. Chem. Soc.* **2015**, *249*, 1.
- J144. Burmistrova, P. V.; Zakharov, D. N.; Favaloro, T.; Mohammed, A.; Stach, E. A.; Shakouri, A.; Sands, T. D., Effect of deposition pressure on the microstructure and thermoelectric properties of epitaxial ScN(001) thin films sputtered onto MgO(001) substrates. *J. Mater. Res.* **2015**, *30* (5), 626-634.
- J145. Wen, C. Y.; Reuter, M. C.; Su, D.; Stach, E. A.; Ross, F. M., Strain and Stability of Ultrathin Ge Layers in Si/Ge/Si Axial Heterojunction Nanowires. *Nano Lett.* **2015**, *15* (3), 1654-1659.
- J146. Zhang, H. B.; Lei, Y.; Kropf, A. J.; Zhang, G. H.; Elam, J. W.; Miller, J. T.; Sollberger, F.; Ribeiro, F.; Akatay, M. C.; Stach, E. A.; Dumesic, J. A.; Marshall, C. L., Enhancing the stability of copper chromite catalysts for the selective hydrogenation of furfural using ALD overcoating (vol 317, pg 284, 2014). *J. Catal.* **2015**, *323*, 165-165.
- J147. Jung, U.; Elsen, A.; Li, Y.; Smith, J. G.; Small, M. W.; Stach, E. A.; Frenkel, A. I.; Nuzzo, R. G., Comparative in Operando Studies in Heterogeneous Catalysis: Atomic and Electronic Structural Features in the Hydrogenation of Ethylene over Supported Pd and Pt Catalysts. *ACS Catalysis* **2015**, *5* (3), 1539-1551.
- J148. Misture, S. T.; Stach, E. A.; Huey, B. D.; Peterson, V. K., IN-SITU AND OPERANDO CHARACTERISATION OF MATERIALS Introduction. *J. Mater. Res.* **2015**, *30* (3), 325-325.
- J149. Hudry, D.; Abeykoon, A. M. M.; Hoy, J.; Sfeir, M. Y.; Stach, E. A.; Dickerson, J. H., Ultrathin Europium Oxide Nanoplatelets: "Hidden" Parameters and Controlled Synthesis, Unusual Crystal Structure, and Photoluminescence Properties. *Chem. Mat.* **2015**, *27* (3), 965-974.
- J150. Pattinson, S. W.; Viswanath, B.; Zakharov, D. N.; Li, J. J.; Stach, E. A.; Hart, A. J., Mechanism and Enhanced Yield of Carbon Nanotube Growth on Stainless Steel by Oxygen-Induced Surface Reconstruction. *Chem. Mat.* **2015**, *27* (3), 932-937.

- J151. Luo, S.; Nguyen-Phan, T. D.; Johnston-Peck, A. C.; Barrio, L.; Sallis, S.; Arena, D. A.; Kundu, S.; Xu, W. Q.; Piper, L. F. J.; Stach, E. A.; Polyansky, D. E.; Fujita, E.; Rodriguez, J. A.; Senanayake, S. D., Hierarchical Heterogeneity at the CeO_x-TiO₂ Interface: Electronic and Geometric Structural Influence on the Photocatalytic Activity of Oxide on Oxide Nanostructures. *J. Phys. Chem. C* **2015**, *119* (5), 2669-2679.
- J152. Saha, B.; Saber, S.; Naik, G. V.; Boltasseva, A.; Stach, E. A.; Kvam, E. P.; Sands, T. D., Development of epitaxial Al_xSc_{1-x}N for artificially structured metal/semiconductor superlattice metamaterials. *Phys. Status Solidi B-Basic Solid State Phys.* **2015**, *252* (2), 251-259.
- J153. He, K.; Xin, H. L. L.; Zhao, K. J.; Yu, X. Q.; Nordlund, D.; Weng, T. C.; Li, J.; Jiang, Y.; Cadigan, C. A.; Richards, R. M.; Doeff, M. M.; Yang, X. Q.; Stach, E. A.; Li, J.; Lin, F.; Su, D., Transitions from Near-Surface to Interior Redox upon Lithiation in Conversion Electrode Materials. *Nano Lett.* **2015**, *15* (2), 1437-1444.
- J154. Hwang, S.; Kim, S. M.; Bak, S. M.; Cho, B. W.; Chung, K. Y.; Lee, J. Y.; Chang, W.; Stach, E. A., Investigating the Local Degradation and Thermal Stability of Charged Ni-Based Cathode Materials through Real Time Electron Microscopy (vol 6, pg 15140, 2014). *Acs Applied Materials & Interfaces* **2015**, *7* (3), 2134-2134.
- J155. Sheets, E. J.; Balow, R. B.; Yang, W. C.; Stach, E. A.; Agrawal, R., Solution-based synthesis and purification of zinc tin phosphide nanowires. *Nanoscale* **2015**, *7* (45), 19317-19323.
- J156. Carter, N. J.; Mainz, R.; Walker, B. C.; Hages, C. J.; Just, J.; Klaus, M.; Schmidt, S. S.; Weber, A.; Yang, W. C. D.; Zander, O.; Stach, E. A.; Unold, T.; Agrawal, R., The role of interparticle heterogeneities in the selenization pathway of Cu-Zn-Sn-S nanoparticle thin films: a real-time study. *J. Mater. Chem. C* **2015**, *3* (27), 7128-7134.
- J157. Yin, Q. Y.; Gao, F.; Gu, Z. Y.; Stach, E. A.; Zhou, G. W., In situ visualization of metallurgical reactions in nanoscale Cu/Sn diffusion couples. *Nanoscale* **2015**, *7* (11), 4984-4994.
- J158. Liu, Q.; Li, Z. F.; Liu, Y. D.; Zhang, H. Y.; Ren, Y.; Sun, C. J.; Lu, W. Q.; Zhou, Y.; Stanciu, L.; Stach, E. A.; Xie, J., Graphene-modified nanostructured vanadium pentoxide hybrids with extraordinary electrochemical performance for Li-ion batteries. *Nature Communications* **2015**, *6*, 10.
- J159. Liu, Z. Y.; Xu, W. Q.; Yao, S. Y.; Johnson-Peck, A. C.; Zhao, F. Z.; Michorczyk, P.; Kubacka, A.; Stach, E. A.; Fernandez-Garcia, M.; Senanayake, S. D.; Rodriguez, J. A., Superior performance of Ni-W-Ce mixed-metal oxide catalysts for ethanol steam reforming: Synergistic effects of W- and Ni-dopants. *J. Catal.* **2015**, *321*, 90-99.
- J160. Yang, W. C.; Miskin, C. K.; Carter, N. J.; Agrawal, R.; Stach, E. A., Compositional Inhomogeneity of Multinary Semiconductor Nanoparticles: A Case Study of Cu₂ZnSnS₄. *Chem. Mat.* **2014**, *26* (24), 6955-6962.
- J161. Wu, F. Z.; Wang, H. H.; Raghothamachar, B.; Dudley, M.; Mueller, S. G.; Chung, G.; Sanchez, E. K.; Hansen, D.; Loboda, M. J.; Zhang, L. H.; Su, D.; Kisslinger, K.; Stach, E., A method to determine fault vectors in 4H-SiC from stacking sequences observed on high resolution transmission electron microscopy images (vol 116, 104905, 2014). *J. Appl. Phys.* **2014**, *116* (16), 1.
- J162. Li, L.; Luo, L. L.; Ciston, J.; Saidi, W. A.; Stach, E. A.; Yang, J. C.; Zhou, G. W., Surface-Step-Induced Oscillatory Oxide Growth. *Phys. Rev. Lett.* **2014**, *113* (13), 5.
- J163. Wu, F. Z.; Wang, H. H.; Raghothamachar, B.; Dudley, M.; Mueller, S. G.; Chung, G.; Sanchez, E. K.; Hansen, D.; Loboda, M. J.; Zhang, L. H.; Su, D.; Kisslinger, K.; Stach, E., A method to determine fault vectors in 4H-SiC from stacking sequences observed on high resolution transmission electron microscopy images. *J. Appl. Phys.* **2014**, *116* (10), 9.

- J164. Behafarid, F.; Pandey, S.; Diaz, R. E.; Stach, E. A.; Roldan Cuenya, B., An in situ transmission electron microscopy study of sintering and redispersion phenomena over size-selected metal nanoparticles: environmental effects. *Phys. Chem. Chem. Phys.* **2014**, *16* (34), 18176-18184.
- J165. Saha, B.; Naik, G. V.; Saber, S.; Akatay, C.; Stach, E. A.; Shalaev, V. M.; Boltasseva, A.; Sands, T. D., TiN/(Al,Sc)N metal/dielectric superlattices and multilayers as hyperbolic metamaterials in the visible spectral range. *Phys. Rev. B* **2014**, *90* (12), 14.
- J166. Hwang, S.; Kim, S. M.; Bak, S. M.; Cho, B. W.; Chung, K. Y.; Lee, J. Y.; Chang, W.; Stach, E. A., Investigating Local Degradation and Thermal Stability of Charged Nickel-Based Cathode Materials through Real-Time Electron Microscopy. *Acs Applied Materials & Interfaces* **2014**, *6* (17), 15140-15147.
- J167. Islam, A. E.; Nikolaev, P.; Amama, P. B.; Saber, S.; Zakharov, D.; Huffman, D.; Erford, M.; Sargent, G.; Semiatin, S. L.; Stach, E. A.; Maruyama, B., Engineering the Activity and Lifetime of Heterogeneous Catalysts for Carbon Nanotube Growth via Substrate Ion Beam Bombardment. *Nano Lett.* **2014**, *14* (9), 4997-5003.
- J168. Dietrich, P. J.; Sollberger, F. G.; Akatay, M. C.; Stach, E. A.; Delgass, W. N.; Miller, J. T.; Ribeiro, F. H., Structural and catalytic differences in the effect of Co and Mo as promoters for Pt-based aqueous phase reforming catalysts. *Appl. Catal. B-Environ.* **2014**, *156*, 236-248.
- J169. Marshall, C. L.; Zhang, H. B.; Kropf, A. J.; Zhang, G. H.; Elam, J. W.; Miller, J. T.; Sollberger, F.; Ribeiro, F.; Stach, E. A.; Dumesic, J. A., Enhancing the stability of copper chromite catalysts for the selective hydrogenation of furfural using ALD overcoating. *Abstr. Pap. Am. Chem. Soc.* **2014**, *248*, 1.
- J170. Wang, Z.; Shen, J. M.; Akatay, C.; Kung, M. C.; Stach, E.; Kung, H., New methods of synthesis of gold nanoparticles. *Abstr. Pap. Am. Chem. Soc.* **2014**, *248*, 1.
- J171. Kim, B. J.; Tersoff, J.; Kodambaka, S.; Jang, J. S.; Stach, E. A.; Ross, F. M., Au Transport in Catalyst Coarsening and Si Nanowire Formation. *Nano Lett.* **2014**, *14* (8), 4554-4559.
- J172. Liu, Q.; Liu, Y. D.; Sun, C. J.; Li, Z. F.; Ren, Y.; Lu, W. Q.; Stach, E. A.; Xie, J., The Structural Evolution of V2O5 Nanocrystals during Electrochemical Cycling Studied Using In operando Synchrotron Techniques. *Electrochim. Acta* **2014**, *136*, 318-322.
- J173. Zhang, H. B.; Lei, Y.; Kropf, A. J.; Zhang, G. H.; Elam, J. W.; Miller, J. T.; Sollberger, F.; Ribeiro, F.; Akatay, M. C.; Stach, E. A.; Dumesic, J. A.; Marshall, C. L., Enhancing the stability of copper chromite catalysts for the selective hydrogenation of furfural using ALD overcoating. *J. Catal.* **2014**, *317*, 284-292.
- J174. Qi, Z. J.; Rodriguez-Manzo, J. A.; Botello-Mendez, A. R.; Hong, S. J.; Stach, E. A.; Park, Y. W.; Charlier, J. C.; Drndic, M.; Johnson, A. T. C., Correlating Atomic Structure and Transport in Suspended Graphene Nanoribbons. *Nano Lett.* **2014**, *14* (8), 4238-4244.
- J175. Manfrinato, V. R.; Wen, J. G.; Zhang, L. H.; Yang, Y. J.; Hobbs, R. G.; Baker, B.; Su, D.; Zakharov, D.; Zaluzec, N. J.; Miller, D. J.; Stach, E. A.; Berggren, K. K., Determining the Resolution Limits of Electron-Beam Lithography: Direct Measurement of the Point-Spread Function. *Nano Lett.* **2014**, *14* (8), 4406-4412.
- J176. Graeser, B. K.; Hages, C. J.; Yang, W. C.; Carter, N. J.; Miskin, C. K.; Stach, E. A.; Agrawal, R., Synthesis of (CuInS₂)_{0.5}(ZnS)_{0.5} Alloy Nanocrystals and Their Use for the Fabrication of Solar Cells via Selenization. *Chem. Mat.* **2014**, *26* (14), 4060-4063.

- J177. DuChene, J. S.; Sweeny, B. C.; Johnston-Peck, A. C.; Su, D.; Stach, E. A.; Wei, W. D., Prolonged Hot Electron Dynamics in Plasmonic-Metal/Semiconductor Heterostructures with Implications for Solar Photocatalysis. *Angew. Chem.-Int. Edit.* **2014**, *53* (30), 7887-7891.
- J178. Qian, K.; Sweeny, B. C.; Johnston-Peck, A. C.; Niu, W. X.; Graham, J. O.; DuChene, J. S.; Qiu, J. J.; Wang, Y. C.; Engelhard, M. H.; Su, D.; Stach, E. A.; Wei, W. D., Surface Plasmon-Driven Water Reduction: Gold Nanoparticle Size Matters. *J. Am. Chem. Soc.* **2014**, *136* (28), 9842-9845.
- J179. Lei, Y.; Zhao, H. Y.; Rivas, R. D.; Lee, S.; Liu, B.; Lu, J. L.; Stach, E.; Winans, R. E.; Chapman, K. W.; Greeley, J. P.; Miller, J. T.; Chupas, P. J.; Elam, J. W., Adsorbate-Induced Structural Changes in 1-3 nm Platinum Nanoparticles. *J. Am. Chem. Soc.* **2014**, *136* (26), 9320-9326.
- J180. Yang, W. C.; Miskin, C. K.; Hages, C. J.; Hanley, E. C.; Handwerker, C.; Stach, E. A.; Agrawal, R., Kesterite Cu₂ZnSn(S,Se)(4) Absorbers Converted from Metastable, Wurtzite-Derived Cu₂ZnSnS₄ Nanoparticles. *Chem. Mat.* **2014**, *26* (11), 3530-3534.
- J181. Xin, H. L. L.; Alayoglu, S.; Tao, R. Z.; Genc, A.; Wang, C. M.; Kovarik, L.; Stach, E. A.; Wang, L. W.; Salmeron, M.; Somorjai, G. A.; Zheng, H. M., Revealing the Atomic Restructuring of Pt-Co Nanoparticles. *Nano Lett.* **2014**, *14* (6), 3203-3207.
- J182. Naik, G. V.; Saha, B.; Liu, J.; Saber, S. M.; Stach, E. A.; Irudayaraj, J. M. K.; Sands, T. D.; Shalae, V. M.; Boltasseva, A., Epitaxial superlattices with titanium nitride as a plasmonic component for optical hyperbolic metamaterials. *Proc. Natl. Acad. Sci. U. S. A.* **2014**, *111* (21), 7546-7551.
- J183. Lee, W. S.; Akatay, M. C.; Stach, E. A.; Ribeiro, F. H.; Delgass, W. N., Gas-phase epoxidation of propylene in the presence of H-2 and O-2 over small gold ensembles in uncalcined TS-1. *J. Catal.* **2014**, *313*, 104-112.
- J184. Alba-Rubio, A. C.; O'Neill, B. J.; Shi, F. Y.; Akatay, C.; Canlas, C.; Li, T.; Winans, R.; Elam, J. W.; Stach, E. A.; Voyles, P. M.; Dumesic, J. A., Pore Structure and Bifunctional Catalyst Activity of Overlayers Applied by Atomic Layer Deposition on Copper Nanoparticles. *Acs Catalysis* **2014**, *4* (5), 1554-1557.
- J185. Carter, N. J.; Yang, W. C.; Miskin, C. K.; Hages, C. J.; Stach, E. A.; Agrawal, R., Cu₂ZnSn(S,Se)(4) solar cells from inks of heterogeneous Cu-Zn-Sn-S nanocrystals. *Sol. Energy Mater. Sol. Cells* **2014**, *123*, 189-196.
- J186. Luo, L. L.; Kang, Y. H.; Yang, J. C.; Su, D.; Stach, E. A.; Zhou, G. W., Comparative study of the alloying effect on the initial oxidation of Cu-Au(100) and Cu-Pt(100). *Appl. Phys. Lett.* **2014**, *104* (12), 5.
- J187. Liu, Q.; He, H.; Li, Z. F.; Liu, Y. D.; Ren, Y.; Lu, W. Q.; Lu, J.; Stach, E. A.; Xie, J., Rate-Dependent, Li-Ion Insertion/Deinsertion Behavior of LiFePO₄ Cathodes in Commercial 18650 LiFePO₄ Cells. *Acs Applied Materials & Interfaces* **2014**, *6* (5), 3282-3289.
- J188. Akatay, M. C.; Zvinevich, Y.; Baumann, P.; Ribeiro, F. H.; Stach, E. A., Gas mixing system for imaging of nanomaterials under dynamic environments by environmental transmission electron microscopy. *Rev. Sci. Instrum.* **2014**, *85* (3), 5.
- J189. Frenkel, A. I.; Cason, M. W.; Elsen, A.; Jung, U.; Small, M. W.; Nuzzo, R. G.; Vila, F. D.; Rehr, J. J.; Stach, E. A.; Yang, J. C., Critical review: Effects of complex interactions on structure and dynamics of supported metal catalysts. *J. Vac. Sci. Technol. A* **2014**, *32* (2), 17.
- J190. Zhao, F. Z.; Liu, Z. Y.; Xu, W. Q.; Yao, S. Y.; Kubacka, A.; Johnston-Peck, A. C.; Senanayake, S. D.; Zhang, A. Q.; Stach, E. A.; Fernandez-Garcia, M.; Rodriguez, J. A., Water-Gas Shift Reaction on Ni-

W-Ce Catalysts: Catalytic Activity and Structural Characterization. *J. Phys. Chem. C* **2014**, *118* (5), 2528-2538.

- J191. Dietrich, P. J.; Akatay, M. C.; Sollberger, F. G.; Stach, E. A.; Miller, J. T.; Delgass, W. N.; Ribeiro, F. H., Effect of Co Loading on the Activity and Selectivity of PtCo Aqueous Phase Reforming Catalysts. *ACS Catalysis* **2014**, *4* (2), 480-491.
- J192. Hwang, S.; Chang, W.; Kim, S. M.; Su, D.; Kim, D. H.; Lee, J. Y.; Chung, K. Y.; Stach, E. A., Investigation of Changes in the Surface Structure of $\text{Li}_x\text{Ni}_{0.8}\text{Co}_{0.15}\text{Al}_{0.05}\text{O}_2$ Cathode Materials Induced by the Initial Charge. *Chem. Mat.* **2014**, *26* (2), 1084-1092.
- J193. Tao, F.; Stach, E. A.; Browning, N. D., Structure of catalyst particles from in-situ electron microscopy: a web themed issue. *Chem. Commun.* **2014**, *50* (83), 12417-12419.
- J194. Hertzberg, B.; Sviridov, L.; Stach, E. A.; Gupta, T.; Steingart, D., A Manganese-Doped Barium Carbonate Cathode for Alkaline Batteries. *J. Electrochem. Soc.* **2014**, *161* (6), A835-A840.
- J195. Kim, B. J.; Kim, M. W.; Jang, J. S.; Stach, E. A., Real time observation of ZnO nanostructure formation via the solid-vapor and solid-solid-vapor mechanisms. *Nanoscale* **2014**, *6* (12), 6984-6990.
- J196. Cargnello, M.; Doan-Nguyen, V. V.; Gordon, T. R.; Diaz, R. E.; Stach, E. A.; Gorte, R. J.; Fornasiero, P.; Murray, C. B., Control of metal nanocrystal size reveals metal-support interface role for ceria catalysts. *Science* **2013**, *341* (6147), 771-773.
- J197. Lee, W. S.; Akatay, M. C.; Stach, E. A.; Ribeiro, F. H.; Delgass, W. N., Enhanced reaction rate for gas-phase epoxidation of propylene using H-2 and O-2 by Cs promotion of Au/TS-1. *J. Catal.* **2013**, *308*, 98-113.
- J198. Cao, B. F.; Veith, G. M.; Diaz, R. E.; Liu, J.; Stach, E. A.; Adzic, R. R.; Khalifah, P. G., Cobalt Molybdenum Oxynitrides: Synthesis, Structural Characterization, and Catalytic Activity for the Oxygen Reduction Reaction. *Angew. Chem.-Int. Edit.* **2013**, *52* (41), 10753-10757.
- J199. Frenkel, A. I.; Li, Y. Y.; Stach, E. A.; Tappero, R.; Baumann, P., Battling complexity: Spectroscopy, scattering, and imaging in the same reaction cell. *Abstr. Pap. Am. Chem. Soc.* **2013**, *246*, 1.
- J200. Li, Y. Y.; Frenkel, A. I.; Baumann, P.; Tappero, R.; Zakharov, D.; Stach, E. A., Operando XAFS-TEM-Raman methodology for nanocatalysts. *Abstr. Pap. Am. Chem. Soc.* **2013**, *246*, 1.
- J201. Li, L.; Wang, L. L.; Johnson, D. D.; Zhang, Z. F.; Sanchez, S. I.; Kang, J. H.; Nuzzo, R. G.; Wang, Q.; Frenkel, A. I.; Li, J.; Ciston, J.; Stach, E. A.; Yang, J. C., Noncrystalline-to-Crystalline Transformations in Pt Nanoparticles. *J. Am. Chem. Soc.* **2013**, *135* (35), 13062-13072.
- J202. Johns, T. R.; Gaudet, J. R.; Peterson, E. J.; Miller, J. T.; Stach, E. A.; Kim, C. H.; Balogh, M. P.; Datye, A. K., Microstructure of Bimetallic PtPd Catalysts under Oxidizing Conditions. *ChemCatChem* **2013**, *5* (9), 2636-2645.
- J203. Cargnello, M.; Doan-Nguyen, V. V. T.; Gordon, T. R.; Diaz, R. E.; Stach, E. A.; Gorte, R. J.; Fornasiero, P.; Murray, C. B., Control of Metal Nanocrystal Size Reveals Metal-Support Interface Role for Ceria Catalysts. *Science* **2013**, *341* (6147), 771-773.
- J204. Pattinson, S. W.; Diaz, R. E.; Stelmashenko, N. A.; Windle, A. H.; Ducati, C.; Stach, E. A.; Koziol, K. K., In Situ Observation of the Effect of Nitrogen on Carbon Nanotube Synthesis. *Chem. Mat.* **2013**, *25* (15), 2921-2923.
- J205. Johnston-Peck, A. C.; Senanayake, S. D.; Plata, J. J.; Kundu, S.; Xu, W. Q.; Barrio, L.; Graciani, J.; Sanz, J. F.; Navarro, R. M.; Fierro, J. L. G.; Stach, E. A.; Rodriguez, J. A., Nature of the Mixed-Oxide

- Interface in Ceria-Titania Catalysts: Clusters, Chains, and Nanoparticles. *J. Phys. Chem. C* **2013**, *117* (28), 14463-14471.
- J206. Jungjohann, K. L.; Bliznakov, S.; Sutter, P. W.; Stach, E. A.; Sutter, E. A., In Situ Liquid Cell Electron Microscopy of the Solution Growth of Au-Pd Core-Shell Nanostructures. *Nano Lett.* **2013**, *13* (6), 2964-2970.
- J207. Baloch, K. H.; Johnston-Peck, A. C.; Kisslinger, K.; Stach, E. A.; Gradecak, S., Revisiting the "In-clustering" question in InGaN through the use of aberration-corrected electron microscopy below the knock-on threshold. *Appl. Phys. Lett.* **2013**, *102* (19), 4.
- J208. Wang, M. X.; Liu, Q.; Li, Z. F.; Sun, H. F.; Stach, E. A.; Xie, J., Structural Modification of Graphene Sheets to Create a Dense Network of Defect Sites. *J. Phys. Chem. Lett.* **2013**, *4* (9), 1484-1488.
- J209. Xu, W. Q.; Liu, Z. Y.; Johnston-Peck, A. C.; Senanayake, S. D.; Zhou, G.; Stacchiola, D.; Stach, E. A.; Rodriguez, J. A., Steam Reforming of Ethanol on Ni/CeO₂: Reaction Pathway and Interaction between Ni and the CeO₂ Support. *Acs Catalysis* **2013**, *3* (5), 975-984.
- J210. Steinke, L.; Cantwell, P.; Stach, E.; Schuh, D.; Morral, A. F. I.; Bichler, M.; Abstreiter, G.; Grayson, M., Hartree simulations of coupled quantum Hall edge states in corner-overgrown heterostructures. *Phys. Rev. B* **2013**, *87* (16), 8.
- J211. Nam, K. W.; Bak, S. M.; Hu, E. Y.; Yu, X. Q.; Zhou, Y. N.; Wu, L. J.; Zhu, Y. M.; Chang, W. Y.; Stach, E. A.; Chung, K. Y.; Yang, X. Q., Origin of thermal instability in charged cathode materials for Li-ion batteries: Combined in situ synchrotron X-rays and electron microscopy study. *Abstr. Pap. Am. Chem. Soc.* **2013**, *245*, 1.
- J212. Xu, F.; Wang, M. X.; Sun, L. L.; Liu, Q.; Sun, H. F.; Stach, E. A.; Xie, J., Enhanced Pt/C catalyst stability using p-benzensulfonic acid functionalized carbon blacks as catalyst supports. *Electrochim. Acta* **2013**, *94*, 172-181.
- J213. Manfrinato, V. R.; Zhang, L. H.; Su, D.; Duan, H. G.; Hobbs, R. G.; Stach, E. A.; Berggren, K. K., Resolution Limits of Electron-Beam Lithography toward the Atomic Scale. *Nano Lett.* **2013**, *13* (4), 1555-1558.
- J214. Hong, W. K.; Park, J. B.; Yoon, J.; Kim, B. J.; Sohn, J. I.; Lee, Y. B.; Bae, T. S.; Chang, S. J.; Huh, Y. S.; Son, B.; Stach, E. A.; Lee, T.; Welland, M. E., Hydrogen-Induced Morphotropic Phase Transformation of Single-Crystalline Vanadium Dioxide Nanobeams. *Nano Lett.* **2013**, *13* (4), 1822-1828.
- J215. Kang, Y.; Li, M.; Cai, Y.; Cargnello, M.; Diaz, R. E.; Gordon, T. R.; Wieder, N. L.; Adzic, R. R.; Gorte, R. J.; Stach, E. A.; Murray, C. B., Heterogeneous Catalysts Need Not Be so "Heterogeneous": Monodisperse Pt Nanocrystals by Combining Shape-Controlled Synthesis and Purification by Colloidal Recrystallization. *J. Am. Chem. Soc.* **2013**, *135* (7), 2741-2747.
- J216. Bak, S. M.; Nam, K. W.; Chang, W.; Yu, X. Q.; Hu, E. Y.; Hwang, S.; Stach, E. A.; Kim, K. B.; Chung, K. Y.; Yang, X. Q., Correlating Structural Changes and Gas Evolution during the Thermal Decomposition of Charged Li_xNi_{0.8}Co_{0.15}Al_{0.05}O₂ Cathode Materials. *Chem. Mat.* **2013**, *25* (3), 337-351.
- J217. Kang, Y. J.; Ye, X. C.; Chen, J.; Qi, L.; Diaz, R. E.; Doan-Nguyen, V.; Xing, G. Z.; Kagan, C. R.; Li, J.; Gorte, R. J.; Stach, E. A.; Murray, C. B., Engineering Catalytic Contacts and Thermal Stability: Gold/Iron Oxide Binary Nanocrystal Superlattices for CO Oxidation. *J. Am. Chem. Soc.* **2013**, *135* (4), 1499-1505.

- J218. Kang, Y. J.; Ye, X. C.; Chen, J.; Cai, Y.; Diaz, R. E.; Adzic, R. R.; Stach, E. A.; Murray, C. B., Design of Pt-Pd Binary Superlattices Exploiting Shape Effects and Synergistic Effects for Oxygen Reduction Reactions. *J. Am. Chem. Soc.* **2013**, *135* (1), 42-45.
- J219. Zhou, G. W.; Luo, L. L.; Li, L.; Ciston, J.; Stach, E. A.; Saidi, W. A.; Yang, J. C., In situ atomic-scale visualization of oxide islanding during oxidation of Cu surfaces. *Chem. Commun.* **2013**, *49* (92), 10862-10864.
- J220. Kang, Y. J.; Pyo, J. B.; Ye, X. C.; Diaz, R. E.; Gordon, T. R.; Stach, E. A.; Murray, C. B., Shape-Controlled Synthesis of Pt Nanocrystals: The Role of Metal Carbonyls. *ACS Nano* **2013**, *7* (1), 645-653.
- J221. Zhou, G. W.; Luo, L. L.; Li, L.; Ciston, J.; Stach, E. A.; Yang, J. C., Step-Edge-Induced Oxide Growth During the Oxidation of Cu Surfaces. *Phys. Rev. Lett.* **2012**, *109* (23), 5.
- J222. Lee, W. S.; Lai, L. C.; Akatay, M. C.; Stach, E. A.; Ribeiro, F. H.; Delgass, W. N., Probing the gold active sites in Au/TS-1 for gas-phase epoxidation of propylene in the presence of hydrogen and oxygen. *J. Catal.* **2012**, *296*, 31-42.
- J223. Sun, D. Z.; Stadler, A. L.; Gurevich, M.; Palma, E.; Stach, E.; van der Lelie, D.; Gang, O., Heterogeneous nanoclusters assembled by PNA-templated double-stranded DNA. *Nanoscale* **2012**, *4* (21), 6722-6725.
- J224. Kim, B. J.; Wen, C. Y.; Tersoff, J.; Reuter, M. C.; Stach, E. A.; Ross, F. M., Growth Pathways in Ultralow Temperature Ge Nucleation from Au. *Nano Lett.* **2012**, *12* (11), 5867-5872.
- J225. Lobo, R.; Marshall, C. L.; Dietrich, P. J.; Ribeiro, F. H.; Akatay, C.; Stach, E. A.; Mane, A.; Lei, Y.; Elam, J.; Miller, J. T., Understanding the Chemistry of H-2 Production for 1-Propanol Reforming: Pathway and Support Modification Effects. *Acs Catalysis* **2012**, *2* (11), 2316-2326.
- J226. Arslan, I.; Stach, E. A., ELECTRON TOMOGRAPHY Seeing atoms in three dimensions. *Nature Materials* **2012**, *11* (11), 911-912.
- J227. Roldan Cuenya, B.; Ono, L. K.; Croy, J. R.; Paredis, K.; Kara, A.; Heinrich, H.; Zhao, J.; Alp, E. E.; DelaRiva, A. T.; Datye, A.; Stach, E. A.; Keune, W., Size-dependent evolution of the atomic vibrational density of states and thermodynamic properties of isolated Fe nanoparticles. *Phys. Rev. B* **2012**, *86* (16), 11.
- J228. Shekhar, M.; Wang, J.; Lee, W. S.; Akatay, M. C.; Stach, E. A.; Delgass, W. N.; Ribeiro, F. H., Counting Au catalytic sites for the water-gas shift reaction. *J. Catal.* **2012**, *293*, 94-102.
- J229. Cargnello, M.; Doan-Nguyen, V.; Gordon, T. R.; Bakhmutsky, K.; Diaz, R. E.; Stach, E. A.; Gorte, R. J.; Fornasiero, P.; Murray, C. B., Catalytic role of the metal-support interface in d(8)-ceria systems prepared using artificial atoms. *Abstr. Pap. Am. Chem. Soc.* **2012**, *244*, 1.
- J230. Chatterjee, S.; Kim, M. J.; Luo, Z. T.; Acerce, M.; Yates, D. M.; Zakharov, D. N.; Kim, S. M.; Stach, E. A.; Johnson, A. T. C.; Maruyama, B.; Sneddon, L. G., Catalytic chemical vapor deposition of boron nitride nanotubes and nanosheets from molecular precursors. *Abstr. Pap. Am. Chem. Soc.* **2012**, *244*, 1.
- J231. Marshall, C. L.; Lobo, R.; Dietrich, P.; Ribeiro, F.; Akatay, C.; Stach, E.; Mane, A.; Lei, Y.; Elam, J.; Miller, J. T., Understanding the chemistry of H-2 production for 1-propanol reforming: Pathway and support modification effects. *Abstr. Pap. Am. Chem. Soc.* **2012**, *244*, 1.

- J232. Stach, E. A.; Diaz, R. E.; Wu, T. P.; Miller, J. T.; Ribeiro, F. H., Environmental transmission electron microscopy in catalysis research: Real time imaging and spectroscopy. *Abstr. Pap. Am. Chem. Soc.* **2012**, *244*, 1.
- J233. Chatterjee, S.; Kim, M. J.; Zakharov, D. N.; Kim, S. M.; Stach, E. A.; Maruyama, B.; Sneddon, L. G., Syntheses of Boron Nitride Nanotubes from Borazine and Decaborane Molecular Precursors by Catalytic Chemical Vapor Deposition with a Floating Nickel Catalyst. *Chem. Mat.* **2012**, *24* (15), 2872-2879.
- J234. Cantwell, P. R.; Kim, H.; Schneider, M. M.; Hsu, H. H.; Peroulis, D.; Stach, E. A.; Strachan, A., Estimating the In-Plane Young's Modulus of Polycrystalline Films in MEMS. *J. Microelectromech. Syst.* **2012**, *21* (4), 840-849.
- J235. Wang, M. X.; Liu, Q.; Sun, H. F.; Stach, E. A.; Zhang, H. Y.; Stanciu, L.; Xie, J., Preparation of high-surface-area carbon nanoparticle/graphene composites. *Carbon* **2012**, *50* (10), 3845-3853.
- J236. Kim, S. J.; Stach, E. A.; Handwerker, C. A., Silver layer instability in a SnO₂/Ag/SnO₂ trilayer on silicon. *Thin Solid Films* **2012**, *520* (19), 6189-6195.
- J237. Chou, Y. C.; Wen, C. Y.; Reuter, M. C.; Su, D.; Stach, E. A.; Ross, F. M., Controlling the Growth of Si/Ge Nanowires and Heterojunctions Using Silver-Gold Alloy Catalysts. *ACS Nano* **2012**, *6* (7), 6407-6415.
- J238. Xin, H. L.; Pach, E. A.; Diaz, R. E.; Stach, E. A.; Salmeron, M.; Zheng, H. M., Revealing Correlation of Valence State with Nanoporous Structure in Cobalt Catalyst Nanoparticles by In Situ Environmental TEM. *ACS Nano* **2012**, *6* (5), 4241-4247.
- J239. Marshall, C. L.; Lobo, R.; Dietrich, P.; Ribeiro, F.; Akatay, C.; Stach, E.; Mane, A.; Lei, Y.; Elam, J.; Miller, J. T., Support effects in the liquid phase reforming of propanol. *Abstr. Pap. Am. Chem. Soc.* **2012**, *243*, 1.
- J240. Ribeiro, F. H.; Shekhar, M.; Williams, W. D.; Lee, W. S.; Wang, J.; Akatay, M. C.; Stach, E. A.; Miller, J. T.; Delgass, W. N., Water-gas shift catalysis on supported Au and Pt nanoparticles. *Abstr. Pap. Am. Chem. Soc.* **2012**, *243*, 1.
- J241. Shekhar, M.; Wang, J.; Lee, W. S.; Williams, W. D.; Kim, S. M.; Stach, E. A.; Miller, J. T.; Delgass, W. N.; Ribeiro, F. H., Size and Support Effects for the Water-Gas Shift Catalysis over Gold Nanoparticles Supported on Model Al₂O₃ and TiO₂. *J. Am. Chem. Soc.* **2012**, *134* (10), 4700-4708.
- J242. Dietrich, P. J.; Lobo-Lapidus, R. J.; Wu, T. P.; Sumer, A.; Akatay, M. C.; Fingland, B. R.; Guo, N.; Dumesic, J. A.; Marshall, C. L.; Stach, E.; Jellinek, J.; Delgass, W. N.; Ribeiro, F. H.; Miller, J. T., Aqueous Phase Glycerol Reforming by PtMo Bimetallic Nano-Particle Catalyst: Product Selectivity and Structural Characterization. *Top. Catal.* **2012**, *55* (1-2), 53-69.
- J243. Lee, W. S.; Akatay, M. C.; Stach, E. A.; Ribeiro, F. H.; Delgass, W. N., Reproducible preparation of Au/TS-1 with high reaction rate for gas phase epoxidation of propylene. *J. Catal.* **2012**, *287*, 178-189.
- J244. Kang, Y. J.; Qi, L.; Li, M.; Diaz, R. E.; Su, D.; Adzic, R. R.; Stach, E.; Li, J.; Murray, C. B., Highly Active Pt₃Pb and Core-Shell Pt₃Pb-Pt Electrocatalysts for Formic Acid Oxidation. *ACS Nano* **2012**, *6* (3), 2818-2825.
- J245. Koppes, J. P.; Grossklaus, K. A.; Muza, A. R.; Revur, R. R.; Sengupta, S.; Rae, A.; Stach, E. A.; Handwerker, C. A., Utilizing the thermodynamic nanoparticle size effects for low temperature Pb-free solder. *Mater. Sci. Eng. B-Adv. Funct. Solid-State Mater.* **2012**, *177* (2), 197-204.

- J246. Saldana, C.; King, A. H.; Stach, E. A.; Compton, W. D.; Chandrasekar, S., Vacancies, twins, and the thermal stability of ultrafine-grained copper. *Appl. Phys. Lett.* **2011**, *99* (23), 3.
- J247. Lu, F.; Zhang, Y.; Zhang, L. H.; Zhang, Y. G.; Wang, J. X.; Adzic, R. R.; Stach, E. A.; Gang, O., Truncated Ditetragonal Gold Prisms as Nanofacet Activators of Catalytic Platinum. *J. Am. Chem. Soc.* **2011**, *133* (45), 18074-18077.
- J248. Angoua, B. F.; Cantwell, P. R.; Stach, E. A.; Slamovich, E. B., Crystallization and electrochemical performance of La_{0.6}Sr_{0.4}Co_{0.2}Fe_{0.8}O_{3-delta}-Ce_{0.8}Gd_{0.2}O_{1.9} thin film cathodes processed by single solution spray pyrolysis. *Solid State Ion.* **2011**, *203* (1), 62-68.
- J249. Park, S. J.; Chung, S. H.; Kim, B. J.; Qi, M. H.; Xu, X. F.; Stach, E. A.; Yang, C., Mechanism of vertical Ge nanowire nucleation on Si (111) during subeutectic annealing and growth. *J. Mater. Res.* **2011**, *26* (21), 2744-2748.
- J250. Liang, Z. W.; Wildeson, I. H.; Colby, R.; Ewoldt, D. A.; Zhang, T.; Sands, T. D.; Stach, E. A.; Benes, B.; Garcia, R. E., Built-in Electric Field Minimization in (In, Ga)N Nanoheterostructures. *Nano Lett.* **2011**, *11* (11), 4515-4519.
- J251. Mitchell, J. I.; Park, S. J.; Watson, C. A.; Srisungsitthisunti, P.; Tansarawiput, C.; Qi, M. H.; Stach, E. A.; Yang, C.; Xu, X. F., Laser direct write of silicon nanowires. *Opt. Eng.* **2011**, *50* (10), 5.
- J252. Bolen, M. L.; Colby, R.; Stach, E. A.; Capano, M. A., Graphene formation on step-free 4H-SiC(0001). *J. Appl. Phys.* **2011**, *110* (7), 6.
- J253. Lee, W. S.; Zhang, R.; Akatay, M. C.; Baertsch, C. D.; Stach, E. A.; Ribeiro, F. H.; Delgass, W. N., Differences in Catalytic Sites for CO Oxidation and Propylene Epoxidation on Au Nanoparticles. *ACS Catalysis* **2011**, *1* (10), 1327-1330.
- J254. Kim, B. J.; Garcia, R. E.; Stach, E. A., Kinetics of Congruent Vaporization of ZnO Islands. *Phys. Rev. Lett.* **2011**, *107* (14), 4.
- J255. Colby, R.; Bolen, M. L.; Capano, M. A.; Stach, E. A., Amorphous interface layer in thin graphite films grown on the carbon face of SiC. *Appl. Phys. Lett.* **2011**, *99* (10), 3.
- J256. Lee, W. S.; Akatay, M. C.; Stach, E.; Ribeiro, F. H.; Delgass, W. N., Highly active Cs-promoted Au/TS-1 catalyst for gas phase epoxidation of propylene using H-2 and O-2. *Abstr. Pap. Am. Chem. Soc.* **2011**, *242*, 1.
- J257. Shekhar, M.; Williams, W. D.; Lee, W. S.; Wang, J.; Kim, S. M.; Stach, E. A.; Miller, J. T.; Delgass, W. N.; Ribeiro, F. H., Determination of active sites and effect of support for the water-gas shift reaction over supported Au nanoparticles. *Abstr. Pap. Am. Chem. Soc.* **2011**, *242*, 1.
- J258. Wang, J.; Shekhar, M.; Lee, W. S.; Akatay, M. C.; Stach, E. A.; Delgass, W. N.; Ribeiro, F. H., Determination of the active site of gold/rutile catalysts for the Water-Gas-Shift (WGS) reaction by bromide poisoning and operando FTIR. *Abstr. Pap. Am. Chem. Soc.* **2011**, *242*, 1.
- J259. Liao, Y. L.; Ye, C.; Gao, H.; Kim, B. J.; Suslov, S.; Stach, E. A.; Cheng, G. J., Dislocation pinning effects induced by nano-precipitates during warm laser shock peening: Dislocation dynamic simulation and experiments. *J. Appl. Phys.* **2011**, *110* (2), 8.
- J260. El-Atwani, O.; Quach, D. V.; Efe, M.; Cantwell, P. R.; Heim, B.; Schultz, B.; Stach, E. A.; Groza, J. R.; Allain, J. P., Multimodal grain size distribution and high hardness in fine grained tungsten fabricated by spark plasma sintering. *Mater. Sci. Eng. A-Struct. Mater. Prop. Microstruct. Process.* **2011**, *528* (18), 5670-5677.

- J261. Wen, C. Y.; Tersoff, J.; Hillerich, K.; Reuter, M. C.; Park, J. H.; Kodambaka, S.; Stach, E. A.; Ross, F. M., Periodically Changing Morphology of the Growth Interface in Si, Ge, and GaP Nanowires. *Phys. Rev. Lett.* **2011**, *107* (2), 4.
- J262. Zhu, Y. W.; Murali, S.; Stoller, M. D.; Ganesh, K. J.; Cai, W. W.; Ferreira, P. J.; Pirkle, A.; Wallace, R. M.; Cychosz, K. A.; Thommes, M.; Su, D.; Stach, E. A.; Ruoff, R. S., Carbon-Based Supercapacitors Produced by Activation of Graphene. *Science* **2011**, *332* (6037), 1537-1541.
- J263. Kim, B. J.; Stach, E. A., Desorption induced formation of negative nanowires in GaN. *J. Cryst. Growth* **2011**, *324* (1), 119-123.
- J264. Yu, Q. K.; Jauregui, L. A.; Wu, W.; Colby, R.; Tian, J. F.; Su, Z. H.; Cao, H. L.; Liu, Z. H.; Pandey, D.; Wei, D. G.; Chung, T. F.; Peng, P.; Guisinger, N. P.; Stach, E. A.; Bao, J. M.; Pei, S. S.; Chen, Y. P., Control and characterization of individual grains and grain boundaries in graphene grown by chemical vapour deposition. *Nature Materials* **2011**, *10* (6), 443-449.
- J265. Lim, J. S.; Kim, S. M.; Lee, S. Y.; Stach, E. A.; Culver, J. N.; Harris, M. T., Surface functionalized silica as a toolkit for studying aqueous phase palladium adsorption and mineralization on thiol moiety in the absence of external reducing agents. *J. Colloid Interface Sci.* **2011**, *356* (1), 31-36.
- J266. Wildeson, I. H.; Ewoldt, D. A.; Colby, R.; Stach, E. A.; Sands, T. D., Controlled Growth of Ordered Nanopore Arrays in GaN. *Nano Lett.* **2011**, *11* (2), 535-540.
- J267. Ye, C. H.; Suslov, S.; Kim, B. J.; Stach, E. A.; Cheng, G. J., Fatigue performance improvement in AISI 4140 steel by dynamic strain aging and dynamic precipitation during warm laser shock peening. *Acta Mater.* **2011**, *59* (3), 1014-1025.
- J268. Wang, M. X.; Xu, F.; Sun, H. F.; Liu, Q.; Artyushkova, K.; Stach, E. A.; Xie, J. A., Nanoscale graphite-supported Pt catalysts for oxygen reduction reactions in fuel cells. *Electrochim. Acta* **2011**, *56* (5), 2566-2573.
- J269. Wang, M. X.; Xu, F.; Liu, Q.; Sun, H. F.; Cheng, R. H.; He, H.; Stach, E. A.; Xie, J. A., Enhancing the catalytic performance of Pt/C catalysts using steam-etched carbon blacks as a catalyst support. *Carbon* **2011**, *49* (1), 256-265.
- J270. Guo, Q.; Ford, G. M.; Yang, W. C.; Walker, B. C.; Stach, E. A.; Hillhouse, H. W.; Agrawal, R., Fabrication of 7.2% Efficient CZTSSe Solar Cells Using CZTS Nanocrystals. *J. Am. Chem. Soc.* **2010**, *132* (49), 17384-17386.
- J271. Prakash, G.; Bolen, M. L.; Colby, R.; Stach, E. A.; Capano, M. A.; Reifenberger, R., Nanomanipulation of ridges in few-layer epitaxial graphene grown on the carbon face of 4H-SiC. *New J. Phys.* **2010**, *12*, 14.
- J272. Bolen, M. L.; Shen, T.; Gu, J. J.; Colby, R.; Stach, E. A.; Ye, P. D.; Capano, M. A., Empirical Study of Hall Bars on Few-Layer Graphene on C-Face 4H-SiC. *J. Electron. Mater.* **2010**, *39* (12), 2696-2701.
- J273. Liang, Z. W.; Colby, R.; Wildeson, I. H.; Ewoldt, D. A.; Sands, T. D.; Stach, E. A.; Garcia, R. E., GaN nanostructure design for optimal dislocation filtering (vol 108, pg 074313, 2010). *J. Appl. Phys.* **2010**, *108* (10), 1.
- J274. Wen, C. Y.; Tersoff, J.; Reuter, M. C.; Stach, E. A.; Ross, F. M., Step-Flow Kinetics in Nanowire Growth. *Phys. Rev. Lett.* **2010**, *105* (19), 4.
- J275. Williams, W. D.; Shekhar, M.; Lee, W. S.; Kispersky, V.; Delgass, W. N.; Ribeiro, F. H.; Kim, S. M.; Stach, E. A.; Miller, J. T.; Allard, L. F., Metallic Corner Atoms in Gold Clusters Supported on Rutile

Are the Dominant Active Site during Water-Gas Shift Catalysis. *J. Am. Chem. Soc.* **2010**, 132 (40), 14018-14020.

- J276. Liang, Z. W.; Colby, R.; Wildeson, I. H.; Ewoldt, D. A.; Sands, T. D.; Stach, E. A.; Garcia, R. E., GaN nanostructure design for optimal dislocation filtering. *J. Appl. Phys.* **2010**, 108 (7), 8.
- J277. Wildeson, I. H.; Colby, R.; Ewoldt, D. A.; Liang, Z. W.; Zakharov, D. N.; Zaluzec, N. J.; Garcia, R. E.; Stach, E. A.; Sands, T. D., III-nitride nanopyramid light emitting diodes grown by organometallic vapor phase epitaxy (vol 108, 044303, 2010). *J. Appl. Phys.* **2010**, 108 (7), 1.
- J278. Kim, S. M.; Pint, C. L.; Amama, P. B.; Hauge, R. H.; Maruyama, B.; Stach, E. A., Catalyst and catalyst support morphology evolution in single-walled carbon nanotube supergrowth: Growth deceleration and termination. *J. Mater. Res.* **2010**, 25 (10), 1875-1885.
- J279. Wang, M. X.; Liu, Q.; Sun, H. F.; Ogbeifun, N.; Xu, F.; Stach, E. A.; Xie, J. A., Investigation of carbon corrosion in polymer electrolyte fuel cells using steam etching. *Mater. Chem. Phys.* **2010**, 123 (2-3), 761-766.
- J280. Lim, J. S.; Kim, S. M.; Lee, S. Y.; Stach, E. A.; Culver, J. N.; Harris, M. T., Biotemplated Aqueous-Phase Palladium Crystallization in the Absence of External Reducing Agents. *Nano Lett.* **2010**, 10 (10), 3863-3867.
- J281. Liao, Y. L.; Ye, C.; Kim, B. J.; Suslov, S.; Stach, E. A.; Cheng, G. J., Nucleation of highly dense nanoscale precipitates based on warm laser shock peening. *J. Appl. Phys.* **2010**, 108 (6), 8.
- J282. Alsem, D. H.; van der Hulst, R.; Stach, E. A.; Dugger, M. T.; De Hosson, J. T. M.; Ritchie, R. O., Wear mechanisms and friction parameters for sliding wear of micron-scale polysilicon sidewalls. *Sens. Actuator A-Phys.* **2010**, 163 (1), 373-382.
- J283. Williams, D.; Shekhar, M.; Kispersky, V.; Lee, W. S.; Kim, S. M.; Ribeiro, F.; Miller, J.; Stach, E.; Delgass, N., Water gas shift reaction over supported gold nanoparticles. *Abstr. Pap. Am. Chem. Soc.* **2010**, 240, 1.
- J284. Wildeson, I. H.; Colby, R.; Ewoldt, D. A.; Liang, Z. W.; Zakharov, D. N.; Zaluzec, N. J.; Garcia, R. E.; Stach, E. A.; Sands, T. D., III-nitride nanopyramid light emitting diodes grown by organometallic vapor phase epitaxy. *J. Appl. Phys.* **2010**, 108 (4), 8.
- J285. Setthapun, W.; Williams, W. D.; Kim, S. M.; Feng, H.; Elam, J. W.; Rabuffetti, F. A.; Poeppelmeier, K. R.; Stair, P. C.; Stach, E. A.; Ribeiro, F. H.; Miller, J. T.; Marshall, C. L., Genesis and Evolution of Surface Species during Pt Atomic Layer Deposition on Oxide Supports Characterized by in Situ XAFS Analysis and Water-Gas Shift Reaction. *J. Phys. Chem. C* **2010**, 114 (21), 9758-9771.
- J286. Koppes, J. P.; Muza, A. R.; Stach, E. A.; Handwerker, C. H., Comment on "Size-Dependent Melting Properties of Small Tin Particles: Nanocalorimetric Measurements". *Phys. Rev. Lett.* **2010**, 104 (18), 1.
- J287. Colby, R.; Liang, Z. W.; Wildeson, I. H.; Ewoldt, D. A.; Sands, T. D.; Garcia, R. E.; Stach, E. A., Dislocation Filtering in GaN Nanostructures. *Nano Lett.* **2010**, 10 (5), 1568-1573.
- J288. Kim, S. J.; Stach, E. A.; Handwerker, C. A., Fabrication of conductive interconnects by Ag migration in Cu-Ag core-shell nanoparticles. *Appl. Phys. Lett.* **2010**, 96 (14), 3.
- J289. Nair, H.; Miller, J. T.; Stach, E. A.; Baertsch, C. D., Mechanism of dynamic structural reorganization in polyoxometalate catalysts. *J. Catal.* **2010**, 270 (1), 40-47.

- J290. Kim, S. M.; Pint, C. L.; Amama, P. B.; Zakharov, D. N.; Hauge, R. H.; Maruyama, B.; Stach, E. A., Evolution in Catalyst Morphology Leads to Carbon Nanotube Growth Termination. *J. Phys. Chem. Lett.* **2010**, *1* (6), 918-922.
- J291. Won, Y. H.; Jang, H. S.; Kim, S. M.; Stach, E.; Ganesana, M.; Andreescu, S.; Stanciu, L. A., Biomagnetic Glasses: Preparation, Characterization, and Biosensor Applications. *Langmuir* **2010**, *26* (6), 4320-4326.
- J292. Cao, H. L.; Yu, Q. K.; Colby, R.; Pandey, D.; Park, C. S.; Lian, J.; Zemlyanov, D.; Childres, I.; Drachev, V.; Stach, E. A.; Hussain, M.; Li, H.; Pei, S. S.; Chen, Y. P., Large-scale graphitic thin films synthesized on Ni and transferred to insulators: Structural and electronic properties. *J. Appl. Phys.* **2010**, *107* (4), 7.
- J293. Lim, J. S.; Kim, S. M.; Lee, S. Y.; Stach, E. A.; Culver, J. N.; Harris, M. T., Quantitative study of Au(III) and Pd(II) ion biosorption on genetically engineered Tobacco mosaic virus. *J. Colloid Interface Sci.* **2010**, *342* (2), 455-461.
- J294. Amama, P. B.; Pint, C. L.; Kim, S. M.; McJilton, L.; Eyink, K. G.; Stach, E. A.; Hauge, R. H.; Maruyama, B., Influence of Alumina Type on the Evolution and Activity of Alumina-Supported Fe Catalysts in Single-Walled Carbon Nanotube Carpet Growth. *ACS Nano* **2010**, *4* (2), 895-904.
- J295. Colby, R.; Yu, Q. K.; Cao, H. L.; Pei, S. S.; Stach, E. A.; Chen, Y. P., Cross-sectional transmission electron microscopy of thin graphite films grown by chemical vapor deposition. *Diam. Relat. Mat.* **2010**, *19* (2-3), 143-146.
- J296. Wen, C. Y.; Reuter, M. C.; Tersoff, J.; Stach, E. A.; Ross, F. M., Structure, Growth Kinetics, and Ledge Flow during Vapor-Solid-Solid Growth of Copper-Catalyzed Silicon Nanowires. *Nano Lett.* **2010**, *10* (2), 514-519.
- J297. Budnitzki, M.; Scates, M. C.; Ritchie, R. O.; Stach, E. A.; Muhlstein, C. L.; Pierron, O. N., The effects of cubic stiffness on fatigue characterization resonator performance. *Sens. Actuator A-Phys.* **2010**, *157* (2), 228-234.
- J298. Kim, S. J.; Quy, O. K.; Chang, L. S.; Stach, E. A.; Handwerker, C. A.; Wei, A., Formation of the ST12 phase in nanocrystalline Ge at ambient pressure. *J. Mater. Chem.* **2010**, *20* (2), 331-337.
- J299. Lim, J. S.; Kim, S. M.; Lee, S. Y.; Stach, E. A.; Culver, J. N.; Harris, M. T., Formation of Au/Pd Alloy Nanoparticles on TMV. *J. Nanomater.* **2010**, 6.
- J300. Liu, Z. Y.; Zhang, J. L.; Yu, P. T.; Zhang, J. X.; Makharia, R.; More, K. L.; Stach, E. A., Transmission Electron Microscopy Observation of Corrosion Behaviors of Platinized Carbon Blacks under Thermal and Electrochemical Conditions. *J. Electrochem. Soc.* **2010**, *157* (6), B906-B913.
- J301. Xu, F.; Wang, M. X.; Liu, Q.; Sun, H. F.; Simonson, S.; Ogbeifun, N.; Stach, E. A.; Xie, J. A., Investigation of the Carbon Corrosion Process for Polymer Electrolyte Fuel Cells Using a Rotating Disk Electrode Technique. *J. Electrochem. Soc.* **2010**, *157* (8), B1138-B1145.
- J302. Wen, C. Y.; Reuter, M. C.; Bruley, J.; Tersoff, J.; Kodambaka, S.; Stach, E. A.; Ross, F. M., Formation of Compositionally Abrupt Axial Heterojunctions in Silicon-Germanium Nanowires. *Science* **2009**, *326* (5957), 1247-1250.
- J303. DaSilva, M.; Schneider, M. M.; Wood, D. S.; Kim, B. J.; Stach, E. A.; Sands, T. D., The Use of Polyethyleneimine to Control the Growth-Front Morphology of Electrochemically Deposited Gold Nanowires for Engineered Nanogap Electrodes. *Small* **2009**, *5* (21), 2387-2391.

- J304. Padalkar, S.; Hulleman, J.; Kim, S. M.; Tumkur, T.; Rochet, J. C.; Stach, E.; Stanciu, L., Fabrication of ZnS nanoparticle chains on a protein template. *J. Nanopart. Res.* **2009**, *11* (8), 2031-2041.
- J305. Kim, B. J.; Tersoff, J.; Wen, C. Y.; Reuter, M. C.; Stach, E. A.; Ross, F. M., Determination of Size Effects during the Phase Transition of a Nanoscale Au-Si Eutectic. *Phys. Rev. Lett.* **2009**, *103* (15), 4.
- J306. Harutyunyan, A. R.; Chen, G. G.; Paronyan, T. M.; Pigos, E. M.; Kuznetsov, O. A.; Hewaparakrama, K.; Kim, S. M.; Zakharov, D.; Stach, E. A.; Sumanasekera, G. U., Preferential Growth of Single-Walled Carbon Nanotubes with Metallic Conductivity. *Science* **2009**, *326* (5949), 116-120.
- J307. Pint, C. L.; Kim, S. M.; Stach, E. A.; Hauge, R. H., Rapid and Scalable Reduction of Dense Surface-Supported Metal-Oxide Catalyst with Hydrazine Vapor. *ACS Nano* **2009**, *3* (7), 1897-1905.
- J308. Wu, Y. Q.; Wang, W. K.; Koybasi, O.; Zakharov, D. N.; Stach, E. A.; Nakahara, S.; Hwang, J. C. M.; Ye, P. D., 0.8-V Supply Voltage Deep-Submicrometer Inversion-Mode In_{0.75}Ga_{0.25}As MOSFET. *IEEE Electron Device Lett.* **2009**, *30* (7), 700-702.
- J309. Kliewer, C. E.; Miseo, S.; Baumgartner, J. E.; Stach, E.; Zakharov, D., Early Stage Strong Metal Support Interaction (SMSI) Effects In An Experimental Titania-Supported Platinum Catalyst: An Environmental TEM Study. *Microscopy and Microanalysis* **2009**, *15*, 1066-1067.
- J310. Kim, S. M.; Pint, C. L.; Amama, P. B.; Zakharov, D. N.; Hauge, R. H.; Maruyama, B.; Stach, E. A., Understanding Growth Termination of Single-Walled Carbon Nanotube Carpets by Documenting the Evolution of Catalyst Morphology with the Transmission Electron Microscope. *Microscopy and Microanalysis* **2009**, *15*, 1176-1177.
- J311. Kodambaka, S.; Tersoff, J.; Wen, C. Y.; Reuter, M. C.; Stach, E. A.; Ross, F. M., Effect of Catalyst Composition on Si Nanowire Growth Kinetics. *Microscopy and Microanalysis* **2009**, *15*, 1226-1227.
- J312. Rawat, V.; Zakharov, D. N.; Stach, E. A.; Sands, T. D., Pseudomorphic stabilization of rocksalt GaN in TiN/GaN multilayers and superlattices. *Phys. Rev. B* **2009**, *80* (2), 5.
- J313. Saldana, C.; Murthy, T. G.; Shankar, M. R.; Stach, E. A.; Chandrasekar, S., Stabilizing nanostructured materials by coherent nanotwins and their grain boundary triple junction drag. *Appl. Phys. Lett.* **2009**, *94* (2), 3.
- J314. Amama, P. B.; Pint, C. L.; McJilton, L.; Kim, S. M.; Stach, E. A.; Murray, P. T.; Hauge, R. H.; Maruyama, B., Role of Water in Super Growth of Single-Walled Carbon Nanotube Carpets. *Nano Lett.* **2009**, *9* (1), 44-49.
- J315. Stach, E., MSE 582 Transmission Electron Microscopy Skills. **2008**.
- J316. Kim, B. J.; Tersoff, J.; Kodambaka, S.; Reuter, M. C.; Stach, E. A.; Ross, F. M., Kinetics of Individual Nucleation Events Observed in Nanoscale Vapor-Liquid-Solid Growth. *Science* **2008**, *322* (5904), 1070-1073.
- J317. Steinke, L.; Cantwell, P.; Zakharov, D.; Stach, E.; Zaluzec, N. J.; Fontcuberta i Morral, A.; Bichler, M.; Abstreiter, G.; Grayson, M., Nanometer-scale sharpness in corner-overgrown heterostructures. *Appl. Phys. Lett.* **2008**, *93* (19), 3.
- J318. Alsem, D. H.; Muhlstein, C. L.; Stach, E. A.; Ritchie, R. O., Further considerations on the high-cycle fatigue of micron-scale polycrystalline silicon. *Scr. Mater.* **2008**, *59* (9), 931-935.
- J319. Alsem, D. H.; Boyce, B. L.; Stach, E. A.; Ritchie, R. O., Effect of post-release sidewall morphology on the fracture and fatigue properties of polycrystalline silicon structural films. *Sens. Actuator A-Phys.* **2008**, *147* (2), 553-560.

- J320. Alsem, D. H.; Dugger, M. T.; Stach, E. A.; Ritchie, R. O., Micron-Scale Friction and Sliding Wear of Polycrystalline Silicon Thin Structural Films in Ambient Air. *J. Microelectromech. Syst.* **2008**, *17* (5), 1144-1154.
- J321. Kisielowski, C.; Freitag, B.; Bischoff, M.; van Lin, H.; Lazar, S.; Knippels, G.; Tiemeijer, P.; van der Stam, M.; von Harrach, S.; Stekelenburg, M.; Haider, M.; Uhlemann, S.; Muller, H.; Hartel, P.; Kabius, B.; Miller, D.; Petrov, I.; Olson, E. A.; Donchev, T.; Kenik, E. A.; Lupini, A. R.; Bentley, J.; Pennycook, S. J.; Anderson, I. M.; Minor, A. M.; Schmid, A. K.; Duden, T.; Radmilovic, V.; Ramasse, Q. M.; Watanabe, M.; Erni, R.; Stach, E. A.; Denes, P.; Dahmen, U., Detection of single atoms and buried defects in three dimensions by aberration-corrected electron microscope with 0.5-angstrom information limit. *Microscopy and Microanalysis* **2008**, *14* (5), 469-477.
- J322. Kim, M. J.; Chatterjee, S.; Kim, S. M.; Stach, E. A.; Bradley, M. G.; Pender, M. J.; Sneddon, L. G.; Maruyama, B., Double-Walled Boron Nitride Nanotubes Grown by Floating Catalyst Chemical Vapor Deposition. *Nano Lett.* **2008**, *8* (10), 3298-3302.
- J323. Stach, E., NANOMATERIALS Nanotubes reveal their true strength. *Nat. Nanotechnol.* **2008**, *3* (10), 586-587.
- J324. Shan, Z. W.; Lu, L.; Minor, A. M.; Stach, E. A.; Mao, S. X., The effect of twin plane spacing on the deformation of copper containing a high density of growth twins. *Jom* **2008**, *60* (9), 71-74.
- J325. Guo, Q.; Kim, S. J.; Kar, M.; Shafarman, W. N.; Birkmire, R. W.; Stach, E. A.; Agrawal, R.; Hillhouse, H. W., Development of CuInSe₂ nanocrystal and nanoring inks for low-cost solar cells. *Nano Lett.* **2008**, *8* (9), 2982-2987.
- J326. Kim, M. J.; Chatterjee, S.; Kim, S. M.; Bradley, M. G.; Pender, M. J.; Stach, E.; Sneddon, L. G.; Maruyama, B., INOR 247-Chemical routes for the syntheses of boron nitride nanotubes. *Abstr. Pap. Am. Chem. Soc.* **2008**, *236*, 1.
- J327. Oliver, M. H.; Schroeder, J. L.; Ewoldt, D. A.; Wildeson, I. H.; Rawat, V.; Colby, R.; Cantwell, P. R.; Stach, E. A.; Sands, T. D., Organometallic vapor phase epitaxial growth of GaN on ZrN/AlN/Si substrates. *Appl. Phys. Lett.* **2008**, *93* (2), 3.
- J328. Padalkar, S.; Hulleman, J. D.; Kim, S. M.; Rochet, J. C.; Stach, E. A.; Stanciu, L. A., Protein-templated semiconductor nanoparticle chains. *Nanotechnology* **2008**, *19* (27), 9.
- J329. Li, N.; Harmon, E. S.; Salzman, D. B.; Zakharov, D. N.; Jeon, J. H.; Stach, E.; Woodall, J. M.; Wang, X. W.; Ma, T. P.; Walker, F., Molecular beam epitaxy growth of InAs and In(0.8)Ga(0.2)As channel materials on GaAs substrate for metal oxide semiconductor field effect transistor applications. *J. Vac. Sci. Technol. B* **2008**, *26* (3), 1187-1190.
- J330. Shan, Z. W.; Knapp, J. A.; Follstaedt, D. M.; Stach, E. A.; Wiezorek, J. M. K.; Mao, S. X., Inter- and intra-agglomerate fracture in nanocrystalline nickel. *Phys. Rev. Lett.* **2008**, *100* (10), 4.
- J331. Shan, Z. W.; Wiezorek, J. M. K.; Knapp, J. A.; Follstaedt, D. M.; Stach, E. A.; Mao, S. X., Large lattice strain in individual grains of deformed nanocrystalline Ni. *Appl. Phys. Lett.* **2008**, *92* (9), 3.
- J332. Hong, W. K.; Kim, B. J.; Kim, T. W.; Jo, G.; Song, S.; Kwon, S. S.; Yoon, A.; Stach, E. A.; Lee, T., Electrical properties of ZnO nanowire field effect transistors by surface passivation. *Colloid Surf. A-Physicochem. Eng. Asp.* **2008**, *313*, 378-382.
- J333. Ferreira, P. J.; Mitsuishi, K.; Stach, E. A., In situ transmission electron microscopy. *MRS Bull.* **2008**, *33* (2), 83-85.

- J334. Robertson, I. M.; Ferreira, P. J.; Dehm, G.; Hull, R.; Stach, E. A., Visualizing the behavior of dislocations - Seeing is believing. *MRS Bull.* **2008**, 33 (2), 122-131.
- J335. Strus, M. C.; Zalamea, L.; Raman, A.; Pipes, R. B.; Nguyen, C. V.; Stach, E. A., Peeling force spectroscopy: Exposing the adhesive nanomechanics of one-dimensional nanostructures. *Nano Lett.* **2008**, 8 (2), 544-550.
- J336. Taylor, C.; Marega, E.; Stach, E. A.; Salamo, G.; Hussey, L.; Munoz, M.; Malshe, A., Directed self-assembly of quantum structures by nanomechanical stamping using probe tips. *Nanotechnology* **2008**, 19 (1), 10.
- J337. Stach, E. A., Real-time observations with electron microscopy. *Mater. Today* **2008**, 11, 50-58.
- J338. Hang, Q. L.; Wang, F. D.; Carpenter, P. D.; Zemlyanov, D.; Zakharov, D.; Stach, E. A.; Buhro, W. E.; Janes, D. B., Role of molecular surface passivation in electrical transport properties of InAs nanowires. *Nano Lett.* **2008**, 8 (1), 49-55.
- J339. Hong, W. K.; Hwang, D. K.; Park, I. K.; Jo, G.; Song, S.; Park, S. J.; Lee, T.; Kim, B. J.; Stach, E. A., Realization of highly reproducible ZnO nanowire field effect transistors with n-channel depletion and enhancement modes. *Appl. Phys. Lett.* **2007**, 90 (24), 3.
- J340. Wu, C. C.; Stach, E. A.; Hull, R., Nanoscale mechanisms of misfit dislocation propagation in undulated Si_{1-x}Gex/Si(100) epitaxial thin films. *Nanotechnology* **2007**, 18 (16), 6.
- J341. Warren, O. L.; Shan, Z. W.; Asif, S. A. S.; Stach, E. A.; Morris, J. W.; Minor, A. M., In situ nanoindentation in the TEM. *Mater. Today* **2007**, 10 (4), 59-60.
- J342. Shan, Z. W.; Wiezorek, J. M. K.; Stach, E. A.; Follstaedt, D. M.; Knapp, J. A.; Mao, S. X., Dislocation dynamics in nanocrystalline nickel. *Phys. Rev. Lett.* **2007**, 98 (9), 4.
- J343. Alsem, D. H.; Stach, E. A.; Dugger, M. T.; Enachescu, M.; Ritchie, R. O., An electron microscopy study of wear in polysilicon microelectromechanical systems in ambient air. *Thin Solid Films* **2007**, 515 (6), 3259-3266.
- J344. Padalkar, S.; Hulleman, J.; Deb, P.; Cunzeman, K.; Rochet, J. C.; Stach, E. A.; Stanciu, L., Alpha-synuclein as a template for the synthesis of metallic nanowires. *Nanotechnology* **2007**, 18 (5), 9.
- J345. Alsem, D. H.; Pierron, O. N.; Stach, E. A.; Muhlstein, C. L.; Ritchie, R. O., Mechanisms for fatigue of micron-scale silicon structural films. *Adv. Eng. Mater.* **2007**, 9 (1-2), 15-30.
- J346. Alsem, D. H.; Timmerman, R.; Boyce, B. L.; Stach, E. A.; De Hosson, J. T. M.; Ritchie, R. O., Very high-cycle fatigue failure in micron-scale polycrystalline silicon films: Effects of environment and surface oxide thickness. *J. Appl. Phys.* **2007**, 101 (1), 9.
- J347. Nalla, R. K.; Porter, A. E.; Dariao, C.; Minor, A. M.; Radmilovic, V.; Stach, E. A.; Tomsia, A. P.; Ritchie, R. O., Ultrastructural examination of dentin using focused ion-beam cross-sectioning and transmission electron microscopy (vol 36, pg 672, 2005). *Micron* **2007**, 38 (7), 771-771.
- J348. De Hosson, J. T. M.; Soer, W. A.; Minor, A. M.; Shan, Z. W.; Stach, E. A.; Asif, S. A. S.; Warren, O. L., In situ TEM nanoindentation and dislocation-grain boundary interactions: a tribute to David Brandon. *J. Mater. Sci.* **2006**, 41 (23), 7704-7719.
- J349. Arslan, I.; Bleloch, A.; Stach, E. A.; Ogut, S.; Browning, N. D., Using EELS to observe composition and electronic structure variations at dislocation cores in GaN. *Philos. Mag.* **2006**, 86 (29-31), 4727-4746.

- J350. Minor, A. M.; Asif, S. A. S.; Shan, Z. W.; Stach, E. A.; Cyrankowski, E.; Wyrobek, T. J.; Warren, O. L., A new view of the onset of plasticity during the nanoindentation of aluminium. *Nature Materials* **2006**, *5* (9), 697-702.
- J351. Ge, D.; Minor, A. M.; Stach, E. A.; Morris, J. W., Size effects in the nanoindentation of silicon at ambient temperature. *Philos. Mag.* **2006**, *86* (25-26), 4069-4080.
- J352. Maschmann, M. R.; Franklin, A. D.; Amama, P. B.; Zakharov, D. N.; Stach, E. A.; Sands, T. D.; Fisher, T. S., Vertical single- and double-walled carbon nanotubes grown from modified porous anodic alumina templates. *Nanotechnology* **2006**, *17* (15), 3925-3929.
- J353. Stankovich, S.; Dikin, D. A.; Dommett, G. H. B.; Kohlhaas, K. M.; Zimney, E. J.; Stach, E. A.; Piner, R. D.; Nguyen, S. T.; Ruoff, R. S., Graphene-based composite materials. *Nature* **2006**, *442* (7100), 282-286.
- J354. Chang, H.; Iqbal, S. M.; Stach, E. A.; King, A. H.; Zaluzec, N. J.; Bashir, R., Fabrication and characterization of solid-state nanopores using a field emission scanning electron microscope. *Appl. Phys. Lett.* **2006**, *88* (10), 3.
- J355. Alsem, D. H.; Stach, E. A.; De Hosson, J. T. M., Quantitative characterization of the growth and morphological evolution of bicrystalline aluminum thin films. *J. Mater. Sci.* **2005**, *40* (18), 5033-5036.
- J356. Deb, P.; Kim, H.; Rawat, V.; Oliver, M.; Kim, S.; Marshall, M.; Stach, E.; Sands, T., Faceted and vertically aligned GaN nanorod arrays fabricated without catalysts or lithography. *Nano Lett.* **2005**, *5* (9), 1847-1851.
- J357. Taylor, C. R.; Stach, E. A.; Salamo, G.; Malshe, A. P., Nanoscale dislocation patterning by ultralow load indentation. *Appl. Phys. Lett.* **2005**, *87* (7), 3.
- J358. Shan, Z. W.; Stach, E. A.; Wiezorek, J. M. K.; Knapp, J. A.; Follstaedt, D. M.; Mao, S. X., Response to comment on "grain boundary-mediated plasticity in nanocrystalline nickel". *Science* **2005**, *308* (5720), 3.
- J359. Deshpande, D. C.; Malshe, A. P.; Stach, E. A.; Radmilovic, V.; Alexander, D.; Doerr, D.; Hirt, D., Investigation of femtosecond laser assisted nano and microscale modifications in lithium niobate. *J. Appl. Phys.* **2005**, *97* (7), 9.
- J360. Alsem, D. H.; Stach, E. A.; Muhlstein, C. L.; Ritchie, R. O., Fatigue failure in thin-film polycrystalline silicon is due to subcritical cracking within the oxide layer. *Appl. Phys. Lett.* **2005**, *86* (4), 3.
- J361. Arslan, I.; Bleloch, A.; Stach, E. A.; Browning, N. D., Atomic and electronic structure of mixed and partial dislocations in GaN. *Phys. Rev. Lett.* **2005**, *94* (2), 4.
- J362. Minor, A. M.; Lilleodden, E. T.; Jin, M.; Stach, E. A.; Chrzan, D. C.; Morris, J. W., Room temperature dislocation plasticity in silicon. *Philos. Mag.* **2005**, *85* (2-3), 323-330.
- J363. Nalla, R. K.; Porter, A. E.; Daraio, C.; Minor, A. M.; Radmilovic, V.; Stach, E. A.; Tomsia, A. P.; Ritchie, R. O., Ultrastructural examination of dentin using focused ion-beam cross-sectioning and transmission electron microscopy. *Micron* **2005**, *36* (7-8), 672-680.
- J364. Soer, W. A.; De Hosson, J. T. M.; Minor, A. M.; Morris, J. W.; Stach, E. A., Effects of solute Mg on grain boundary and dislocation dynamics during nanoindentation of Al-Mg thin films. *Acta Mater.* **2004**, *52* (20), 5783-5790.

- J365. Ohmura, T.; Minor, A. M.; Stach, E. A.; Morris, J. W., Dislocation-grain boundary interactions in martensitic steel observed through in situ nanoindentation in a transmission electron microscope. *J. Mater. Res.* **2004**, *19* (12), 3626-3632.
- J366. Gopal, V.; Radmilovic, V. R.; Daraio, C.; Jin, S.; Yang, P. D.; Stach, E. A., Rapid prototyping of site-specific nanocontacts by electron and ion beam assisted direct-write nanolithography. *Nano Lett.* **2004**, *4* (11), 2059-2063.
- J367. Jin, M.; Minor, A. M.; Stach, E. A.; Morris, J. W., Direct observation of deformation-induced grain growth during the nanoindentation of ultrafine-grained Al at room temperature. *Acta Mater.* **2004**, *52* (18), 5381-5387.
- J368. Ge, D.; Domnich, V.; Juliano, T.; Stach, E. A.; Gogotsi, Y., Structural damage in boron carbide under contact loading. *Acta Mater.* **2004**, *52* (13), 3921-3927.
- J369. Shan, Z. W.; Stach, E. A.; Wiezorek, J. M. K.; Knapp, J. A.; Follstaedt, D. M.; Mao, S. X., Grain boundary-mediated plasticity in nanocrystalline nickel. *Science* **2004**, *305* (5684), 654-657.
- J370. Gopal, V.; Stach, E. A.; Radmilovic, V. R.; Mowat, I. A., Metal delocalization and surface decoration in direct-write nanolithography by electron beam induced deposition. *Appl. Phys. Lett.* **2004**, *85* (1), 49-51.
- J371. Ritchie, R. O.; Kruzic, J. J.; Muhlstein, C. L.; Nalla, R. K.; Stach, E. A., Characteristic dimensions and the micro-mechanisms of fracture and fatigue in 'nano' and 'bio' materials. *Int. J. Fract.* **2004**, *128* (1-4), 1-15.
- J372. Perrey, C. R.; Carter, C. B.; Michael, J. R.; Kotula, P. G.; Stach, E. A.; Radmilovic, V. R., Using the FIB to characterize nanoparticle materials. *J. Microsc.* **2004**, *214*, 222-236.
- J373. Malshe, A.; Deshpande, D.; Stach, E.; Rajurkar, K.; Alexander, D., Investigation of femtosecond laser-assisted micromachining of lithium niobate. *CIRP Ann-Manuf. Technol.* **2004**, *53* (1), 187-190.
- J374. Minor, A. M.; Lilleodden, E. T.; Stach, E. A.; Morris, J. W., Direct observations of incipient plasticity during nanoindentation of Al. *J. Mater. Res.* **2004**, *19* (1), 176-182.
- J375. Detavernier, C.; Ozcan, A. S.; Jordan-Sweet, J.; Stach, E. A.; Tersoff, J.; Ross, F. M.; Lavoie, C., An off-normal fibre-like texture in thin films on single-crystal substrates. *Nature* **2003**, *426* (6967), 641-645.
- J376. Stach, E. A.; Radmilovic, V.; Deshpande, D.; Malshe, A.; Alexander, D.; Doerr, D., Nanoscale surface and subsurface defects induced in lithium niobate by a femtosecond laser. *Appl. Phys. Lett.* **2003**, *83* (21), 4420-4422.
- J377. Schenkel, T.; Radmilovic, V.; Stach, E. A.; Park, S. J.; Persaud, A., Formation of a few nanometer wide holes in membranes with a dual beam focused ion beam system. *J. Vac. Sci. Technol. B* **2003**, *21* (6), 2720-2723.
- J378. Phung, X.; Groza, J.; Stach, E. A.; Williams, L. N.; Ritchey, S. B., Surface characterization of metal nanoparticles. *Mater. Sci. Eng. A-Struct. Mater. Prop. Microstruct. Process.* **2003**, *359* (1-2), 261-268.
- J379. Xie, Z.; Liu, Y.; Stach, E., In situ TEM study of the shape recovery process in predeformed NiTi shape memory alloy. *J. Phys. IV* **2003**, *112*, 769-772.
- J380. Minor, A. M.; Stach, E. A.; Morris, J. W.; Petrov, I., In-situ nanoindentation of epitaxial TiN/MgO (001) in a transmission electron microscope. *J. Electron. Mater.* **2003**, *32* (10), 1023-1027.

- J381. Stach, E. A.; Pauzauskie, P. J.; Kuykendall, T.; Goldberger, J.; He, R. R.; Yang, P. D., Watching GaN nanowires grow. *Nano Lett.* **2003**, *3* (6), 867-869.
- J382. Altenberger, I.; Stach, E. A.; Liu, G.; Nalla, R. K.; Ritchie, R. O., An in situ transmission electron microscope study of the thermal stability of near-surface microstructures induced by deep rolling and laser-shock peening. *Scr. Mater.* **2003**, *48* (12), 1593-1598.
- J383. Demczyk, B. G.; Zhou, J. N.; Choe, G.; Stach, E.; Nelson, E. C.; Dahmen, U., Origin of the orientation ratio in sputtered longitudinal media. *J. Appl. Phys.* **2003**, *93* (10), 7393-7395.
- J384. Chong, R. K. K.; Yeadon, M.; Choi, W. K.; Stach, E. A.; Boothroyd, C. B., Nitride-mediated epitaxy of CoSi₂ on Si(001). *Appl. Phys. Lett.* **2003**, *82* (12), 1833-1835.
- J385. Schneider, G.; Meyer, M. A.; Denbeaux, G.; Anderson, E.; Bates, B.; Pearson, A.; Knochel, C.; Hambach, D.; Stach, E. A.; Zschech, E., Electromigration in passivated Cu interconnects studied by transmission x-ray microscopy. *J. Vac. Sci. Technol. B* **2002**, *20* (6), 3089-3094.
- J386. Minor, A. M.; Lilleodden, E. T.; Stach, E. A.; Morris, J. W., In-situ transmission electron microscopy study of the nanoindentation behavior of Al. *J. Electron. Mater.* **2002**, *31* (10), 958-964.
- J387. Schneider, G.; Denbeaux, G.; Anderson, E. H.; Bates, B.; Pearson, A.; Meyer, M. A.; Zschech, E.; Hambach, D.; Stach, E. A., Dynamical x-ray microscopy investigation of electromigration in passivated inlaid Cu interconnect structures. *Appl. Phys. Lett.* **2002**, *81* (14), 2535-2537.
- J388. Muhlstein, C. L.; Stach, E. A.; Ritchie, R. O., A reaction-layer mechanism for the delayed failure of micron-scale polycrystalline silicon structural films subjected to high-cycle fatigue loading. *Acta Mater.* **2002**, *50* (14), 3579-3595.
- J389. Muhlstein, C. L.; Stach, E. A.; Ritchie, R. O., Mechanism of fatigue in micron-scale films of polycrystalline silicon for microelectromechanical systems. *Appl. Phys. Lett.* **2002**, *80* (9), 1532-1534.
- J390. Hukari, K.; Dannenberg, R.; Stach, E. A., Nitrogen effects on crystallization kinetics of amorphous TiO_xN_y thin films. *J. Mater. Res.* **2002**, *17* (3), 550-555.
- J391. Moore, K. T.; Stach, E. A.; Howe, J. M.; Elbert, D. C.; Veblen, D. R., A tilting procedure to enhance compositional contrast and reduce residual diffraction contrast in energy-filtered TEM imaging of planar interfaces. *Micron* **2002**, *33* (1), 39-51.
- J392. Stach, E. A.; Freeman, T.; Minor, A. M.; Owen, D. K.; Cumings, J.; Wall, M. A.; Chraska, T.; Hull, R.; Morris, J. W.; Zettl, A.; Dahmen, U., Development of a nanoindenter for in situ transmission electron microscopy. *Microscopy and Microanalysis* **2001**, *7* (6), 507-517.
- J393. Minor, A. M.; Morris, J. W.; Stach, E. A., Quantitative in situ nanoindentation in an electron microscope. *Appl. Phys. Lett.* **2001**, *79* (11), 1625-1627.
- J394. Takeuchi, I.; Chang, K.; Sharma, R. P.; Bendersky, L. A.; Chang, H.; Xiang, X. D.; Stach, E. A.; Song, C. Y., Microstructural properties of (Ba, Sr)TiO₃ films fabricated from BaF₂/SrF₂/TiO₂ amorphous multilayers using the combinatorial precursor method. *J. Appl. Phys.* **2001**, *90* (5), 2474-2478.
- J395. Stach, E. A.; Hull, R., Enhancement of dislocation velocities by stress-assisted kink nucleation at the native oxide/SiGe interface. *Appl. Phys. Lett.* **2001**, *79* (3), 335-337.
- J396. Dannenberg, R.; Stach, E.; Groza, J. R., Phenomenological description of grain growth stagnation for nanocrystalline films and powders. *J. Mater. Res.* **2001**, *16* (4), 1090-1095.

- J397. Dannenberg, R.; Stach, E.; Groza, J. R.; Dresser, B. J., TEM annealing study of normal grain growth in silver thin films. *Thin Solid Films* **2000**, 379 (1-2), 133-138.
- J398. Stach, E. A.; Kelsch, M.; Nelson, E. C.; Wong, W. S.; Sands, T.; Cheung, N. W., Structural and chemical characterization of free-standing GaN films separated from sapphire substrates by laser lift-off. *Appl. Phys. Lett.* **2000**, 77 (12), 1819-1821.
- J399. Stach, E. A.; Hull, R.; Tromp, R. M.; Ross, F. M.; Reuter, M. C.; Bean, J. C., In-situ transmission electron microscopy studies of the interaction between dislocations in strained SiGe/Si(001) heterostructures. *Philos. Mag. A-Phys. Condens. Matter Struct. Defect Mech. Prop.* **2000**, 80 (9), 2159-2200.
- J400. Dannenberg, R.; Stach, E. A.; Groza, J. R.; Dresser, B. J., In-situ TEM observations of abnormal grain growth, coarsening, and substrate de-wetting in nanocrystalline Ag thin films. *Thin Solid Films* **2000**, 370 (1-2), 54-62.
- J401. Park, Y.; Cich, M. J.; Zhao, R.; Specht, P.; Weber, E. R.; Stach, E.; Nozaki, S., Analysis of twin defects in GaAs(111)B molecular beam epitaxy growth. *J. Vac. Sci. Technol. B* **2000**, 18 (3), 1566-1571.
- J402. Stach, E. A.; Schwarz, K. W.; Hull, R.; Ross, F. M.; Tromp, R. M., New mechanism for dislocation blocking in strained layer epitaxial growth. *Phys. Rev. Lett.* **2000**, 84 (5), 947-950.
- J403. Moore, K. T.; Howe, J. M.; Veblen, D. R.; Murray, T. M.; Stach, E. A., Analysis of electron intensity as a function of aperture size in energy-filtered transmission electron microscope imaging. *Ultramicroscopy* **1999**, 80 (3), 221-236.
- J404. Hull, R.; Stach, E. A.; Tromp, R.; Ross, F.; Reuter, M., Interactions of moving dislocations in semiconductors with point, line and planar defects. *Phys. Status Solidi A-Appl. Res.* **1999**, 171 (1), 133-146.
- J405. Hull, R.; Demarest, J.; Dunn, D.; Stach, E. A.; Yuan, Q., Applications of ion microscopy and in situ electron microscopy to the study of electronic materials and devices. *Microscopy and Microanalysis* **1998**, 4 (3), 308-316.
- J406. Stach, E. A.; Hull, R.; Bean, J. C.; Jones, K. S.; Nejm, A., In situ studies of the interaction of dislocations with point defects during annealing of ion implanted Si/SiGe/Si (001) heterostructures. *Microscopy and Microanalysis* **1998**, 4 (3), 294-307.
- J407. Stach, E. A.; Hull, R.; Tromp, R. M.; Reuter, M. C.; Copel, M.; LeGoues, F. K.; Bean, J. C., Effect of the surface upon misfit dislocation velocities during the growth and annealing of SiGe/Si (001) heterostructures. *J. Appl. Phys.* **1998**, 83 (4), 1931-1937.
- J408. Lanzerotti, L. D.; Sturm, J. C.; Stach, E.; Hull, R.; Buyuklimanli, T.; Magee, C., Suppression of boron transient enhanced diffusion in SiGe heterojunction bipolar transistors by carbon incorporation. *Appl. Phys. Lett.* **1997**, 70 (23), 3125-3127.
- J409. Hull, R.; Stach, E. A., Equilibrium and metastable strained layer semiconductor heterostructures. *Curr. Opin. Solid State Mat. Sci.* **1996**, 1 (1), 21-28.

Invited Oral Conference Presentations:

- I1. Plenary Presentation, *Characterizing working catalysts with correlated electron and photon probes*, International Centre for Diffraction Data Spring Meeting, Newtown Square, PA, March 2020. Cancelled due to COVID-19.
- I2. *Characterizing working catalysts with correlated electron and photon probes*, Dynamic Evolution of Catalysts session, American Chemical Society, March 2020.
- I3. Plenary Presentation, *Characterizing working catalysts with correlated electron and photon probes*, 13th Multinational Congress on Microscopy, XXVIII International Materials Research Congress 2019 Cancun, Mexico, August 2019.
- I4. *Using in-situ electron microscopy methods to study the thermal degradation of nickel-based cathode materials*, Microscopy Society of America, Portland, August 2019.
- I5. *Development of a method to characterize active sites in photocatalysis using operando transmission electron microscopy*, Microscopy Society of America, Portland, August, 2019.
- I6. *Operando methods for the characterization of bimetallic catalysts using multimodal probes*, 2019 Energy Frontier Research Centers Principal Investigator Meeting, Washington, DC, July, 2019.
- I7. *Advanced electron microscopy for organic and inorganic materials at the Singh Center for Nanotechnology*, Beckman Center for Cryo-EM Inaugural Symposium, University of Pennsylvania, May, 2019
- I8. *Characterizing Working Catalysts with Correlated Electron and Photon Probes; Operando Spectroscopy in Catalysis (OPSCAT)*, Oslo, Norway, January 2019.
- I9. *Using in-situ electron microscopy methods to study the thermal degradation of nickel-based cathode materials*, Electronic Materials and Applications, American Ceramic Society, January, 2019.
- I10. *Using in-situ electron microscopy methods to study the thermal degradation of nickel-based cathode materials*, Fall Materials Research Society Meeting, November, 2018
- I11. *Using in-situ electron microscopy methods to study the thermal degradation of nickel-based cathode materials*, Catalysis Club of Philadelphia, November, 2018
- I12. *Using in-situ electron microscopy methods to study the thermal degradation of nickel-based cathode materials*, Materials Science and Technology Meeting, October, 2018
- I13. *Advanced electron microscopy methods to characterize quantum defects*, Defects by Design: Quantum Nanophotonics in Emerging Materials, Optical Society of America, Washington, DC, September, 2018.
- I14. *Characterizing Working Catalysts with Correlated Electron and Photon Probes*; International Microscopy Congress, Sydney, Australia, September, 2018.
- I15. *Characterizing Working Catalysts with Correlated Electron and Photon Probes*; "Catalysis East", Jiminy Peak, MA, August, 2018.
- I16. *Characterizing Working Catalysts with Correlated Electron and Photon Probes*; Microscopy and Microanalysis, Pre-Meeting Congress on Electron Microscopy in Gases and Liquids, MA, Baltimore, MD, August, 2018.
- I17. *Improving Electron Microscopy with Artificial Intelligence and Big Data*; Microscopy and Microanalysis, Baltimore, MD, August, 2018.
- I18. *Improving Electron Microscopy with Artificial Intelligence and Big Data*; TRSC Workshop, Telluride, CO, June, 2018.

- I19. *Improving Electron Microscopy with Artificial Intelligence and Big Data*; Grand Opening Symposium, Irvine Materials Research Institute, June 2018.
- I20. *Improving Electron Microscopy with Artificial Intelligence and Big Data*; Materials Research Society, Phoenix, AZ, April, 2018
- I21. *Improving Electron Microscopy with Artificial Intelligence and Big Data*; American Physical Society, Los Angeles, March, 2018
- I22. *Characterizing Working Catalysts with Correlated Electron and Photon Probes*, Fall Materials Research Society Meeting, Boston, MA, 2018.
- I23. *Characterizing Working Catalysts with Correlated Electron and Photon Probes*, 13th Multinational Congress on Microscopy, Plenary presentation, Rovinj, Croatia, September 2017.
- I24. *Atomic Resolution Imaging of Organic Materials using Low-Dose Electron Microscopy*, Microscopy Society of America, St. Louis, MO, July 2017.
- I25. *Characterizing Working Catalysts with Correlated Electron and Photon Probes*, Microscopy Society of America, St. Louis, MO, July 2017.
- I26. *Characterizing Working Catalysts with Correlated Electron and Photon Probes*, Cornell Summer School, Ithaca, NY, July 2017.
- I27. *Using Direct Electron Detectors to Quantify Real Time Processes in Materials*, Electron Microscopy with High Time Resolution workshop, Strasbourg, France, May 2017.
- I28. *Characterizing Working Catalysts with Correlated Electron and Photon Probes*, American Chemical Society, San Francisco, CA April 2017.
- I29. *Watching Catalysts Work: Using Environmental TEM to understand nanotube growth*, American Chemical Society, San Francisco, CA April 2017.
- I30. *Characterizing NiPt Bimetallic Catalysts with Correlated Electron and Photon Probes*; Fall Materials Research Society Meeting, Boston, MA, December 2016.
- I31. *Characterizing Working Catalysts with Correlated Electron and Photon Probes*; In-Situ and Operando Spectroscopy and Microscopy for Catalysts, Surfaces, & Materials Focus Topic, 63rd Annual Meeting of the American Vacuum Society, Nashville, TN, November, 2016
- I32. Plenary Presentation, International Committee on Nanostructured Materials, Quebec City, August, 2016. Declined.
- I33. *Operando Characterization: correlating data from multiple probes to understand the function of energyrelated nanomaterials*, Workshop on Basic Research Needs for Innovation and Discovery of Transformative Experimental Tools: Solving Grand Challenges in the Energy Sciences, June, 2016
- I34. *Characterizing Working Catalysts with Correlated Electron and Photon Probes*, Symposium VV, Fall 2015 Materials Research Society Meeting, November 2015
- I35. *Transmission electron microscopy in liquids and gases*, Workshop: Theory & Computation for Interface Sciences & Catalysis, Center for Functional Nanomaterials, November, 2015.
- I36. *Using operando probes to link electrons and photons in heterogeneous catalysis*, Frontiers of Electron Microscopy in Materials Science, Lake Tahoe, CA September, 2015

- I37. *Characterizing working catalysts with electron and photon probes*, American Chemical Society Meeting, Boston, MA, August, 2015 (I was invited, but had post-doctoral research Shen Zhao give my talk due to other commitments that arose).
- I38. *Using operando probes to link electrons and photons in heterogeneous catalysis*, Microscopy and Microanalysis Meeting, Portland, OR, August, 2015
- I39. *Using operando probes to link electrons and photons in heterogeneous catalysis*, Advanced Light Source Users Meeting, October, 2015 (Talk given by Skype)
- I40. *Using operando probes to link electrons and photons in heterogeneous catalysis*, Workshop on Electron Microscopy for Biological, Environmental, and Energy Research, Pacific Northwest National Laboratory, July 29 - 30, 2015.
- I41. *Creating a Big Data Ecosystem at Brookhaven National Laboratory*, NSRC Workshop on Big, Deep and Smart Data Analytics in Materials Imaging, Oak Ridge National Laboratory, June, 2015.
- I42. *A New Paradigm for Electron Microscopy: Fast Detectors and Extreme Data Experimentation*, Eric Stach, AAAS Annual Meeting, San Jose, Feb 12, 2015
- I43. *Environmental Transmission Electron Microscopy: The Example of Carbon Nanotubes*, Eric Stach, Advances in In-situ Characterization, Ohio State Materials Week, May 2014
- I44. *Electron microscopy at the Center for Functional Nanomaterials*, Eric Stach, Spring 2014 Polymer Symposium, UMass Amherst, May 2014
- I45. *Environmental Transmission Electron Microscopy: The Example of Carbon Nanotubes*, Eric Stach, Midwest Imaging and Microanalysis Workshop, Notre Dame University, May 2014
- I46. *A Closed Cell Micro-Reactor for Operando X-ray Absorption Spectroscopy and Transmission Electron Microscopy*, Eric A. Stach, Yuanyuan Li, Dmitri Zakharov, Ralph Nuzzo, Anatoly Frenkel, Workshop 3: Exploring the Pivotal Role of Next Generation X-rays in Bridging the Scale-Gaps in Next Generation Energy Materials under Extremes, NSLS-CFN User Meeting, 2014
- I47. *Exploring the Complementarity Between Advanced Electron Microscopy and Soft X-ray Spectromicroscopy*, Eric A. Stach, Yuanyuan Li, Dmitri Zakharov, Ralph Nuzzo, Anatoly Frenkel Workshop 2: Complex Functional Materials: Probing the Meso-Scale Structural Organization and the System Dynamics with Soft X-rays, NSLS-CFN User Meeting, 2014.
- I48. Microscopy and Microanalysis 2013 Meeting, New Instrumentation at the Limits: Characteristics and Applications Symposium, August, 2013.
- I49. *The Role of Nanotube Interactions on Self-Organization and Growth Termination during CNT Carpet Growth*, Eric Andrew Stach, Dmitri Zakharov, Mostafa Bedewy, Eric Meshot, A. John Hart, Nanowire and Nanotubes: Advanced Heterostructures, Doping and Devices Symposium, Fall 2013 MRS Meeting, Boston, MA, December 2013.
- I50. Microscopy and Microanalysis 2013 Meeting, Pre-meeting congress on Environmental Transmission Electron Microscopy, August, 2013.
- I51. International Conference on Electron Microscopy and XXXIV Annual Meeting of the Electron Microscope Society of India, Kolkata, July 3-5, 2013 declined.
- I52. Advanced Catalyst Characterization Workshop at BP, Naperville, June 18-19, 2013.
- I53. 4th International Workshop on Remote Electron Microscopy and In Situ Studies, May 22-24, 2013. Declined.

- I54. 2013 NSLS/CFN Joint Users' Meeting, May 21-23, 2013. Declined.
- I55. *Environmental TEM: What is it good for?*; Beyond Resolution: The Next Revolution in TEM; Key West, Florida, May 1-4, 2013.
- I56. *Real time studies of growth termination via chemo-mechanical coupling*; The Sixth Rice University, Air Force Research Laboratory, and NASA on Nucleation and Growth Mechanisms of Single Wall Carbon Nanotubes, Bandera, TX, April 12-16, 2013.
- I57. *In-situ characterization of the thermal degradation of LiNi_{0.8}Co_{0.15}Al_{0.05}O₂ cathode materials in lithium ion batteries*, In-situ characterization methods in energy research symposium, Spring 2013, Materials Research Society Meeting
- I58. Advanced Energy Materials Session, 2013 Renewable Energy and Energy Efficiency Workshop (Louisville, March 24-26, 2013). Declined.
- I59. TMS 2013, Nanostructured Materials for Lithium Ion Batteries and for Supercapacitors Symposium, March 3-7, 2013. Declined.
- I60. *Inhomogeneity of nanoparticle reduction and oxidation studied via environmental transmission electron microscopy*; Fall 2012 Materials Research Society Meeting, Frontiers of Chemical Imaging: Integrating Electrons, Photons and Ions, November, 2012
- I61. *Environmental TEM in catalysis research*; 244th Annual American Chemical Society Meeting, Spectroscopy and Microscopy in Catalysis: The In Situ Age Philadelphia, PA, August 2012.
- I62. *Environmental TEM in catalysis research*; Advanced Microscopy and Theoretical Calculations, Nagoya, Japan, May, 2012.
- I63. Plenary Lecture. 11th Annual Conference of the Yugoslav Materials Research Society, Herceg Novi, Montenegro, September, 2011. Unable to attend.
- I64. *Environmental Transmission Electron Microscopy (broadly defined)*; Future directions in Electron Optics, Materials and Manufacturing Directorate, Wright Patterson Air Force Research Laboratory, August, 2011.
- I65. *Catalyst morphological evolution during CNT growth*; The Fifth Rice University, Air Force Research Laboratory, and NASA Workshop on Nucleation and Growth Mechanisms of Single Wall Carbon Nanotubes.
- I66. *The effect of gaseous ambients on catalytic nanoparticles and the impact on nanotube chirality selection*, Session A30: Focus Session: Carbon Nanotubes: Chirality-Controlled Growth of Carbon Nanotubes and Nanostructures, American Physical Society Meeting, Portland, Oregon, March 2011.
- I67. *In-situ transmission electron microscopy*; Symposium Tutorial Presentation, Symposium TT: "In Situ X-Ray Synchrotron Radiation Spectroscopies in Energy-Related Materials Science and Heterogeneous Catalysis", Fall 2010 Materials Research Society Meeting, November, 2010.
- I68. *Update on the Purdue / BNL ETEM work in the CNT Collaboration*, SWNT Collaborators Workshop, Yellow Springs, OH, October, 2010.
- I69. *Understanding the mechanisms of carbon nanotube growth and growth termination*; plenary lecture at Nanomex '10, International and Interdisciplinary Meeting on Nanoscience and Nanotechnology, Cuernavaca, Mexico, November, 2010.
- I70. Declined. "Understanding materials using in-situ microscopy" in Göttingen, Germany on Nov. 10-12, 2010.

- I71. *Environmental TEM: What does aberration correction gain you?*; Midwest Microscopy Society (M3S) Meeting; In-situ TEM, October, 2010.
- I72. *Environmental TEM: What does aberration correction gain you?*; Symposium on Materials Characterization using Advanced Electron Microscopy; Rutgers University, October, 2010.
- I73. Update on the Purdue / BNL ETEM work in the CNT Collaboration, SWNT Collaborators Workshop, Yellow Springs, OH, October, 2010.
- I74. *Declined*, Extended Defects in Semiconductors (EDS2010).
- I75. *Evolution in catalyst morphology leads to carbon nanotube growth termination*, S.M. Kim, C.L. Pint, P. Amama, R.H. Hauge, B. Maruyama, and E.A. Stach, in “Nanostructure Applications in Cross-over Scientific and Technology Fields”, International Materials Research Congress, Cancun, Mexico, August 2010.
- I76. *Characterizing and optimizing the performance of the FEI Titan ETEM*; Microscopy and Microanalysis Meeting, August 2010.
- I77. *Declined*, 11th IUMRS International Conference in Asia (IUMRS-ICA 2010).
- I78. *Stabilizing nanostructured metals via the incorporation of high densities of twins*; International Symposium on Plasticity and its Current Applications, St. Kitts, January 2010.
- I79. *Using in-situ TEM to understand growth termination of water-assisted single-walled carbon nanotube arrays*; Midwest Microscopy Society (M3S) Meeting, August, 2009.
- I80. *Declined*, Workshop on In-situ Nanomechanics, Indian Institute of Science, August, 2009.
- I81. *Understanding the interplay of mechanisms contributing to termination of water-assisted single-walled carbon nanotube array growth*, C.L. Pint, S.M. Kim, P. Amama, B. Maruyama, E.A. Stach, and R.H. Hauge, NT '09, Beijing, CN (6-21-2009).
(a) Selected as an invited presentation from the pool of submitted abstracts
- I82. *Kinetics of individual nucleation events in nanoscale vapor-liquid-solid growth*, “Semiconductor Nanowires”, Materials Research Society Meeting, Spring 2009.
- I83. *Optimizing our ETEM for controlled nanostructure growth: some substantial successes and several remaining challenges*, FEI Corporation Workshop on Environmental Transmission Electron Microscopy, Eindhoven, The Netherlands, April, 2009.
- I84. *Declined*. International Symposium on Plasticity and its Current Applications, January 2009.
- I85. *Ostwald ripening of Fe on alumina during nanotube growth*, “In-situ Studies Across Spatial and Temporal Length Scales for Nanoscience and Technology”, Materials Research Society Meeting, Fall 2008.
- I86. *Ostwald ripening of Fe on alumina during nanotube growth*, Advanced Electron Microscopy in Materials Science, ORNL Workshop, November, 2008.
- I87. *Ostwald ripening of Fe on alumina during nanotube growth*; In-situ Electron Microscopy, AVS 55th International Symposium, October, 2008.
- I88. *Ostwald ripening of Fe on alumina during nanotube growth*, Yellow Springs Workshop on Nanotube Growth Mechanisms, October, 2008.
- I89. *Declined*; Workshop on Aberration-Corrected Microscopy and Spectroscopy for Materials, ORNL, September, 2008.

- I90. *Expanding in-situ mechanical testing into the “ultrafast” regime*; Ultrafast Electron Microscopy and Ultrafast Science Symposium, Microscopy and Microanalysis Meeting, August, 2008.
- I91. *Kinetics of individual nucleation events observed in nanoscale vapor-liquid-solid growth*; “Opportunities and Challenges for In-Situ Microscopy, User’s Week 2008, Argonne National Laboratory, May, 2008.
- I92. *Exploiting quantitative in-situ nanoindentation to investigate the mechanisms of plastic deformation in thin films*, American Ceramic Society Annual Meeting, Daytona, FL, January, 2008
- I93. Declined. International Symposium on Plasticity and its Current Applications, Keahou Bay January 2008.
- I94. *Quantitative in-situ nanoindentation of thin films*, Center for Electron Nanoscopy Inauguration, Denmark Technical University, Lyngby, Denmark, December 2007.
- I95. *Using real time electron microscopy to understand nucleation and growth in semiconducting nanowires and carbon nanotubes*, Quantitative Electron Microscopy for Materials Science, Fall 2007 MRS meeting, Boston, MA, November 2007.
- I96. *Using real time electron microscopy to understand nucleation and growth in semiconducting nanowires and carbon nanotubes*, In-situ Electron Microscopy, AVS 54th International Symposium, October, 2007.
- I97. *Using real time electron microscopy to understand nucleation and growth in semiconducting nanowires and carbon nanotubes*, Frontiers of Electron Microscopy in Materials Science Conference, October, 2007
- I98. Declined, Interamerican Congress of Electron Microscopy 2007, September 2007
- I99. *Using real time microscopy to understand the nucleation of nanotubes and nanowires*, Ninth Annual Conference of the Yugoslav Materials Research Society, Herceg Novi, Montenegro, September, 2007.
- I100. Declined, 2007 ASME Mechanics and Materials Conference, Austin, Texas, June, 2007.
- I101. *Why is ultra-fast imaging needed for in-situ transmission electron microscopy?*, Fast Electron Gun Workshop, Argonne National Laboratory, June 5th, 2007.
- I102. *Using real time electron microscopy to understand nucleation and growth in semiconducting nanowires and carbon nanotubes*, In Situ Studies of Interfacial Reactivity Workshop, User’s Week 2007, Argonne National Laboratory, May 10, 2007.
- I103. *Understanding the mechanisms of single walled nanotube growth from “spin-on-catalysts” using real time imaging in the TEM*, E.A. Stach, Seung Min Kim, Mark Pender, Tyson C. Back, Allison Jacques and Benji Maruyama, 2007 Workshop on Nucleation and Growth of Single Wall Carbon Nanotubes.
- I104. *Understanding the onset of plasticity in materials using quantitative in-situ nanoindentation*, E.A. Stach, A.M. Minor, D. Ge, J.W. Morris, Jr., S. Asif, T. Wyrobek and O. Warren, 2007 International Conference on Metallurgical Coatings and Thin Films (ICMCTM), San Diego, April 2007.
- I105. *Size effects on the deformation behavior of silicon*; E.A. Stach, A.M. Minor, D. Ge, J.W. Morris, Jr., S. Asif, T. Wyrobek and O. Warren, Workshop on the Mechanical Behavior of Systems at Small Length Scales, Indian Institute of Science, Bangalore, February, 2007.

- I106. *Observing mechanical behavior and crystal growth at improved time resolution*; E.A. Stach, Workshop on Dynamic Transmission Electron Microscopy, Lawrence Livermore National Laboratory, Livermore, CA Aug 10 & 11, 2006.
- I107. Declined, Extended Defects in Semiconductors, Halle, 2006.
- I108. *Quantitative nanoindentation in-situ to the TEM*; E.A. Stach, A. Minor, Z. Shan, M. Jin, J.W. Morris, Jr., A. Syed and O. Warren, AVS Prairie Chapter Symposium, June 2006.
- I109. *Characterization of nanomaterials*; Eric Stach, Food Nanotechnology Grand Rounds, Food & Drug Administration, April 25 2006.
- I110. *Quantitative in-situ nanoindentation of silicon*, E.A. Stach, D. Ge, A.M. Minor, J.W. Morris, Jr., S. Asif, T. Wyrobek and O. Warren “In-situ electron microscopy”, Fall 2005 MRS meeting, Boston MA.
- I111. *In-situ nanoindentation: a quantitative technique for understanding nanoscale deformation mechanisms*, E.A. Stach, A. Minor, D. Ge, M. Jin and J.W. Morris, Jr., “Dynamics of Materials Revealed by Electron Microscopy”, Midwest Microscopy and Microanalysis Society, Urbana, Illinois, June 2005.
- I112. Declined, Eighth Annual Conference of the Yugoslav Materials Research Society, Herceg Novi, Montenegro, September, 2005.
- I113. *In-situ transmission electron microscopy studies of the deformation of nanocrystalline metals*; E.A. Stach, A. Minor, D. Ge, M. Jin, J.W. Morris, Jr., Z. Shan, S.X. Mao, J.M.K. Wiezorek, D.M. Follstaedt and J.A. Knapp, China-US Workshop on Advanced Materials, May, 2005.
- I114. *In-situ nanoindentation of ultrananocrystalline diamond and amorphous diamond thin film coating*; E.A. Stach, A.M. Minor, D. Ge, J.W. Morris, Jr., T.A. Friedmann, X. Xiao, O. Auciello, J.A. Carlisle, “Nanostructured diamond and diamond-like materials for micro- and nano-devices”, Spring 2005 MRS meeting, April, 2005.
- I115. *Using the electron microscope to explore reliability in nanostructured materials*; E.A. Stach, D. Ge, M. Jin, A. Minor, J.W. Morris, Jr., V. Gopal, and V. Radmilovic, “Thin Films – Stresses and Mechanical Properties XI”, Spring 2005 MRS meeting, April 2005.
- I116. *In-situ nanoindentation: a novel technique for understanding nanoscale deformation mechanisms*, The 10th International Symposium on Advanced Physical Fields, National Institute for Materials Science, Tsukuba, Japan, March 2005
- I117. *Using the electron microscope to explore reliability in microelectromechanical systems and nanostructured materials*; E.A. Stach, V. Gopal, M. Jin, D.H. Alsem, M.J. Williamson, A. Minor, V. Radmilovic, C.L. Muhlstein, J.W. Morris, Jr., and R.O. Ritchie, Microscopy and Microanalysis, Savannah, Georgia, August, 2004.
- I118. *In-situ nanoindentation – a unique probe of deformation response in materials*; E.A. Stach, A.M. Minor, E.T. Lilleodden, M. Jin, D. Chrzan, J.W. Morris, Jr., T.A. Friedmann, X. Xiao, O.H. Auciello, and J.A. Carlisle, Microscopy and Microanalysis Meeting, San Antonio, TX, August 2003.
- I119. *In-situ TEM studies of nanoindentation: a novel method for quantitatively exploring thin film mechanical behavior*; E.A. Stach, A.M. Minor, E.T. Lilleodden, M. Jin and J.W. Morris, Jr., American Society for Mechanical Engineering, Scottsdale, AZ, June 2003.
- I120. *Quantitative in-situ nanoindentation: a novel method for exploring thin film mechanical behavior*; E.A. Stach, A.M. Minor, E.T. Lilleodden, M. Jin and J.W. Morris, Jr., American Physical Society Meeting, Texas, March 2003.

- I121. *In-situ transmission electron microscopy studies of grain growth in thin films during simultaneous heating and electrical bias*; E.A. Stach, X. Phung, L. Stanciu, J.R. Groza, K. Hukari, “Materials Processing Under the Influence of Electrical and Magnetic Fields” TMS Annual Meeting, San Diego, CA, March 2003.
- I122. *Quantitative determination of the kinetics of nanopipe growth in GaN*; E.A. Stach, W.S. Wong and M. Kneissl, 4th Symposium on Non-Stoichiometric III-V Compounds, Asilomar, CA, October 2002.
- I123. *Quantitative in-situ nanoindentation: a novel method for exploring thin film mechanical behavior*; E.A. Stach, A. Minor, E.T. Lilleodden and J.W. Morris, Jr., XI International Materials Research Congress, Cancún, Mexico, August 2002.
- I124. *Transmission electron microscopy in thin film mechanical property research*, E.A. Stach, Chama River Workshop on Thin Film Mechanical Properties, Cuba, New Mexico, August 2002.
- I125. *Fatigue of thin-film silicon-based MEMS materials: experiments, mechanisms and durability*; C. Muhlstein, E.A. Stach (presenting) and R.O. Ritchie, at “MEMS and Nanotechnology” Symposium, 14th U.S. National Congress of Theoretical and Applied Mechanics, Blacksburg, VA, June 2002.
- I126. *On the suppression of premature fatigue failure in thin-film polycrystalline silicon for MEMS*; C. Muhlstein, E.A. Stach (presenting) and R.O. Ritchie, at “Mechanics of Thin Films and Other Small Structures” Symposium, Fourteenth U.S. National Congress of Theoretical and Applied Mechanics, Blacksburg, VA, June 2002.
- I127. *Thermochemical decomposition in GaN: Laser lift-off and novel defect formation*; E.A. Stach, T. Sands, Y. Cho and W.S. Wong, “Defect and Impurity-Engineered Semiconductors and Devices, III”, Materials Research Society Meeting, San Francisco, CA, April 2002.
- I128. *In-situ TEM: a tool for quantitative observations of deformation behavior in thin films and nanostructured materials*; E.A. Stach, DOE Workshop on New Materials Science Enabled by *In-situ* Microscopies, Half Moon Bay, CA, January 2001.
- I129. *In-situ transmission electron microscopy studies of dislocations in metallic thin films*; E.A. Stach, A. M. Minor, J. W. Morris, Jr., J. A. Floro, S. Seel and C. V. Thompson, International Conference on Materials for Advanced Technologies – “Thin Films: Stress, Strain and Structure – Property Relationships” Symposium, IUMRS Meeting, Singapore, July 2001.
- I130. *In-situ transmission electron microscopy studies of dislocations in metallic thin films*; E.A. Stach, A. Minor, J.W. Morris, Jr., J.A. Floro, S.C. Seel and C.V. Thompson “Dislocations and Deformation Mechanisms in Thin Films and Small Structures”, Spring 2001 Materials Research Society meeting, San Francisco, CA, April 2001.
- I131. *In-situ transmission electron microscopy studies of defect formation and dislocation interactions in semiconductor materials*; E.A. Stach, R. Hull, R.M. Tromp, K. Schwarz, F.M. Ross, C.F. Kisielowski, T. Sands and W.S. Wong, International Conference on Extended Defects in Semiconductors, Sussex, England, July 2000.
- I132. *In-situ microscopy in an aberration-free microscope*; Summer Workshop on Aberration Correction in Electron Microscopy, Argonne National Laboratory, Argonne, IL, July 2000.
- I133. *In-situ transmission electron microscopy studies of dislocations in thin film systems*; E.A. Stach, R. Hull, R.M. Tromp, F.M. Ross, K.W. Schwarz, M.C. Reuter, and W.D. Nix, Fall 1999 Materials Research Society Meeting, Boston, MA, December 1999.

Departmental Seminars

At Materials Science Departments unless otherwise noted

- 1998: National Center for Electron Microscopy, Lawrence Berkeley National Laboratory
- 1999: Sandia National Laboratories, Livermore
- 2000: Xerox Palo Alto Research Center; Lucent Bell Laboratories; University of California at Berkeley
- 2001: Sandia National Laboratories, Albuquerque; Northern California Society for Microscopy; University of Illinois at Urbana-Champaign; University of Virginia; Cornell University
- 2002: IBM Almaden Research Laboratory; Palo Alto Research Center, Incorporated; The Advanced Light Source, Lawrence Berkeley National Laboratory; University of Washington; Stanford University; University of Colorado at Boulder; Brown University
- 2003: University of California, Los Angeles; Department of Mechanical Engineering, University of Nevada, Reno; Department of Mechanical Engineering, University of Arkansas; Department of Physics, University of California, Berkeley; IBM Almaden Research Laboratory; Sandia National Laboratories, Albuquerque; Hysitron Corporation; Zyvex Corporation
- 2004: Argonne National Laboratory; Purdue University; University of Florida; University of Maryland, University of California at Berkeley; Sandia National Laboratories, Albuquerque; Department of Mechanical Engineering, Princeton University; Palo Alto Research Center, Incorporated
- 2005: Case Western Reserve University; Tohoku University; Argonne National Laboratory; Ohio State University; Department of Chemical Engineering, University of Louisville; University of Michigan; GE Global Research
- 2006: Harvard University
- 2007: University of Virginia
- 2008: Department of Mechanical Engineering, University of Pittsburgh; Department of Mechanical Engineering, Michigan Technological University; Center for Nano and Molecular Science and Technology, University of Texas, Austin; Northwestern University
- 2009: Center for Nanoscale Science and Technology, National Institute of Standards and Technology; Center for Functional Nanomaterials, Brookhaven National Laboratory
- 2010: University of Illinois at Urbana-Champaign; Ohio State University; Nanoscale Research and Engineering Center, Columbia University; Rensselaer Polytechnic Institute
- 2011: Cornell University; University of Pennsylvania; Massachusetts Institute of Technology's Center for Excitonics
- 2012: IBM T.J. Watson Research Center, Physical Sciences Seminar; Discovery Lecture, Center for Nanophase Materials Science, Oak Ridge National Laboratory
- 2013: Brown University, Joint Materials and Mechanics Group Seminar; Stevens Institute of Technology, Department of Materials Science and Engineering; Princeton Research Institute for the Science of Materials; University of Connecticut
- 2014: Brown University
- 2015: University of Pittsburgh
- 2016: University of Florida; Notre Dame University (Skype); University of Pennsylvania; Center for Nanoscale Science and Technology, National Institute of Standards and Technology; Massachusetts Institute of Technology
- 2017: BASF Corporation, Heterogeneous Catalysis Research Center; Rowland Institute, Harvard University; Dartmouth College; Duke University

2018: None

2019: Denmark Technical University, Johns Hopkins University

2020: Lehigh University (cancelled – COVID-19)