

Curriculum Vitae

Bruce E. Koel

Professor Emeritus and Senior Scholar of Chemical and Biological Engineering
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Education: Ph.D., Chemistry, *The University of Texas at Austin*, 1981
M.S., Chemistry, *Emporia State University*, 1978
B.S., Highest Honors, Chemistry, *Emporia State University*, 1976

Research Activities: Surface processes and probes. *Plasma-materials interactions* – fusion plasma, NSTX-U, LTX- β , liquid metals; low temperature plasma, nanomaterials synthesis, diamond ALE; *Plasma-assisted catalysis* – NH₃ synthesis and decomposition, CH₄ and CO₂ conversion; *Heterogeneous catalysis* – bimetallic Au catalysis, hydrodeoxygenation; *Photoelectrocatalysis, electrocatalysis, electrochemistry* – CO₂ reduction, oxygen evolution, solid electrolyte interphase, cathode active materials; *Environmental remediation* – iron and iron oxide nanoparticles; *Electron and ion spectroscopy; Scanning probe microscopy.*

Professional Positions:

Senior Scholar of Chemical and Biological Engineering, *Princeton University*, 2024–
Professor Emeritus of Chemical and Biological Engineering, *Princeton University*, 2024–
Visiting Researcher, Chemical and Biomolecular Engineering Department, *University of California, Los Angeles*, 2020-2022
Co-founder, Member of the Technology Advisory Committee, *Princeton NuEnergy, Inc.*, 2019–
LTX- β Collaborator, *Princeton Plasma Physics Laboratory (PPPL)*, 2018–
Associated Faculty, High Meadows Environmental Institute (HMEI), *Princeton U.*, 2018-2024
Associated Faculty, Andlinger Ctr. for Energy and Environ. (ACEE), *Princeton U.*, 2015-2024
Associated Faculty, Princeton Materials Institute (PMI), *Princeton U.*, 2011-2024
Associated Faculty in Mechanical and Aerospace Engineering, *Princeton University*, 2011-2024
Associated Faculty in Chemistry, *Princeton University*, 2011-2024
Undergraduate Dept. Representative, Chem. and Bio. Engineering, *Princeton U.*, 2011-2014
NSTX-U Collaborator, *Princeton Plasma Physics Laboratory (PPPL)*, 2011–
Professor of Chemical and Biological Engineering, *Princeton University*, 2011-2024
Adjunct Professor of Chemistry, *Lehigh University*, 2011
Interim Vice President, Assoc. Provost for Research & Grad. Studies, *Lehigh Univ.*, 2008-2010
Interim Vice Provost for Research, *Lehigh University*, 2007-2008
Member, Center for Advanced Materials and Nanotech. (CAMN), *Lehigh Univ.*, 2005-2010
Professor of Chemistry, *Lehigh University*, 2005-2010
Visiting Research Collaborator, Dept. of Chemical Engineering, *Princeton University*, 2004-05
Chair, Department of Chemistry, *University of Southern California*, 1998-2001
Visiting Scholar, Department of Chemistry, *Cambridge University*, Jan. - June 1996
Professor (Adjunct) of Materials Science, *University of Southern California*, 1995-2005
Founding Member, Laboratory for Molecular Robotics, *Univ. of Southern California*, 1994-2005

Professor of Chemistry, *University of Southern California*, 1993-2005
Associate Professor of Chemistry, *University of Southern California*, 1990-1993
Associate Professor of Chemistry, *University of Colorado, Boulder*, 1989
Fellow, Coop. Inst. for Research in Environmental Sciences (CIRES), *U. Colorado*, 1983-1989
Assistant Professor of Chemistry, *University of Colorado, Boulder*, 1983-1989
Miller Postdoctoral Fellow, *University of California, Berkeley*, 1981-1983

Selected Honors, Awards and Fellowships:

Eastman Lectureship, Dept. of Chemical Engineering, *University of South Carolina*, Fall 2016
Honorary Professorship, 111 Program, *Tongji University*, Shanghai, P. R. China, 2013-2017
EaStCHEM Intern'l Visiting Fellowship lecturer, *U. of Edinburgh & St. Andrews*, Scotland 2008
George A. Olah Award in Hydrocarbon or Petroleum Chemistry, Amer. Chem. Soc. (ACS) 2007
Fellow of the American Association for the Advancement of Science (AAAS), 2004
Professeur Invite', *University de Paris-Sud*, Orsay, France, 2001
AIST Guest Researcher Awards, *Osaka Nat'l Res. Inst.*, Osaka, Japan, 1999 and 2000
Keynote Address, Brazilian Vacuum Society Annual Conf., Sao Jose dos Campos, Brazil, 2000
Fellow of the American Vacuum Society (AVS), 1999
Distinguished Alumnus of *Emporia State University*, 1998
Fellow of the American Physical Society (APS), 1996
Who's Who (Marquis; Strathmore; et al.), 1996—
Union Carbide Innovation Research Awards, 1990 and 1991
Alfred P. Sloan Research Fellowship, 1990
Exxon Education Foundation Award, 1987
Junior Faculty Development Award, *University of Colorado, Boulder*, 1985
Dreyfus Foundation Grant for New Faculty, 1983
Miller Institute Postdoctoral Fellowship, *University of California, Berkeley*, 1981
ACS Division of Colloid and Surface Chemistry Proctor and Gamble Fellowship, 1980
National Science Foundation Traineeship; University Fellowship, *Univ. Texas, Austin*, 1978

Other Work Experience:

Co-founder, Member of the Technology Advisory Committee, *Princeton NuEnergy, Inc.*, established 2019
Consulting: Carl Zeiss SMT GmbH, Germany, 2023-2024; Surface Chemistry Discoveries, Inc., 2005; Arkema (ATOFINA Chemicals, Inc.), 2004; Atherton Quantum Insight, ChevronTexaco, 2003-05; Jet Propulsion Laboratory, 1998-2000; Dow Chemical Co., 1995; Chem Alert Corp., 1993-95; Burge and Associates, 1992-94; CLS-1, Los Alamos National Lab., 1992-94; J&A Associates, 1986; Hewlett-Packard, 1985-89; CLS-2, Los Alamos National Lab., 1984-92.

Intellectual Property, Patents, and related activity:

Enhancing Ammonium Oxidation and Fluorochemical Degradation with Ferric Iron Phase Comprising Polymeric Coatings. P.R. Jaffé, B.E. Koel. [US Application No. 18/533,781](#), Filed December 8, 2023. Patent pending in US.
Systems and Methods for Lithium-Ion Battery Cathode Material Recovery, Regeneration, and Improvement. Y. Ju, B.E. Koel, C. Yan, X. Yang. [US Application No. 18/322,327](#), Filed May 23, 2023. Patent pending in US.
Systems and Methods for Lithium-Ion Battery Cathode Material Recovery, Regeneration, and Improvement. Y. Ju, B.E. Koel, C. Yan, X. Yang. PCT Application No. [PCT/US2021/060502](#), Filed November 23, 2021. Patent pending in US, Taiwan, Europe and China.

Layered Nanofabrication, A. A.G. Requicha, B.E. Koel, R. Resch, D. Lewis, M.E. Thompson.
[U.S. Patent No. 6,508,979 B1](#), Date of Patent: January 1, 2003.

Membership in Professional Societies: American Association for the Advancement of Science (AAAS), The American Ceramic Society (ACerS), American Chemical Society (ACS), American Institute of Chemical Engineers (AIChE), American Physical Society (APS), American Vacuum Society (AVS), Catalysis Society of Metropolitan New York, The Electrochemical Society (ECS), International Plasma Chemistry Society (IPCS), Materials Research Society (MRS)

Editorial Services to Scholarly Publications:

Guest Member, Editorial Committee, *Annual Review of Physical Chemistry*, Vol. 61(2010), 2008

Member, Editorial Advisory Board of *Langmuir*, 1993-2001

Co-Editor, Proceedings of the Symposium on Bimetallic Surface Chemistry and Catalysis, *Langmuir*, 4(5), 1073-1222 (1988)

Referee for: ACS Applied Materials & Interfaces, ACS Nano, Applied Surface Science, Catalysis Letters, Catalysis Today, Chemistry of Materials, J. Catalysis, J. Chemical Physics, J. Electron Spectroscopy and Related Phenomena, J. Physical Chemistry, J. American Chemical Society, J. Vacuum Science and Technology, Langmuir, Physical Chemistry Chemical Physics, Physical Review, Physical Review Letters, Proceed. National Academy of Sciences, Science, and Surface Science

Selected Professional Activities:

Member, Plasma Material Interaction (PMI) Subpanel, Basic Research Needs for Measurement Innovation (MI) in Fusion Energy Sciences (FES), Workshop and Report, Department of Energy (DoE), 2023-2024

Member, Advisory Board, Center for Programmable Energy Catalysis (CPEC), a U.S. Department of Energy, Energy Frontier Research Center (EFRC), 2023–

Member, ACS National Award Canvassing Committee, 2022

Member, DOE On-Site Review Panel, Office of Basic Energy Sciences, Energy Innovation Hub “Fuels from Sunlight”, Pasadena, CA, 2018

Chair, Surface Science Division, American Vacuum Society (AVS), 2017-2018

Chair, AVS 64 Surface Science Division Program Committee for the AVS 64th International Symposium and Exhibition, Tampa, FL, 2016-2017

Member, ACS National Awards Selection Committees, 2017, 2016, 2015, 2014, 2008, 2007

Member, DOE BES On-Site Review Panel, SUNCAT Center for Interface Science and Catalysis - FWP Program, BES Catalysis Program at SLAC National Accelerator Laboratory, 2016

Member, Advisory Committee, 4th International Workshop on Nanotechnology, Renewable Energy & Sustainability, Xi’an, China, 2016

Member, DOE On-Site Review Panel, Laboratory Director’s Review, Chemical Science Division, Lawrence Berkeley National Laboratory (LBNL), 2015

Member, DOE Panel Review, Office of Basic Energy Sciences, Energy Innovation Hub Renewal “Fuels from Sunlight”, 2015

Member, Laboratory for Plasma Nanosynthesis, Princeton Plasma Physics Laboratory, 2015–

Member, Program Committee, AVS International Symposium and Exhib., 2014-2019

Member, AVS Surface Science Division Executive Committee, 2014-2019

Member, DOE On-Site Review Panel, Catalysis Science Program, Lawrence Berkeley National Laboratory (LBNL), 2014

Organizer, Spring Symposium of The Catalysis Society of Metropolitan New York, 2013

Member, Science Advisory Committee (SAC) of the Center for Functional Nanomaterials (CFN) at Brookhaven National Laboratory (BNL), 2012-2016
Member, Governing Board, Council for Chemical Research (CCR), 2011-2013
Member, Advisory Committee, QEXAFS/XRD beamline, NSLS-II, 2010
University Leader, CCR Research Collaboration Action Network (RC-AN), 2009-10
Affiliated Faculty of the Catalysis Center for Energy Innovation (CCEI), University of Delaware, an Energy Frontier Research Center funded by the U.S. DOE, Office of Science, 2009-13
Member, 2009 Physical Electronics Conference Meeting Local Program Committee, 2009
Member, DOE Materials Science Merit Review Panel, National Energy Technology Laboratory (NETL), 2009
Member, Tech. Advisory Committee, PA NanoMaterials Commercialization Center, 2008-10
Member, CCR Research Collaboration Action Network (RC-AN), 2007-10
Member, International Advisory Board, Chemical and Energy Sciences, BNL, NSLS-II, 2007-10
Member, Board of Directors, Ben Franklin Technology Partners of Northeastern PA, 2007-10
Member, Executive Board, Lehigh Nanotechnology Network (LNN), 2007-10
Member, NSF SBIR/STTR Program Industrial Innovation & Partnerships Panel, 2007
Member, General Committee of the Physical Electronics Conference, 2007-10
Member, NSF Analytical and Surface Chemistry Panel, 2007
Instructor, Scanning Probe Microscopy: From Fundamentals to Advanced Applications Course, Lehigh Microscopy School, 2006-10
Member, CCR 2006 Annual Meeting Planning Committee, 2005
ARO Chemistry Position Workshop, Chemical Sciences Div., North Carolina St. Univ., 2004
Member, DOE Materials Chemistry Review Team, Lawrence Berkeley Nat'l Laboratory, 2003
Chair, Surface Science Division, American Vacuum Society (AVS), 2000 and 2001
Member, Program Committee, AVS 47th Int'l Symposium & NANO-6, Boston, MA, 2000
2000 SET (Science, Engineering, and Technology) Congressional Visits Day, Washington, DC
AVS Strategic Planning Workshop, Chicago, IL, 2000
Member, Long Range Planning Committee, AVS Surface Science Division, 1998-2000
Reviewer, 2000 Western Assoc. of Grad. Schools (WAGS) Distinguished Masters Thesis Award
Chair, California Catalysis Society Annual Meeting, 1999
Congressional Visits Day, CCR, Washington, DC, 1999
Chair, AVS Surface Science Division Program Committee, 1999
Member, CCR Government Relations Committee, 1998-2005
Chair, Leading Edge Symposium, 31st Annual Symp. of the Southern Calif. AVS, Orange, 1998
Member, AVS Award Committees, 1997, 1994
Member, Executive Committee & Program Committee, AVS Surface Science Division, 1997-99
Member, Gordon Research Conference Council, 1997
Chair, Chemical Reactions at Surfaces Gordon Research Conference, 1997
Chair, Stauffer Symposium on Surface Chemistry, 1995
Vice-Chair, Chemical Reactions at Surfaces Gordon Research Conference, 1995
Member, Review Panel for DOE Distinguished Postdoctoral Research Program, 1993
Member, Canvassing Committee for the Arthur W. Adamson Award for Distinguished Service in the Advancement of Surface Chemistry, ACS, 1992-95
Co-chair, 8th DOE-BES Heterogeneous Catalysis & Surface Chemistry Mtg., Los Angeles, 1992
Chair, P&G Fellowship Committee, Division of Colloid and Surface Chemistry, ACS, 1992
Member, P&G Fellowship Committee, Div. of Colloid and Surface Chemistry, ACS, 1991-93
Chair, Organizing Committee, Chemical Reactions at Surfaces Gordon Conference, 1991-93

Faculty Participant, USC Center for Research on Environmental Sciences, Policy and Engineering (CRESPE), 1991-1996
Member, Procter & Gamble Fellowship Comm., Div. Colloid & Surf. Chem., ACS, 1991-1993
Co-chair, Continuing Symposium on Molecular Processes at Solid Surfaces, Div. Colloid & Surf. Chem., ACS, 1989-1993
Co-Chair, Symposium on "Bimetallic and Alloy Surface Chemistry and Catalysis," Div. Colloid & Surf. Chem., 1987 National ACS Meeting, New Orleans, 1987
Member, Program Committee, Div. Colloid & Surf. Chem., ACS, 1986-1988
Co-Chair, Symposium on "Surface Science of Coal Liquefaction Catalysts," Div. of Fuel Chemistry, 1986 National ACS Meeting, New York, 1986
Chair, Symposium on "Chemical and Physical Properties of Bimetallic and Alloy Surfaces," 1986 Rocky Mountain ACS Meeting, Denver, 1986
Instructor, Surface Analysis, Short Course "Analytical Chemistry," U. Colorado, Boulder, 1985-1989
Co-Chair, Physical Chemistry Workshop, University of Colorado, Boulder, June 1985
Member, Review Panel for University Coal Research Program, DOE, Pittsburgh Energy Technology Center (PETC), 1985

Invited Lectures at Technical Meetings:

- 2023 DOE Low Temperature Plasma Centers and User Facilities Annual Meeting, Arlington, VA
13th Asian-European International Conference on Plasma Surface Engineering (AEPSE 2023) and Topical Workshop on Plasma Catalysis Towards Decarbonizing Society, Busan, Republic of Korea
ACS Natl. Meeting, Fall 2023, Symposium on "Electrocatalysis for Energy and Sustainability", San Francisco, CA & Hybrid
ECS National Meeting, 243rd, with 18th International Symposium on Solid Oxide Fuel Cells (SOFC-XVIII), Symposium I02: "Renewable Fuels via Artificial Photosynthesis or Heterocatalysis 9", Boston, MA
- 2022 DOE Low Temperature Plasma Centers and User Facilities Annual Meeting, Arlington, VA
ACS Natl. Meeting, 264th, Symposium on "Mechanisms and Kinetics of Reactions at Plasma-Catalyst Interfaces", Chicago, IL (Virtual)
NIEHS Superfund Research Program Internet Seminar, Utilizing Innovative Materials Science Approaches to Enhance Bioremediation: Session I - Per- and Polyfluoroalkyl substances, (**P. Jaffé**, J. Park, S. Huang, B.E. Koel) (Virtual)
- 2021 Engage 2021 Conference, Catalyze the Transformation of Research into Innovation, Celebrate Princeton Innovation 2021, Princeton University, Princeton, NJ, (Virtual meeting due to COVID-19)
NSTX-U / Magnetic Fusion Science Meeting, Princeton Plasma Physics Laboratory (PPPL), Princeton, NJ, (**S. Abe**, B.E. Koel, et al.) (Virtual meeting due to COVID-19)
63rd Annual Meeting of the APS Division of Plasma Physics (DPP-21), Session TI02: MFE IV: Edge and Scrape-Off Layer Plasmas, Pittsburgh, PA, (**S. Abe**, B.E. Koel, et al.)
13th Asian-European International Conference on Plasma Surface Engineering (AEPSE 2021), Plasma Catalysis Workshop, BEXCO, Busan, Republic of Korea (Postponed due to COVID-19)

- DOE Low Temperature Plasma Centers and User Facilities Annual Meeting, Bethesda, MD, (Z. Chen, H. Zhao, S. Jaiswal, S. Sundaresan, Y. Ju, **B.E. Koel**) (Virtual talk due to COVID-19)
- Superfund Research Program (SRP) Newly Funded Individual Research Grants (R01) Programs, RFA-ES-20-004 - Optimizing Natural Systems for Remediation: Utilizing Innovative Materials Science Approaches to Enhance Bioremediation, Kick-Off Call (**P. Jaffe**, B.E. Koel) (Virtual meeting due to COVID-19)
- NSTX-U / Magnetic Fusion Science Meeting, Princeton Plasma Physics Laboratory (PPPL), Princeton, NJ, (**J.P. Allain**, **B.E. Koel**, **K. Woller**) (Virtual meeting due to COVID-19)
- 2020 2nd Research Coordination Meeting (RCM) of the CRP on Atomic Data for Vapour Shielding in Fusion Devices, International Atomic Energy Agency (IAEA) Headquarters, Vienna, Austria (Virtual meeting due to COVID-19)
- Plasma Centers Virtual Meeting, University of Michigan, Ann Arbor, MI (Virtual meeting due to COVID-19)
- ECS National Meeting, 237th with International Meeting on Chemical Sensors (IMCS) 2020, Symposium I04: “Renewable Fuels via Artificial Photosynthesis or Heterocatalysis 5”, Montreal, Canada (Cancelled due to COVID-19)
- MRS Spring Meeting 2020, Symposium EN03: “Solar-Energy Conversion for Sustainable Water-Energy-Environmental Nexus”, Phoenix, AZ (Cancelled due to COVID-19)
- 11th International Meeting on Recent Developments in the Study of Radiation Effects in Matter (REM 2020), Cozumel, Mexico, (**P.S. Krstic**, F.J. Dominguez Gutierrez, B. Koel)
- 2019 AVS 66th Internat’l Symp. & Exhib., Symposium on “Plasma Conversion and Enhanced Catalysis for Chemical Synthesis”, Columbus, OH
- NSLS-II Strategic Planning Workshop “Exploring New Science Frontiers at NSLS-II”, Brookhaven National Laboratory, Upton, NY
- ECS National Meeting, 236th, Symposium on “Photocatalysts, Photoelectrochemical Cells and Solar Fuels 10”, Atlanta, GA
- ACS Fall 2019 Natl. Meeting, Symposium on “Adsorption and Reaction at Surfaces: Symposium in Honor of Charles T. Campbell”, San Diego, CA
- Keynote: 70th Annual International Society of Electrochemistry (ISE) Meeting, Symposium S04 - Renewable Energy and Photo-Electrochemistry, Durban, S. Africa
- International Conference on Energy, Materials and Photonics 2019 (EMP19), Session: Energy & Catalysis (II), Shanghai, P. R. China
- European MRS (E-MRS) Spring Meeting 2019, Symposium A: Latest Advances in Solar Fuels, Nice, France
- MRS Spring Meeting 2019, Symposium ES06: “Atomic-Level Understanding of Materials in Fuel Cells and Electrolyzers”, ES06.06: Electrocatalysis III, Phoenix, AZ
- ACS Natl. Meeting, 257th, Symposium on “Applied Electrocatalysis for Renewable Energy and Synthesis”, Orlando, FL
- ACS Natl. Meeting, 257th, Symposium on “Elucidation of Mechanisms and Kinetics on Surfaces”, Orlando, FL
- Metro. New York Catalysis Society (NYCS) Annual Symposium 2019, Princeton, NJ
- 1st RCM of the CRP on Atomic Data for Vapour Shielding in Fusion Devices, IAEA Headquarters, Vienna, Austria, (**Predrag Krstić**, B.E. Koel, F. J. Dominguez-Gutierrez)

- US-Japan and International Workshop on Power and Particle Control in DEMO Fusion Reactor by Liquid Metal Plasma-Facing Components, Princeton, NJ
- 2018 MRS Fall Meeting 2018, Symposium PM07: “PlasmaBased Synthesis, Processing and Characterization of Novel Materials for Advanced Applications”, Boston, MA
- XXVII International Materials Research Congress (IMRC 2018), Symposium C3: Solar Hydrogen Production, Cancún, México
- International Conference on Energy, Materials and Photonics 2018 (EMP18), Session: Catalysis and Photocatalysis, Montreal, Canada
- 45th IEEE International Conference on Plasma Science (ICOPS 2018), Session 5D: 4.7 Plasma Material Interactions I, Denver, CO
- 45th IEEE International Conference on Plasma Science (ICOPS 2018), Session 7E: 5.1 Nonequilibrium Plasma Applications IV, Denver, CO
- Invited Tutorial: 23rd International Conference on Plasma Surface Interactions in Controlled Fusion Devices (PSI-23), Princeton, NJ
- 40th DOE Solar Photochemistry Research Conference, Gaithersburg, MD
- 2018 University Coalition for Fossil Energy Research (UCFER) Annual Meeting, National Energy Technology Laboratory, Morgantown, WV
- 2018 MRS Spring Meeting, Symposium: NM03: “Rational Designed Hierarchical Nanostructures for Photocatalytic Systems”, Phoenix, AZ
- 42nd Internat’l Conf. & Expos. on Adv. Ceramics & Composites (ICACC), Symposium S7: 12th Internat’l Symp. on Nanostruct. Mat, Functional Nanomat. and Thin Films for Sustainable Energy Harvesting, Environmental and Health Applic, Daytona Beach, FL
- 2017 MRS Fall Meeting 2017, Symposium ES02: “On the Way to Sustainable Solar Fuels— New Concepts, Materials and System Integration”, Boston, MA
- APS Mid-Atlantic Section, 2017 Annual Meeting, Session M4: Chemistry and Energy Science-I, Newark, NJ
- Singh Nanovation Conference, 2017 Annual, Session: Nanotechnology in Energy and the Environment, U. Pennsylvania, Philadelphia, PA
- ECS National Meeting, 232nd, Symposium on “Photocatalysts, Photoelectrochemical Cells and Solar Fuels 8”, National Harbor, MD
- AFOSR Molecular Dynamics/Theoretical Chemistry Program Review, 2017, Albuquerque, NM
- ACS Natl. Meeting, 253rd, “Molecular Surface Science, Nanomaterials & Catalysis: Symposium in Honor of Gabor Somorjai at 80”, San Francisco, CA
- ACS Natl. Meeting, 253rd, Symposium “GSSPC: Water Sustainability: Chemists in Pursuit of Clean Water”, San Francisco, CA
- 2016 Summer School on “Interfaces and Energy”, Göttingen, Germany
- Keynote: SPIE Optics + Photonics 2016, Solar Hydrogen and Nano. XI, San Diego, CA
- ACS Natl. Meeting, 252nd, Symposium “Novel Materials”, Philadelphia, PA
- 9th International Conference on High Temperature Ceramic Matrix Composites and Global Forum on Advanced Materials and Technologies for Sustainable Development 2016, Toronto, Canada
- 2016 Middle Atlantic Regional Meeting (MARM), “Photocatalysis and Solar Fuel” Symposium, Riverdale, NY
- 2016 MRS Spring Meeting, Symposium EE2: Advancements in Solar Fuels, Generation, Materials, Devices and Systems, Phoenix, AZ
- ACS Natl. Meeting, 251st, Symposium “Advances in In situ Pollutant Destruction by Nanoscale Zero Valent Iron & Other Engineered Nanoparticles”, San Diego, CA

- ACS Natl. Meeting, 251st, Symposium “Surface Chemistry & Catalysis of Metal Oxides”, San Diego, CA
2016 Plasma Chemistry AFOSR BRI Annual Program Review: Plasma-Surface Interactions in Reactive Environments, Arlington, VA
- 2015 46th Eastern Analytical Symp. & Exhib., Session: Surface Functionalization of Nanoparticles and Nanomaterials, Somerset, NJ
ECS Natl. Meeting, 228th, Symposium on Solar Fuels, Photocatalysts and Photoelectrochemical Cells, Phoenix, AZ
Keynote: 3rd International Workshop on Nanotechnology, Renewable Energy & Sustainability, Xi’an, China
Keynote: SPIE Optics + Photonics 2015, Solar Hydrogen and Nano. X, San Diego, CA
2015 IEEE/NPSS Symposium on Fusion Engineering (SOFE): Session SO14 PMI and Plasma, Austin, TX
37th DOE Solar Photochemistry Research Conference, Gaithersburg, MD
2015 MRS Spring Meeting, Symposium J: Latest Advances in Solar Water Splitting, San Francisco, CA
ACS Natl. Meeting, 249th, George A. Olah Award Symposium in Honor of Jingguang G. Chen, Denver, CO
- 2014 AFOSR BRI Review: Plasma-Surface Interactions in Reactive Environments, Albuquerque, NM
AVS Prairie Chapter Symposium, Chicago, IL
Keynote: SPIE Solar Energy + Technology 2014, Solar Hydrogen and Nanotechnology IX, San Diego, CA
International Conference on Nanoscience + Technology 2014 (ICN+T 2014), Vail, CO
Materials Challenges in Alternative & Renewable Energy Conference, MCARE 2014, Solar Fuels: Materials for Water Splitting: Hematite, Clearwater, FL
- 2013 66th Gaseous Electronics Conference of the APS, GEC 2013, Princeton, NJ
ACS Natl. Meeting, 245th, Fuel Symp.: Catalysts for Energy Conversion and Storage, New Orleans, LA
- 2012 ACS Natl. Meeting, 244th, ENFL Symp.: Frontiers in Energy and Fuels, Philadelphia, PA
2012 Annual Symposium of The Catalysis Society of Metro. New York, Clinton, NJ
- 2011 Int’l Symposium and the 3rd Iwasawa Conference on Catalysis and Surface Science for Efficient Utilization of Carbon Resources and Related Topics, Xiamen Univ., China
Int’l Symposium on Controlled Surface Reactions, 41st Summer Annual Conf. of the Korean Vacuum Society, Daegu, Korea
- 2010 ACS Natl. Meeting, 240th, CATL Symp.: Surface Science of Catalysis, Boston, MA
ACS Natl. Meeting, 239th, George A. Olah Award Symposium in Honor of Peter C. Stair, San Francisco, CA
- 2009 EPI Workshop, Particles for Emerging Needs: Directed Synthesis and Characterization toward Biomedical and Catalytic Applications, Lehigh University, Bethlehem, PA
ACS Natl. Meeting, 237th, George A. Olah Award Symposium in Honor of Cynthia M. Friend, Salt Lake City, UT
- 2008 AIChE Annual Meeting, A Century of Surface Science and Catalysis, Philadelphia, PA
ACS Natl. Meeting, 236th, Symposium in Memory of Mike White, Philadelphia, PA
20th International Conference on the Application of Accelerators in Research and Industry (CAARI 2008), Fort Worth, TX
ACS Natl. Meeting, 235th, George A. Olah Award Symposium in Honor of Israel E. Wachs, New Orleans, LA

- ACS Natl. Meeting, 235th, Arthur W. Adamson Award Symposium in Honor of Francisco Zaera, New Orleans, LA
- ACS Natl. Meeting, 235th, Symposium Honoring Priestley Medal Winner Gabor Somorjai, New Orleans, LA
- 2007 46th Eastern Analytical Symp. & Exhib., Catalysis and Surface Sci. Symp., Somerset, NJ
- ACS Natl. Mtg., 233rd, Div. of Colloid and Surface Chemistry Award Symp., Chicago, IL
- ACS Natl. Mtg., 233rd, George A. Olah Award Symp. in Honor of Bruce E. Koel, Chicago, IL
- 2006 2006 AIChE Annual Meeting, Topics in Surface Science and Catalysis, In Honor of Robert J. Madix, San Francisco, CA
- ACS Natl. Meeting, 232nd, Dynamics of Single Atoms, Molecules and Clusters on Surfaces Symposium, San Francisco, CA
- Spring Symposium of the New York Catalysis Society, Bethlehem, PA
- 4th Annual Univ. of California Surface Science and Applic. Symposium, Berkeley, CA
- 2005 AVS 52nd Internat'l Symp. & Exhib., Bimetallic Surfaces Symposium, Boston, MA
- 207th Mtg. of The Electrochemical Society, Electrocatalysis Symp., Quebec City, Canada
- Southern California Symposium on Surface Science, University of California, Irvine
- 2004 AVS, Rocky Mountain Annual Symp., RMAVS 2004, Nanostructured Materials Symposium, Golden, CO
- BioNEMS Symposium, sponsored by the Center for Interdisciplinary Research of USC and the National Cancer Institute (NCI), Los Angeles, CA
- ACS Natl. Meeting, 227th, Vibrations at Surfaces Symposium, Anaheim, CA
- 2nd Annual Univ. of California Surface Science and Applic. Symposium, San Diego, CA
- 2003 204th Meeting of The Electrochemical Society, Electrochemistry Symposium in Memory of Michael Weaver, Orlando, FL
- 77th ACS Colloid and Surface Science Symposium, Atlanta, GA
- ACS Natl. Meeting, 225th, Mechanistic Surface Chemistry Symposium, New Orleans
- ACS Natl. Meeting, 225th, Electrochemistry and Surface Science Symposium in Memory of Mike Weaver, New Orleans
- 2002 ACS Natl. Meeting, Nanoscale Studies of Surface Phenomena Symposium, Orlando
- Int'l Technol. Service Mission on Nanotechnology to West Coast USA, Los Angeles
- 2001 Molecular Visualization in Science Education Workshop, NSF, Arlington
- Int'l Collaboration Programme, Catalysis of Gold Nanoparticles Deposited on Titanium Oxides, AIST, 2000, Osaka Nat'l Research Inst., Osaka, Japan
- Gordon Conference on Chemical Reactions at Surfaces, California.
- ACS Natl. Meeting, 221st, Adamson Award Symp. Honoring J. Michael White, San Diego
- Workshop on Nanotechnology: Opportunity and Challenge for Industry, LARTA, CNSI, UCLA, Los Angeles
- 3rd Int'l Symposium on Electronic and Atomic Structure (ISEAS-3) Tamkang Univ., Taiwan
- 2000 ACS Natl. Meeting, 219th, Surface Chemistry Symposium Honoring Gabor A. Somorjai, San Francisco
- Keynote Address: Brazilian Vacuum Society Annual Conf., Sao Jose dos Campos, Brazil
- 11th DOE/BES Heterogeneous Catalysis and Surface Science Contractors Mtg., Rockville, Maryland, 2000
- 21st Century Chemical Catalysis: A Symposium in Honor of Wolfgang Sachtler & Tobin J. Marks, Ipatieff Professors of Chemistry, Northwestern Univ., Evanston
- FEA Cathodes for Electrodynamic Tethers Workshop, JPL, Pasadena

- 4th Int'l Chemical Congress of Pacific Basin Societies (Pacifichem 2000), Symposium on Electrochemical Surface Science at Molecular/Atomic Resolution, Honolulu, Hawaii
- 4th Int'l Chemical Congress of Pacific Basin Societies (Pacifichem 2000), Symposium on Photon and Electron Induced Processes on Surfaces, Honolulu, Hawaii
- 1999 Twelfth International Workshop on Inelastic Ion-Surface Collisions, Padre Island, Texas
ARO Workshop on Fuel Cell/Fuel Processor Catalysis/Computational Chem., Chicago
Gordon Research Conference on Clusters, Nanocrystals, and Nanostructures
- 1998 IBC's 3rd Annual Molecular Nanotechnology Conf., San Francisco
- 1997 ACS Natl. Meeting, 213th, Symp. Honoring the Memory of B.E. Bent, San Francisco
Brian Bent Symposium, Columbia University, New York
Workshop on "Structure and Topography of Surfaces", La Plata, Argentina
- 1995 ACS Natl. Mtg., 209th, Metal-Metal Bonding: From Clusters to Surfaces Symp, Anaheim
Stauffer Symposium on Surface Chemistry, Los Angeles
- 1994 ACS Natl. Meeting, 207th, Surface Science of Catalysis Symposium, San Diego
- 1992 ACS Natl. Meeting, 204th, Catalytic Selective Oxidation Symposium, Washington
- 1991 Union Carbide Innovation Research Colloquium, South Charleston
FACSS/Pacific Conference, Symposium on Reactions at Surfaces, Anaheim
- 1990 APS March Meeting, Division of Condensed Matter Physics, Symposium on Atomic and Electronic Structure of Alloy Surfaces, Anaheim
ACS Natl. Meeting, 199th, Kendall Award Symposium, Boston
Union Carbide Innovation Research Colloquium, South Charleston
DOE Surface Studies Conference, 16th, Golden
Symposium on Frontiers of Surface Chemistry, Catalysis Research Center, Hokkaido University, Sapporo, Japan
Chemistry at Surfaces Meeting, Irvine
- 1989 Center for Separations Using Thin Films Conference, Boulder
Catalysis Society, 11th North Amer. Meeting., Surface and Spectrosc. Symposium
Workshop on Hydrocarbon Discharge Plasma Diagnostics, Madison
Gordon Conference on Catalysis, New London
Symposium on New Horizons in Chemical Sensors, Tempe
Chemically-Modified Oxide Surfaces Symposium, Dow Corning, Midland
IUVSTA Workshop Meeting on the Structure and Reactivity of Small Molecules on Surfaces, Ofir, Portugal
Advances in Catalytic Chemistry IV, A Symposium in Honor of John H. Sinfelt, Snowbird, Utah
International Chemical Congress of Pacific Basin Societies, Solid Surfaces and Catalysis Symposium, Honolulu
- 1988 AVS, 24th Annual Symp. of the New Mexico Chapter, Surface Science Session
ACS Natl. Meeting, 195th (3rd Chemical Congress of North America), Surface Science of Catalysis Symposium, Toronto
- 1986 ACS, 8th Rocky Mtn. Regional Meeting, Surface Analysis Symposium, Denver
MRS, 1986 Fall Meeting, Boston
- 1985 Scanning Electron Microscopy/1985 International Meeting, Las Vegas
Summer Symposium on Analytical Chemistry, 38th Annual: Surface Characterization of Catalytic and Electronic Materials, Potsdam
Symposium on Surface Chemical Processes, Austin

Invited Seminars at Universities and Laboratories:

- 2020 University of California, Los Angeles (UCLA), Dept. of Chem. and Biomol. Eng.
(Cancelled due to COVID-19)
- 2019 Stevens Institute of Technology, Hoboken, NJ, Dept. of Chem. Eng. and Mat. Sci.
- 2017 Queens College, City University of New York, Flushing, NY, Department of Chemistry
INRS, Energy Materials and Telecommunication, Varennes, Canada
University of Cologne, Institute of Inorganic Chemistry, and E-MRS/MRS Cologne
Chapter Materials Science Lecture Series, Cologne, Germany
Tongji University, State Key Laboratory of Pollution Control and Resources Reuse,
Shanghai, P. R. China, Advanced Institute of Environmental Science and Engineering
Tsinghua University, Beijing, P. R. China, Department of Chemical Engineering
Chinese Academy of Sciences, Institute of Physics and State Key Laboratory for Surface
Physics (SKLSP) Beijing, P. R. China, Surface Science Colloquium
Tianjin University, Tianjin, P. R. China, School of Chemical Engineering & Technology
Beijing Jiaotong University, Beijing, P. R. China, School of Mechanical and Electronic
Control Engineering
McGill University, Montréal, Québec, Canada, Department of Chemistry
National Research Council Canada, Ottawa, Ontario, Canada, Emerging Tech. Division
General Atomics, San Diego, CA, DIII-D Boundary/PMI Center
- 2016 Eastman Lectureship, Dept. of Chemical Engineering, University of South Carolina
South Dakota School of Mines & Technol., Rapid City, SD, Chem. & Bio. Engin. Dept.
Drexel University, Philadelphia, PA, Dept. of Chemical and Biological Engineering
- 2015 Tongji University, Shanghai, China, College of Environmental Science and Technology
- 2014 General Atomics, San Diego, CA, DIII-D Boundary/PMI Center
Princeton Plasma Physics Laboratory (PPPL), Princeton, NJ, LM PFC Strategy Series
Univ. of Pittsburgh, Pittsburgh, PA, Department of Chemical and Petroleum Engineering
- 2013 McGill Univ., Montréal, Québec, Canada, Brace Centre for Water Resources Mgmt.
- 2012 Rutgers U./Princeton U. Joint Seminar, Nanotechnology for Clean Energy IGERT
- 2011 University of Notre Dame, Notre Dame, IN, Department of Chemistry and Biochemistry
Indiana University, Bloomington, IN, Department of Chemistry
Clemson University, Clemson, SC, Dept. of Chem. and Biomolec. Engineering (ChBE)
Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Korea, EEWS-
MIRC-KINC Distinguished Lecture
Seoul National University, Seoul, South Korea, Department of Chemistry
PPPL, Princeton, NJ, Boundary Physics Science Focus Group (BPSFG)
University of Wyoming, Laramie, WY, Department of Chemistry
Iowa State University, Ames, IA, Department of Chemistry
Princeton Plasma Physics Laboratory (PPPL), Princeton, NJ, PPPL Colloquium
- 2010 Yeshiva University, New York City, Department of Physics
Princeton University, Joint Depts. of Chem. Bio. Engin., and Mech. and Aero. Engin.
- 2008 University of Edinburgh, Edinburgh, Scotland, Department of Chemistry
St. Andrews University, St. Andrews, Scotland, Department of Chemistry
Univ. of Pennsylvania, Philadelphia, Lab. for Research on the Struct. of Matter (LRSM)
- 2007 Brown University, Providence, Joint Solid Mechanics/Materials Seminar
ExxonMobil Corporate Strategic Research Laboratories, Clinton
Air Products and Chemicals, Inc., Corporate Research Services Dept., Allentown, PA
Università degli Studi di Napoli Federico II, Napoli, Italy, Dipartimento di Chimica
University of Florida, Gainesville, Department of Chemical Engineering
Georgetown University, Washington, DC, Department of Chemistry

- Lebanon Valley College, Annville, PA, Department of Chemistry
Carnegie Mellon University, Pittsburgh, Department of Chemical Engineering
Yale University, New Haven, Department of Chemical Engineering
- 2006 Temple University, Philadelphia, Department of Chemistry
Johns Hopkins University, Baltimore, Department of Chemistry
Thomas Jefferson University, Philadelphia
Air Products and Chemicals, Inc., Corporate Research Services Dept., Allentown, PA
- 2005 Brookhaven National Laboratory (BNL), Upton, Chemistry Department
Lehigh University, Bethlehem, Dept. of Chemistry, Undergraduate Research Seminar
Lehigh University, Bethlehem, Department of Chemistry
Rutgers, The State Univ. of New Jersey, Piscataway, Inst. Adv. Mat. and Dev. (IAMD)
- 2004 Arkema (ATOFINA Chemicals, Inc.), Philadelphia, Additives Group
ExxonMobil Corporate Strategic Research Laboratories, Clinton
Columbia University, New York, Department of Chemistry
Princeton University, Princeton Department of Chemistry
Rutgers, The State Univ. of New Jersey, Piscataway, Dept. of Chemistry and LSM
Princeton University, Princeton, Department of Chemical Engineering
Lehigh University, Bethlehem, Department of Chemistry
University of Delaware, Newark, Department of Chemistry
Princeton University, Princeton, Department of Chemical Engineering
University of Pennsylvania, Philadelphia, "Frontiers in Materials" lecture, LRSM
Princeton University, Princeton, Depts. of Chemistry, Chem. Engineering, and PRISM
University of California, Los Angeles, Department of Materials Science
- 2003 Pacific Northwest National Laboratory (PNNL), Pasco, Chemistry Division and EMSL
University of Illinois, Urbana-Champaign, IL, Department of Chemistry
- 2002 California Institute of Technology (CIT), Pasadena, Department of Materials Science
University of Kansas, Lawrence, Department of Chemistry
Sandia National Laboratories (SNL), Livermore, Thin Film and Interface Science
University of California, Berkeley, and Lawrence Berkeley Laboratory (LBL)
Trojan Chemistry Club, University of Southern California, Department of Chemistry
- 2001 Osaka National Research Institute (ONRI), Ikeda, Japan
University of Tokyo, Japan, Department of Chemistry
- Tokyo Institute of Technology (TIT), Nagatsuta, Tokyo, Japan
Saitama University, Tokyo, Japan
Waseda University, Tokyo, Japan, Department of Chemistry
University of California, San Diego, Department of Chemistry
Universite Paris Sud, Orsay, France, LCAM (lab. des collisions atom. et moleculaires)
University of California, Los Angeles, Department of Chemistry
- 2000 California Institute of Technology (CIT), Pasadena, Chemical Physics Seminar
University of Wisconsin, Madison, Department of Chemical Engineering
ITA-San Jose de Campos, Brazil
Campinas University, Campinas, Brazil
University of Northern Colorado, Greeley, Department of Chemistry
Colorado State University, Fort Collins, Department of Chemistry
University of Colorado, Boulder, Department of Chemistry
- 1999 Celanese Technical Center, Corpus Christi
Texas Instruments, Dallas
University of Texas, Austin, Department of Chemistry

- Univ. of Southern California, Dept. of Chemistry, "Perspectives on the Sciences" Series
National Institute of Standards and Technol. (NIST), Gaithersburg, Electron Phys. Group
Sandia National Laboratories (SNL), Albuquerque, Physics & Chemistry Colloquium
Sandia National Laboratories (SNL), Albuquerque, Surface & Interface Science Dept.
Jet Propulsion Lab. (JPL), Pasadena, Center for In Situ Explor. & Sample Ret. (CISSR)
Centro de Ciencias de la Materia Condensada (CCMC) UNAM, Ensenada, B.C., Mexico
California State University, Northridge, Department of Physics and Astronomy
Osaka National Research Institute (ONRI), Ikeda, Japan
Kyoto University, Kyoto, Japan, Grad. School of Sci., Department of Chemistry
Institute of Physical and Chemical Research (RIKEN), Saitama, Japan
Tokyo Institute of Technology (TIT), Nagatsuta Campus, Japan
- 1998 University of Southern California, Los Angeles, Department of Chemical Engineering
University of Missouri, Columbia, Department of Chemistry
Kansas State University, Manhattan, Department of Chemistry
Emporia State University, Emporia, Division of Physical Sciences
Army Research Laboratory (ARL), Aberdeen Proving Grounds
Emporia State University, Emporia, Division of Physical Sciences
Emporia State University, Emporia, Distinguished Alumnus Presentations
University of Northern Colorado, Greeley, Department of Chemistry
- 1997 University of California, Los Angeles, Department of Chemistry
Los Alamos National Laboratory, CST Division
- 1996 Oxford University, England, Department of Physical and Theoretical Chemistry
University of Cambridge, England, Surface Science Group
University of Liverpool, England, Surface Science Research Centre
University of Aarhus, Denmark, Institute of Physics and Astronomy
Swiss Federal Institute of Technology (ETH-Zurich), Switzerland, Dept. of Materials
The Technical University of Denmark, Lyngby, Physics Department
University of Ulm, Germany, Surface Chemistry and Catalysis Division, Chemistry
Technical University of Munich, Garching, Germany, Physics Department
University of Würzburg, Germany, Experimental Physics Department
Fritz-Haber-Institute der Max Planck-Gesellschaft, Berlin, Germany
Forschungszentrum Jülich, IGV, Germany, Physics Department
University of Bonn, Germany, Department of Physical Chemistry
University of Reading, England, Catalysis Research Center
Colorado State University, Fort Collins, Department of Chemistry
University of Colorado, Boulder, Chemical Physics Colloquium
- 1995 University of Montreal, Montreal, Canada, Department of Chemistry
University of Toronto, Toronto, Canada, Department of Chemical Engineering
Brookhaven National Laboratory, Department of Chemistry
Northwestern University, Department of Chemistry and Catalysis Center
Westmont College, Division of Natural Sciences
University of Southern California, Los Angeles, Materials Science Department
University of California, Davis, Department of Chemistry
- 1994 University of Southern California, Los Angeles, Environmental Engineering Department
University of California, Berkeley, Department of Chemistry, and LBL
Shell Development Co., Westhollow Research Center
Army Research Laboratory, Aberdeen Proving Ground, MD
California State University, Fullerton, Department of Chemistry

- California Institute of Technology, Pasadena, Dept. of Chemistry and Chem. Engineering
University of Southern California, Los Angeles, Physics Department
- 1993 Los Alamos National Laboratory, Los Alamos, Chemistry Seminar
Sandia National Laboratory, Albuquerque, Surface and Interface Science Seminar
- 1992 California Institute of Technology, Pasadena, Dept. of Chemistry and Chem. Engineering
Arizona State University, Tempe, Dept. of Chemistry, Solid State Science Center
University of California, San Diego, Department of Chemistry
Wright-Patterson AFB, Wright Laboratory
University of Southern California, Los Angeles, Department of Chemistry
Rice University, Houston, Department of Chemistry
University of Texas, Austin, Department of Chemistry
Texas A&M University, College Station, Department of Chemistry
Allied Signal Inc., Research and Technology, Des Plaines
- 1991 University of California, Riverside, Department of Chemistry
IBM Almeden Research Center, San Jose
University of Washington, Seattle, Department of Chemistry
Battelle Pacific Northwest Laboratories, Richland
California State University, Northridge, Department of Chemistry
University of California, Berkeley, CA, Surface Science and Catalysis Seminar
- 1990 Amoco Oil Company, Naperville
Ford Motor Company, Dearborne
Dow Chemical Company, Midland
Michigan Catalysis Society, Detroit
California Institute of Technology, Pasadena, Department of Chemistry
Columbia University, New York, Department of Chemistry
Rutgers University, New Brunswick, Department of Chemistry
Princeton University, Princeton, Department of Chemistry
General Motors Research Laboratories, Warren
University of Tokyo, Tokyo, Institute for Solid State Physics
University of California, Irvine, Department of Chemistry
- 1989 University of Southern California, Los Angeles, Department of Chemistry
Colorado School of Mines, Golden, Department of Physics
University of Texas, El Paso, Department of Physics
Oak Ridge National Laboratory, Oak Ridge
- 1988 University of Colorado, Boulder, CO, Department of Physics
University of Texas, Austin, TX, Department of Chemistry
University of California, Los Angeles, CA, Department of Chemistry
University of Colorado, Boulder, CO, Department of Chemistry
University of Wisconsin, Madison, WI, Department of Chemistry
- 1987 University of California, Berkeley, CA, Surface Science and Catalysis Seminar
University of California, Irvine, CA, Department of Chemistry
Stanford University, Stanford, CA, Department of Chemistry
- 1986 University of Colorado, Boulder, CO, Department of Physics
University of Texas, Austin, TX, Department of Chemistry
Los Alamos National Laboratory, Los Alamos, NM, Physical Chemistry Seminar
- 1985 Colorado State University, Fort Collins, CO, Department of Chemistry
Brookhaven National Laboratory, Upton, Long Island, NY, Department of Physics
- 1984 Colorado School of Mines, Golden, CO, Dept. of Chemistry and Geochemistry

- 1983 Bell Laboratories, Murray Hill, NJ
Sandia National Laboratories, Albuquerque, NM
Los Alamos National Laboratory, Los Alamos, NM.
Iowa State University, Ames, IA, Department of Chemistry
Sandia National Laboratories, Livermore, CA
Arizona State University, Tempe, AZ, Department of Physics
University of California , Santa Barbara, CA, Department of Chemistry
University of Colorado, Boulder, CO, Department of Chemical Engineering
- 1982 Texas A&M University, College Station, TX, Department of Chemistry
University of Colorado, Boulder, CO, Department of Chemistry
University of Wisconsin, Madison, WI, Department of Chemistry
General Motors Research Laboratories, Warren, MI
Exxon Corporate Research Laboratories, Linden, NJ
- 1980 Los Alamos National Laboratory, Los Alamos, NM

PUBLICATIONS

[Total citations= 20,604; h-index = 74; i10-index = 280]

See Google Scholar: <https://scholar.google.com/citations?user=Uc98gkAAAAAJ&hl=en&oi=ao>

ORCID ID: 0000-0002-0032-4991

Forthcoming (Published online, in press, accepted, under revision, submitted)

373. “Effects of thickness of an oxide layer on the surface properties of lithium irradiated by deuterium plasma”, P. Krstic, A. Maan, R. Majeski, B.E. Koel, *Phys. Rev. Appl.*, submitted.
372. “Water adsorption on GaP(110) surface: a UHV study”, D.V. Potapenko, A. Gilman, B.E. Koel, *Surf. Sci.*, submitted.
371. “Methanol Adsorption and Dissociation on GaP(110) Studied by Ambient Pressure Photoelectron Spectroscopy”, D.V. Potapenko, Z. Chen, S. Xu, X. Yang, I. Waluyo, A. Gilman, E.A. Carter, B.E. Koel, *Surf. Sci.* submitted.
370. “Investigation of the dynamics of Pt catalyst dynamics under DBD plasma jet during CO oxidation via operando DRIFTS”, J.L. Trettin, Y. Zheng, S.E. Arumuganainar, D.D. Caron, C.W. Hullfish, B.E. Koel, M.L. Sarazen, *JACS*, submitted.
369. “Visible-Light-Enhanced Hydrogen Production via Catalytic Ammonia Decomposition on Plasmonic Ag-Ru Bimetallic Nanoparticles”, Y. Zheng, P. Blaisdell-Pijuan, A. Gilman, S. Sundaresan, C.F. Gmachl, B.E. Koel, *ACS Catal.*, submitted.
368. “Thermal stability of Li films on a polycrystalline W substrate”, E. Ostrowski, Z. Lin, B.E. Koel, *Vacuum*, submitted.
367. “Probing the Transformation of Trace Toxic Metals in a Single Nanoparticle”, D. Sun, W. Yan, B.E. Koel, W.-X. Zhang, L. Ling, *Acc. Chem. Res.*, submitted.
366. “Net Lithium Deposition and Dominant Self-Sputtering in Lithium Tokamak Experiment-β with a Liquid Lithium Wall”, E. Jung, S. Abe, A. Maan, J. Garcia, Z. Lin, D.P. Boyle, R. Majeski, B.E. Koel, *Nuclear Mat. Energy*, submitted.
365. “Influence of ordered mesoporous oxides in plasma-assisted ammonia synthesis”, S.E. Arumuganainar, S. Sartzetakis, C.W. Hullfish, B.E. Koel, M.L. Sarazen, *Energy & Fuels*, under revision.

Published in final form

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364. “Reaction-Driven Restructuring of Defective PtSe₂ into Ultra-stable Catalyst for the

- Oxygen Reduction Reaction”, W. Niu, S. Pakhira, G. Chen, F. Zhao, N. Yao, J.L. Mendoza-Cortes, B.E. Koel, *Nat. Mater.* (2024). 9pp [DOI:10.1038/s41563-024-02020-w](https://doi.org/10.1038/s41563-024-02020-w)
363. “A tutorial on the micro-trench technique for incident ion angle, material erosion, and impurity deposition measurements at plasma-facing surfaces”, S. Abe, C.H Skinner, B.E. Koel, *Nucl. Instrum. Methods Phys. Res. Sect. B Beam Interact. Mater. Atoms*, **556**, 165510 (6pp) (2024). [DOI:10.1016/j.nimb.2024.165510](https://doi.org/10.1016/j.nimb.2024.165510)
362. “DIII-D research to provide solutions for ITER and fusion energy”, C.T. Holcomb, et al., *Nucl. Fusion A*, **64**(11), 112003 (18pp) (2024). 29th IAEA Fusion Energy Conference (FEC 2023) Overview Papers. [DOI:10.1088/1741-4326/ad2fe9](https://doi.org/10.1088/1741-4326/ad2fe9)
361. “Catalytic Consequences of Hierarchical Pore Architectures within MFI and FAU Zeolites for Polyethylene Conversion”, J.Z.Tan, M. Ortega, S.A. Miller, C. Hullfish, H. Kim, S. Kim, W. Hu, J.Z. Hu, J.A. Lercher, B.E. Koel, M.L. Sarazen, *ACS Catalysis*, **14**(10), 7536-7552 (2024). [DOI:10.1021/acscatal.4c01213](https://doi.org/10.1021/acscatal.4c01213)
360. “Kinetic Modeling Analysis of Ar Addition to Atmospheric Pressure N₂-H₂ Plasma for Plasma-Assisted Catalytic Synthesis of NH₃”, Z. Lin, S. Abe, Z. Chen, S. Jaiswal, B.E. Koel, *J. Phys. Chem. A*, **128** (12), 2427- 2437 (2024). ([arXiv:2310.03307](https://arxiv.org/abs/2310.03307) [physics.plasm-ph]) [DOI:10.1021/acs.jpca.3c06841](https://doi.org/10.1021/acs.jpca.3c06841)
359. “Investigation of W-SiC compositionally graded films as a divertor material”, Z. Lin, C. Monton, S. Bringuier, G. Sinclair, G. Cheng, E. Marin, Z. Bergstrom, D. Rudakov, Ž. Popović, U. Losada, I. Bykov, E. T. Ostrowski, S. Abe, N. Yao, B.E. Koel, T. Abrams, *J. Nucl. Mater.*, **592**, 154942-1-8 (2024). ([arXiv:2308.16358](https://arxiv.org/abs/2308.16358) [physics.plasm-ph]) [DOI:10.1016/j.jnucmat.2024.154942](https://doi.org/10.1016/j.jnucmat.2024.154942)
- 2023**
358. “Hydrogen irradiation-driven computational surface chemistry of lithium oxide and hydroxide”, P.S. Krstic, S. Dwivedi, E.T. Ostrowski, S. Abe, A. Maan, A.C.T van Duin, B.E. Koel, *J. Chem. Phys.*, **159**, 244703-1-12 (2023). [DOI:10.1063/5.0177460](https://doi.org/10.1063/5.0177460)
357. “Ion concentration ratio measurements of ion beams generated by a commercial microwave electron cyclotron resonance plasma source”, S. Abe, B.E. Koel, *Rev. Sci. Instrum.*, **94**, 113506-1-5 (2023). [DOI:10.1063/5.0166926](https://doi.org/10.1063/5.0166926)
356. “Enhanced Feammox activity and perfluorooctanoic acid (PFOA) degradation by *Acidimicrobium* sp. Strain A6 using PAA-coated ferrihydrite as an electron acceptor”, J. Park, S. Huang, B.E. Koel, P.R. Jaffé, *J. Hazard. Mater.*, **459**, 132039-1-10 (2023). [DOI:10.1016/j.jhazmat.2023.132039](https://doi.org/10.1016/j.jhazmat.2023.132039)
355. “Quantitative Measurement of Positive and Negative Ion Species Ejected from a Li–O–H Surface by Hydrogen and Noble Gas Ion Irradiation”, S. Abe, E.T. Ostrowski, A. Maan, P. Krstic, R. Majeski, B.E. Koel, *J. Fusion Energ.*, **42**:35, (12pp) (2023). [DOI:10.1007/s10894-023-00380-w](https://doi.org/10.1007/s10894-023-00380-w)

354. “Detailed Studies of the Processes in Low Energy H Irradiation of Li and Li-Compound Surfaces”, P.S. Krstic, E.T. Ostrowski, S. Dwivedi, S. Abe, A. Maan, A.C.T. van Duin, B.E. Koel, *J. Appl. Phys.*, **134**, 100902-1-14 (2023). Perspective. [DOI:10.1063/5.0149502](https://doi.org/10.1063/5.0149502)
353. “Conversion of polyethylene waste to short chain hydrocarbons under mild temperature and hydrogen pressure with metal-free and metal-loaded MFI zeolites”, J.Z. Tan, C.W. Hullfish, Y. Zheng, B.E. Koel, M.L. Sarazen, *Appl. Catal. B: Environmental*, **338**, 123028 (2023). [DOI:10.1016/j.apcatb.2023.123028](https://doi.org/10.1016/j.apcatb.2023.123028)
352. “Adsorption, surface reactions and hydrodeoxygenation of acetic acid on platinum and nickel catalyts”, L. Ezeonu, Z. Tang, Y. Qi, F. Huo, Y. Zheng, B.E. Koel, S.G. Podkolzin, *J. Catalysis*, **418**, 190–202 (2023). [DOI:10.1016/j.jcat.2023.01.013](https://doi.org/10.1016/j.jcat.2023.01.013)
351. “Mechanistic Elucidations of Highly Dispersed Metalloporphyrin Metal-Organic Framework Catalysts for CO₂ Electroreduction”, M.R. Smith, C.B. Martin, S. Arumuganainar, A. Gilman, B.E. Koel, M.L. Sarazen, *Angew. Chem. Int. Ed.*, e202218208 (8pp) (2023). [DOI:10.1002/anie.202218208](https://doi.org/10.1002/anie.202218208)
350. “Processes at lithium-hydride/deuteride surfaces upon low energy impact of H/D”, P.S. Krstic, E.T. Ostrowski, A. Maan, S. Dwivedi, S. Abe, A. Van Duin, B.E. Koel, *Front. Phys.*, **11**:1105194 (11pp) (2023). [DOI:10.3389/fphy.2023.1105194](https://doi.org/10.3389/fphy.2023.1105194)

2022

349. “Effect of Porous Catalyst Support on Plasma-Assisted Catalysis for Ammonia Synthesis”, Z. Chen, S. Jaiswal, A. Diallo, S. Sundaresan, B.E. Koel, *J. Phys. Chem. A*, **126** (46), 8741–8752 (2022). [DOI:10.1021/acs.jpca.2c05023](https://doi.org/10.1021/acs.jpca.2c05023). Also published as part of *The Journal of Physical Chemistry B* virtual special issue “[Pablo G. Debenedetti Festschrift](#)”.
348. “Enhanced thermal stability of aerosol-synthesized Ni-rich Li-ion battery cathode materials via concentration-gradient Ca-doping”, Y. Lin, C.M. Abram, X. Shi, I.G. McKendry, Z. Wang, H. Zhong, H. Zhao, X. Yang, B.E. Koel, C. Yan, Y. Ju, *ACS Appl. Energy Mater.*, **5**, 10751-10757 (2022). [DOI:10.1021/acsaem.2c01471](https://doi.org/10.1021/acsaem.2c01471)
347. “Insights into Metal-Organic Framework-Derived Copper Clusters for CO₂ Electroreduction”, M.R. Smith, A. Gilman, W. Niu, Y. Zheng, B.E. Koel, M.L. Sarazen, *J. Phys. Chem. C*, **126**, 13649-13659 (2022). [DOI:10.1021/acs.jpcc.2c01287](https://doi.org/10.1021/acs.jpcc.2c01287)
346. “Computational investigation of ion incident angles and material erosion at rough graphite and silicon carbide divertor surfaces”, S. Abe, C.H. Skinner, A. Liu, J. Garcia, Z. Lin, S. Binguier, T. Abrams, B.E. Koel, *Phys. Plasmas*, **29**(10), 102503 (13 pp) (2022). [DOI: 10.1063/5.0095155](https://doi.org/10.1063/5.0095155) (Invited APS-DPP Special Issue manuscript; DOE Office of Science Highlight: energy.gov/science/listings/science-highlights)
345. “Sputtering and reflection processes from amorphous lithium surfaces by low-energy impacts of H and D atoms and D₂ molecules”, P.S. Krstic, E.T. Ostrowski, F.J. Domínguez-Gutierrez, S. Abe, B.E. Koel, *J. Nucl. Mat.*, **568**, 153848 (16pp) (2022). [DOI:10.1016/j.jnucmat.2022.153848](https://doi.org/10.1016/j.jnucmat.2022.153848)

344. “Energy, angle and temperature dependencies of the sticking of D atoms on Li surfaces”, P.S. Krstic, E. Schiltz-Rouse, S. Abe, E.T. Ostrowski, B.E. Koel, *J. Appl. Phys.*, **131**, 243304 (7pp) (2022). [DOI:10.1063/5.0096816](https://doi.org/10.1063/5.0096816)
343. “DIII-D research advancing the physics basis for optimizing the tokamak approach to fusion energy”, M. E. Fenstermacher, et al., *Nucl. Fusion*, **62**, 042024 (22pp) (2022). [DOI:10.1088/1741-4326/ac2ff2](https://doi.org/10.1088/1741-4326/ac2ff2)
342. “Determination of the Characteristic Magnetic Pre-Sheath Length at Divertor Surfaces Using Micro-Engineered Targets on DiMES at DIII-D”, S. Abe, C.H. Skinner, I. Bykov, Y.W. Yeh, A. Lasa, J. Coburn, D.L. Rudakov, C.J. Lasnier, H.Q. Wang, A.G. McLean, T. Abrams, B.E. Koel, *Nucl. Fusion*, **62**, 066001 (9pp) (2022). [DOI:10.1088/1741-4326/ac3cdb](https://doi.org/10.1088/1741-4326/ac3cdb)
341. “Spectroscopic Observation and Structure-Insensitivity of Hydroxyls on Gold”, Y. Zheng, Y. Qui, Z. Tang, J.Z. Tan, B.E. Koel, S.G. Podkolzin, *ChemComm.*, **58**, 4036-4039 (2022). [DOI:10.1039/D2CC00283C](https://doi.org/10.1039/D2CC00283C)
340. “NSTX-U theory, modeling and analysis results”, W. Guttenfelder, et al., *Nucl. Fusion*, **62**, 042023 (17pp) (2022). [DOI:10.1088/1741-4326/ac5448](https://doi.org/10.1088/1741-4326/ac5448)
339. “Propane Dehydrogenation to Propylene and Propylene Adsorption on Ni and Ni-Sn Catalysts”, J.P. Robbins, L. Ezeonu, Z. Tang, X. Yang, B.E. Koel, S.G. Podkolzin, *ChemCatChem*, **14(6)**, e202101546 (2022). [DOI:10.1002/cctc.202101546](https://doi.org/10.1002/cctc.202101546)
338. “Plasma-assisted catalysis for ammonia synthesis in a dielectric barrier discharge reactor: key surface reaction steps and potential causes of low energy yield”, Z. Chen, B.E. Koel, S. Sundaresan, *J. Physics D: Appl. Phys.*, **55(5)**, 055202, 1-17 (2022). [DOI:10.1088/1361-6463/ac2f12](https://doi.org/10.1088/1361-6463/ac2f12)
337. “In situ identification of NNH and N₂H₂ by using molecular beam mass spectrometry in plasma-assisted catalysis for NH₃ synthesis”, H. Zhao, G. Song, Z. Chen, X. Yang, C. Yan, S. Abe, Y. Ju, S. Sundaresan, B.E. Koel, *ACS Energy Lett.*, **7**, 53-58 (2022). [DOI:10.1021/acsenerylett.1c02207](https://doi.org/10.1021/acsenerylett.1c02207)

2021

336. “Micro-trench Measurements of the Net Deposition of Carbon Impurity Ions in the DIII-D Divertor and the Resulting Suppression of Surface Erosion”, S. Abe, C.H. Skinner, I. Bykov, J. Guterl, A. Lasa, Y.W. Yeh, J. Coburn, D.L. Rudakov, C.J. Lasnier, H.Q. Wang, A.G. McLean, T. Abrams, B.E. Koel, *Physica Scripta*, **96(12)**, 124039, 1-8 (2021). (PFMC-18 special issue). [DOI:10.1088/1402-4896/ac2af4](https://doi.org/10.1088/1402-4896/ac2af4)
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