



MRS Bulletin Volume Organizers guide technical theme topics for 2018

www.mrs.org/bulletin

The *MRS Bulletin* 2018 Volume Organizers, appointed by MRS President-Elect Susan Trolier-McKinstry, will guide the development of theme topics for the 2018 volume year. They are Karsten Albe (Technische Universität Darmstadt, Germany), Hiroshi Funakubo (Tokyo Institute of Technology, Japan), Michael Hickner (The Pennsylvania State University, USA), and Beth Stadler (University of Minnesota, USA).

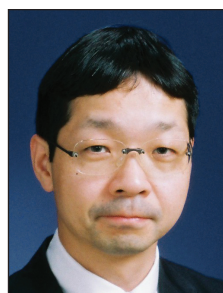
Karsten Albe is a professor of materials science and Head of the Materials Modeling Division at Technische Universität Darmstadt (TU Darmstadt), Germany. He received his diploma in physics from Universität Ulm and obtained his doctorate from Technische Universität Dresden. He



was a postdoctoral fellow at the Frederick Seitz Materials Research Laboratory and the Center for Simulation of Advanced Rockets at the University of Illinois at Urbana-Champaign. He joined TU Darmstadt as a junior faculty member and has been a full professor since 2007. His research focuses on modeling the electronic structure, thermodynamics, and kinetics of defects in functional oxides by quantum mechanical methods. Other activities include the simulation of mechanical properties of nanostructured metals by large-scale computer simulations. Albe has been a spokesperson of the Collaborative Research Center 595: "Electrical Fatigue in Functional Materials," and was elected as a member of the Deutsche Forschungsgemeinschaft panel for materials science and engineering. He is the author of more than 120 publications and has served as a co-chairperson of the

Materials Science and Engineering Congress in 2012 and 2014.

Hiroshi Funakubo is a professor in the Department of Materials Science and Engineering at the School of Materials and Chemical Technology at the Tokyo Institute of Technology. In 1989, he became an assistant professor in the faculty of engineering at the Tokyo Institute of Technology. He received a PhD degree from the Tokyo Institute of Technology in 1994. He was appointed associate professor in 1997, followed by full professor in 2012 of the Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology. Funakubo's research is focused on preparation and properties of dielectric, ferroelectric, and piezoelectric films, as well as film solid-oxide fuel cells and thermoelectric materials development. He has been involved in the organization of several international ferroelectric conferences and organized a MRS symposium on ferroelectric thin films at the 2003 MRS Fall Meeting.



Michael Hickner is an associate professor and the Corning Faculty Fellow in the Department of Materials Science and Engineering at The Pennsylvania State University (Penn State). Before joining Penn State in 2007, he was a staff member at Sandia National Laboratories. His research group focuses on the synthesis and properties of ion-containing polymers, measurement of



water-polymer interactions using spectroscopic techniques, and the application of polymeric materials in energy and water treatment technologies. Hickner's work has been recognized by Young Investigator Awards from the Office of Naval Research and the Army Research Office, a 3M Non-Tenured Faculty Grant, the Rustum and Della Roy Innovation in Materials Research Award, and a Presidential Early Career Award for Scientists and Engineers from President Obama. He is on the Editorial Board of the journals *Macromolecules* and *ACS Macro Letters* and has co-authored eight patents and more than 150 publications.

Beth Stadler is a professor of Electrical and Computer Engineering and a graduate faculty of Chemical Engineering and Materials Science at the University of Minnesota (UMN). She obtained her PhD degree from the Massachusetts Institute of Technology in 1994. Her research won the National Science Foundation CAREER Award and the McKnight Presidential Fellowship. She was a 2015 IEEE Magnetics Society Distinguished Lecturer, giving 55 talks worldwide; and taught at the IEEE Magnetic Summer School in Chennai, India (2012) and Assis, Italy (2013). Stadler's photonics research is focused on integration of magneto-optical garnets with semiconductors and other convenient platforms. In magnetics, she works primarily with magnetic nanowires for nonvolatile memory, hard drives, and bio-barcodes. She served on the MRS Board of Directors, as Secretary of MRS, on the Program Development Subcommittee of MRS, and co-chaired six MRS Symposia and the 2004 MRS Fall Meeting.



Requests for instructions on submitting proposals for *MRS Bulletin* theme topics can be emailed to bulletin@mrs.org.



2017 **MRS**® SPRING MEETING & EXHIBIT

April 17–21, 2017 | Phoenix, Arizona

PREREGISTRATION OPENS MID-JANUARY

CHARACTERIZATION, THEORY AND MODELING

- CM1 Emergent Material Properties and Phase Transitions Under Pressure
- CM2 Advanced Numerical Algorithms for Metallic Systems at the Mesoscale in Materials Science
- CM3 Computer-Based Modeling and Experiment for the Design of Soft Materials
- CM4 *In Situ* Electron Microscopy of Dynamic Materials Phenomena
- CM5 Mechanically Coupled Properties, Phenomena and Testing Methods in Small-Scale and Low-Dimensional Systems
- CM6 Dislocation Microstructures and Plasticity
- CM7 Genomic Approaches to Accelerated Materials Innovation

ELECTRONIC DEVICES AND MATERIALS

- ED1 Silicon-Carbide, Diamond and Related Materials for Quantum Technologies
- ED2 Materials and Devices for Neuromorphic-Engineering and Brain-Inspired Computing
- ED3 Physics, Chemistry and Materials for Beyond Silicon Electronics
- ED4 Luminescent Materials for Photon Upconversion
- ED5 Photoactive Nanoparticles and Nanostructures
- ED6 Nanostructured Quantum-Confined States for Advanced Optoelectronics
- ED7 Materials and Device Engineering for Beyond the Roadmap Devices in Logic, Memory and Power
- ED8 Development and Integration of Organic and Polymeric Materials for Thin-Film Electronic Devices
- ED9 Advanced Interconnects for Logic and Memory Applications—Materials, Processes and Integration
- ED10 Material Platforms for Plasmonics and Metamaterials—Novel Approaches Towards Practical Applications
- ED11 Phase-Change Materials and Their Applications—Memories, Photonics, Displays and Non-von Neumann Computing
- ED12 Quantum Sensing, Metrology and Devices
- ED13 Novel Photonic, Electronic and Plasmonic Phenomena in Materials
- ED14 Molecular and Colloidal Plasmonics—Synthesis and Applications

ENERGY STORAGE AND CONVERSION

- ES1 Perovskite Solar Cells—Towards Commercialization
- ES2 High-Capacity Electrode Materials for Rechargeable Energy Storage
- ES3 Materials for Multivalent Electrochemical Energy Storage
- ES4 Nanogenerators and Piezotronics
- ES5 Advances in Materials, Experiments and Modeling for Nuclear Energy
- ES6 Mechanics of Energy Storage and Conversion—Batteries, Thermoelectrics and Fuel Cells
- ES7 (Photo)electrocatalytic Materials and Integrated Assemblies for Solar Fuels Production—Discovery, Characterization and Performance
- ES8 Caloric Materials for Energy-Efficient Applications
- ES9 Surfaces, Coatings and Interfaces in Concentrated Solar Energy Applications
- ES10 Frontiers in Oxide Interface Spintronics—Magnetoelectrics, Multiferroics and Spin-Orbit Effects
- ES11 Advanced and Highly Efficient Photovoltaic Devices
- ES12 Soft Magnetic Materials for Next-Generation Power Electronics
- ES13 Interfaces and Interphases in Electrochemical Energy Storage and Conversion
- ES14 Thin-Film Chalcogenide Semiconductor Photovoltaics

NANOMATERIALS

- NM1 Emerging Non-Graphene 2D Materials
- NM2 Nanoscale Heat Transport—From Fundamentals to Devices
- NM3 Aerogels and Aerogel-Inspired Materials
- NM4 Novel Catalytic Materials for Energy and Environment
- NM5 Frontiers in Terahertz Materials and Technology
- NM6 Mechanical Behavior of Nanostructured Composites
- NM7 Semiconductor Nanowires for Energy Applications
- NM8 2D Materials—Macroscopic Perfection vs. Emerging Nanoscale Functionality
- NM9 High-Performance Metals and Alloys in Extreme Conditions
- NM10 Micro/Nano Assembling, Manufacturing and Manipulation for Biomolecular and Cellular Applications

SOFT MATERIALS AND BIOMATERIALS

- SM1 Bioelectronics—Materials, Processes and Applications
- SM2 Advanced Multifunctional Fibers and Textiles
- SM3 Advanced Biomaterials for Neural Interfaces
- SM4 A Soft Future—From Electronic Skin to Robotics and Energy Harvesting
- SM5 Aqueous Cytomimetic Materials
- SM6 Materials in Immunology—From Fundamental Material Design to Translational Applications
- SM7 Emerging Membrane Materials for Sustainable Separations
- SM8 Advanced Polymers

Meeting Chairs

Christopher J. Bettinger Carnegie Mellon University
Stefan A. Maier Imperial College London
Alfonso H.W. Ngan The University of Hong Kong
W. Jud Ready Georgia Institute of Technology
Eli A. Sutter University of Nebraska—Lincoln

www.mrs.org/spring2017

Don't Miss These Future MRS Meetings!

2017 MRS Fall Meeting & Exhibit
November 26 – December 1, 2017, Boston, Massachusetts

2018 MRS Spring Meeting & Exhibit
April 2 – 6, 2018, Phoenix, Arizona

MRS MATERIALS RESEARCH SOCIETY®
Advancing materials. Improving the quality of life.

506 Keystone Drive • Warrendale, PA 15086-7573
Tel 724.779.3003 • Fax 724.779.8313
info@mrs.org • www.mrs.org



2016 MRS[®] FALL EXHIBITORS

www.mrs.com/fall-2016-exhibit

HYNES CONVENTION CENTER | LEVEL 2

Tuesday, November 29 11:00 am – 5:30 pm

Wednesday, November 30 11:00 am – 5:30 pm

Thursday, December 1 10:00 am – 1:30 pm

**2D Crystal Consortium—
Materials Innovation Platform** **Booth 1304**

mip.psu.edu
2D Chalcogenide Thin Film and Bulk Single Crystals;
Research Program and National User Facility;
Theory/Simulation of Complex Reaction Kinetics

A&N Corporation **Booth 1016**

www.ancorp.com
Custom Flanges and Fittings; Ball Valves;
Custom Vacuum Chambers

**AAAS Science & Technology
Policy Fellowships** **Booth 220**

www.stpf-aaas.org
Fellowship; Professional Development

abcr GmbH **Booth 1312**

www.abcr.de
Ceramic Powders; Metal-organics; Silanes

Across International LLC **Booth 520**

www.acrossinternational.com
Material Processing Equipment; Vacuum Ovens; Pumps;
Rotary Evaporators; Glass Reactors

ACS Publications **Booth 113**

pubs.acs.org
ACS Publications Materials Science Portfolio

AdValue Technology, LLC **Booth 812**

www.advaluetech.com
Alumina; Quartz; Sapphire; Zirconia; Crucibles; Tubes;
Substrates; Powders; Wools; Cuvettes

Advanced Energy **Booth 1313**

www.advanced-energy.com
DC Power Supplies; High Voltage Power Supplies;
Non-Contact Pyrometers

Advanced Polymer Materials Inc. **Booth 1023**

www.apmpolymers.com
Biodegradable Polymers; Block Copolymers;
PEG Related Polymers

Advanced Research Systems, Inc. **Booth 316**

www.arscryo.com
Nanoscience Cryostat; Cryogenic Probe Station;
Laboratory Cryogenics

Aerotech, Inc. **Booth 822**

www.aerotech.com
Motion Control; Positioning Systems; Nanotechnology

Agnitron Technology, Inc. **Booth 832**

www.agnitron.com
OEM MOCVD Equipment; Refurbished MOCVD Equipment;
MOCVD Control Software; Contract Research

AIP Publishing **Booth 211**

journals.aip.org
Physics Journals; Conference Proceedings; Digital Archive

Air Force Office of Scientific Research **Booth 118**

www.wpafb.af.mil/afri/afosr
Aerospace Materials for Extreme Environments

AIXTRON SE **Booth 406**

www.aixtron.com
Deposition Equipment for the Semiconductor Industry;
MOCVD, PECVD, CVD, OVPD, PVPD and ALD

AJA International, Inc. **Booth 800**

www.ajaint.com
Deposition Systems; Sputter Sources; Sputter Targets

Alemnis AG **Booth 1209**

www.alemnis.ch
Alemnis Nanoindenter; High Dynamic Nanoindentation
Module; High Temperature Nanoindentation Module

American Journal Experts **Booth 205**

www.aje.com
Editing/Formatting; Translation; Research Visuals

American Physical Society **Booth 201**

journals.aps.org
Publications

Amuneal Manufacturing Corp. **Booth 1008**

www.amuneal.com
Magnetic Shielding; Hydrogen Annealing;
Soft Magnetic Nickel-Iron Alloys

Anasys Instruments Corp. **Booth 1306**

www.anasysinstruments.com
Nanoscale Infrared Spectroscopy (nanoIR, nanoIR2);
afm+; nanoTA2

Andeen-Hagerling, Inc. **Booth 421**

www.andeen-hagerling.com
Capacitance Bridges; Reference Capacitors

Angstrom Engineering Inc. **Booth 1029**

www.angstromengineering.com
PVD, CVD, Sputter Deposition Systems; Electron Beam and
Thermal Evaporation Systems; R&D and Pilot Production
Systems; Robotic Cluster Tools

Angstrom Sciences Inc. **Booth 1307**

www.angstromsciences.com
Magnetrons; Sputtering Material; Sputtering Cathodes

Angstrom Scientific Inc. **Booth 322**

www.angstrom.us
Electron Microscopes and Accessories; Nano-manipulators;
TEM Heating Holders

Annealsys **Booth 307**

www.annealsys.com
RTP; CVD; DLI-CVD; MOCVD; ALD; RTCVD

Anton Paar USA **Booth 622**

www.anton-paar.com
SAXSpace; Nano Scratch Tester (NST); X-Ray Diffraction

Applied NanoStructures, Inc. **Booth 1206**

www.apnano.com
AFM Scanning Thermal Imaging; SPM Probes; MEMS

Applied Surface Technologies **Booth 912**

www.co2clean.com
CO₂ Snow Jet Cleaning; Surface Cleaning;
Substrate Cleaning

Applied Vacuum Technology, LLC **Booth 1308**

www.appliedvacuum.com
Vacuum Chambers; Vacuum Flanges;
Custom Components and Assemblies

Asahi Spectra Co., Ltd. **Booth 921**

www.asahi-spectra.com
Xenon Light Source for Photoreaction;
Monochromatic Illuminator; Optical Filters

**Asylum Research,
an Oxford Instruments Company** **Booth 510**

www.oxford-instruments.com/AFM
Atomic Force Microscopes; Scanning Probe Microscopes

attocube systems Inc. **Booth 602**

www.attocube.com
Piezo Positioning Systems; Low-vibration Cryogen-free
Cryostats; Low Temperature Scanning Probe and
Confocal Microscopes

Bio-Logic USA, LLC **Booth 523**

www.bio-logic.us
MTZ-35 Impedance Analyzer; MCS-10 Multi Conductivity
System; Multi-channel Potentiostats

Biolin Scientific, Inc. **Booth 521**

www.biolinscientific.com
Quartz Crystal Microbalance with Dissipation;
Precision Tensiometers; Deposition Troughs

Biomomentum Inc. **Booth 1106**

www.biomomentum.com
Multiaxial Mechanical Tester;
GLP-compliant Biomechanical Testing Services

Blue Wave Semiconductors, Inc. **Booth 801**

www.bluewavesemi.com
Pulsed Laser Deposition; Electron Beam Deposition;
Thermal Evaporator

BNNT, LLC **Booth 908**

www.bnnt.com
Boron Nitride Nanotubes

Brooks Automation, Inc. **Booth 1011**

www.brooks.com
Cryogenics; Cryopumps; Waterpumps; Cryochillers;
PCC Compact Coolers; Cryodyne Refrigerators

Bruker AFM Probes **Booth 321**

www.BrukerAFMProbes.com
AFM Probes; AFM Accessories

Bruker AXS **Booth 301**

www.bruker.com
X-Ray Diffraction; X-Ray Fluorescence; Micro-diffraction

Bruker Nano Surfaces **Booth 300**

www.bruker.com/nano
Atomic Force and 3D Optical Microscopes; Stylus Profilers;
Tribometers; Nano-, Micro- and Macro-Indenters;
Scratch Testers

Cambridge Polymer Group **Booth 810**

www.campoly.com
Contract Research; Analytical Testing; Materials Formulation

**Cambridge University Press /
Materials Research Society** Booth 100
www.cambridge.org
Books; Journals

Carl Zeiss Microscopy, LLC Booth 310
www.zeiss.com/us/microscopy
Microscopes; Cameras; Imaging Software

Charlesworth Author Services Booth 1302
www.charlesworthauthorservices.com
Author Services

Chemat Scientific Booth 1202
www.chematscientific.com
Spin Coating; Dip Coating; Chemical Precursors

ColdEdge Cryo Booth 1305
www.coldedgecryo.com
Cryogenic Cooling Systems; Custom Cryogenic Interfaces;
Cryostats

Cornell Center for Materials Research Booth 107
www.ccmr.cornell.edu
Electron Microscopy; Materials Characterization

Cornell NanoScale & Technology Facility Booth 107
www.cnf.cornell.edu
Nanofabrication; Microfabrication; Characterization

Cornell University, PARADIM Booth 107
paradim.org
Thin Film Growth; Bulk Crystal Growth;
Materials Characterization

CRAIC Technologies, Inc. Booth 505
www.microspectra.com
UV-visible-NIR microscopes; Microspectrophotometers;
Raman Microspectrometers

CrystalMaker Software Ltd. Booth 929
www.crystallmaker.com
CrystalMaker; CrystalDiffract; SingleCrystal

CVD Equipment Corporation Booth 831
www.cvdequipment.com
CVD Equipment; Gas/Chemical Delivery; Abatement;
Graphene; CNTs; TMDs; h-BN; Nanowires

DCA Instruments, Inc. Booth 522
www.dca.fi
Molecular Beam Epitaxy Systems; UHV Sputtering Systems;
UHV Substrate Manipulators; PLD

De Gruyter Booth 124
www.degruyter.com
Books; eBooks; Journals

Delong America Inc. Booth 1021
www.lv-em.com
LVEM5 5kV Benchtop EM TEM/SEM/STEM;
LVEM25 25kV TEM

Denton Vacuum, LLC Booth 700
www.dentonvacuum.com
Sample Preparation Tools; High Vacuum Carbon
Evaporators; Thin Film Deposition Systems

DigiM Solution LLC Booth 1121
www.digimsolution.com
3D High Resolution Micro-imaging; Big Image Data
Analytics; Image-Based Simulation

Digital Surf Booth 704
www.digitalsurf.com
Surface Imaging, Analysis and Metrology Software for
Microscopes and Profilers

**Dr. Fritsch Powder
Shaping Technologies** Booth 1022
www.fastintering.com
FAST/SPS Sintering; Granulation; Cold Pressing and Mixing

Duniway Stockroom Corporation Booth 600
www.duniway.com
Ion Pumps; Vacuum Gauges; Vacuum Supplies

Ebara Technologies, Inc. Booth 306
www.ebaratech.com
Dry Vacuum Pumps; Turbomolecular Pumps;
Vacuum Gauges

Ecopia Corp. Booth 609
www.fourpointprobes.com
Hall Effect Measurement Systems; Rapid Thermal
Processing Systems; RTE Systems;
Mini Thermal Evaporator Systems

**EDAX Inc., AMETEK
Materials Analysis Division** Booth 916
www.edax.com
Energy Dispersive X-ray; EBSD; X-ray Detectors

Edinburgh Instruments Ltd. Booth 719
www.edinst.com
Fluorescence Spectrometers; Laser Flash Photolysis
Spectrometer; Gas Lasers

Electron Microscopy Sciences/Diatome Booth 617
www.emsdiasum.com
Grinders/Polishers; Diamond Wheels/Saws;
Microscopy Supplies

EMSL Analytical, Inc. Booth 1212
www.emsl.com
Analytical Laboratory

Energetiq Technology, Inc. Booth 709
www.energetiq.com
UV Light Source; Broadband Light Source;
High Brightness Light Source

Ephemeron Labs Inc. Booth 728
www.ephemeron-labs.com
Quantitative EBIC Scan Controller; SEM Sample Holders;
Manual Wire Bonding Micro-positioners

Eulitha AG Booth 723
www.eulitha.com
PhableR 100 Lithography System; Nanoimprint Stamps;
Lithography Services

Evactron® by XEI Scientific, Inc. Booth 1028
www.evactron.com
Evactron De-Contaminators; Plasma Cleaners

Everbeing International Corp. Booth 1130
www.ebprober.com.tw
Probe Station; Micropositioner; Probing Accessories

FEI Booth 701
www.fei.com
Apreo; Avizo; Helios G4; Helios PFIB; microCT; Talos TEM;
Themis Z TEM

FemtoTools AG Booth 722
www.femtotools.com
Nanomechanical Testing System; Micromechanical Testing
and Assembly Station

Film Sense Booth 1020
www.film-sense.com
Ellipsometer; Thin Film Measurements; *In Situ* Measurements

Filmetrics, Inc. Booth 718
www.filmetrics.com
Optical Profilers; Thin-film Measurement Tools

Fischione Instruments Booth 506
www.fischione.com
TEM Accessories; Sample Preparation; Specimen Holders

FlackTek, Inc. Booth 1018
www.speedmixer.com
Mixing Machines; Laboratory Mixers; High-speed Mixing

**Fraunhofer USA Center
for Coatings and Diamond Technologies** Booth 108
www.ccd.fraunhofer.org
Contract R&D; Diamond Materials; Thin Films

Frontics America Inc. Booth 1207
www.fronticsamerica.com
Material Properties Tester NANO-AIS; Instrumented
Indentation Test (IIT); Nano Indenter; Residual Stress

Frontiers Booth 221
www.frontiersin.org
Open-Access Academic Journals

Furuya Metal Americas, Inc. Booth 706
www.furuya-ma.com
Precious Metals Manufacturing; Thermocouples; Crucibles

Gamry Instruments Booth 804
www.gamry.com
Potentiostats; Impedance Spectroscopy;
Quartz Crystal Microbalance

Gatan Booth 412
www.gatan.com
TEM and SEM Analysis Software, Specimen Preparation
Instruments, and Imaging and Spectroscopy

Geib Refining Corp. Booth 507
www.geibreifining.com
Precious Metals; Refining; Shield Cleaning;
Vacuum Chamber Cleaning

Getson & Schatz, P.C. Booth 1210
researchgreencard.com
Immigration Law Firm

GNB KL Group Booth 1128
www.gnbvalves.com
Vacuum Chambers; Vacuum Valves; Vacuum Accessories

Goodfellow Corporation Booth 1012
www.goodfellowusa.com
Metals and Materials; Precious Metals; Ceramics and Glass

Heidelberg Instruments, Inc. Booth 1310
www.himt.de
Maskless Aligner Systems; Direct Write Lithography Tools;
Volume Pattern Generators

Herzan LLC Booth 304
www.herzan.com
AEK-2002 Acoustic Enclosure; TS Vibration Isolation Tables;
WaveCatcher Site Survey Tool

Hitachi High Technologies America, Inc. Booth 1117
www.hitachi-hightech.com/us
Electron Microscopes; Atomic Force Microscopes; Ion
Milling Instrumentation and Sample Preparation

HORIBA Scientific Booth 816
www.horiba.com/scientific
Spectroscopy/Spectrometers; Raman; Ellipsometry

Hummingbird Scientific Booth 1004
www.hummingbirdscientific.com
TEM, X-ray Microscopy and SEM Specimen Holders

Huntington Mechanical Laboratories, Inc. Booth 1000
www.huntvac.com
Feedthroughs; Valves; Chambers

HVA, LLC Booth 910
www.highvac.com
High Vacuum Valves; Ultra-high Vacuum Valves

Hysitron, Inc. Booth 417
www.hysitron.com
Nano Indentation Systems; Nano Tribology;
In situ Nanomechanics; Correlative Nanomechanics

ibss Group, Inc. Booth 608
www.ibssgroup.com
GV10x DS Asher; Mobile Cubic Asher;
Gentle Asher Chamber

ICSPI Corp. Booth 1107
www.iscpicorp.com
nGauge Single-Chip AFM System

**Idaho National Laboratory,
Nuclear Science & Technology** Booth 1109
www.inl.gov
Nuclear Fuel and Material Development;
Nuclear Fuel and Reactor Modeling and Simulation;
Advanced Reactor Technology R&D

Image Metrology A/S Booth 1100
www.imagemet.com
SPIP™ Image Analysis Software; TopoStitch™

Inert Booth 323
www.inerttechnology.com
Glovebox Systems; Solvent Purification Systems;
Gas Management Systems

Innovative Photonic Solutions Booth 1124
www.IPSLasers.com
Wavelength Stabilized Lasers; Raman Probes;
Custom Raman Systems

InRedox Booth 721
www.inredox.com
Nanoporous Anodic Aluminum Oxide; Nanotubular Anodic
Titanium Oxide; Nanoporous Membranes and Nanotemplates

Integrated Dynamics Engineering Booth 931
www.ideworld.com
Vibration Isolation; EMI Cancellation;
Acoustic Controls; Robotics

**International Centre
for Diffraction Data (ICDD)** Booth 503
www.icdd.com
X-Ray Powder Diffraction; Database; Software

Intlvac Thin Film Booth 922
www.intlvac.com
Ion Beam Etch Systems; Physical Vapor Deposition

IOP Publishing Booth 114
www.ioppublishing.org
Journals; Magazines; ebooks

ISS, Inc. Booth 607
www.iss.com
Spectrofluorometers; Confocal Microscopes;
Time-Resolved Fluorescence

J microTechnology, Inc. Booth 905
www.jmicrotechnology.com
Probe Stations; Test Probes; Test Fixtures;
Probe Accessories

Janis Research Company, LLC Booth 407
www.janis.com
Micromanipulated Probe Stations; Cryostats; Cryocoolers

Japan Science and Technology Agency Booth 206
www.jst.go.jp/tt/EN/
Technologies for Licensing; Japanese Novel Materials

Japan Society of Applied Physics Booth 112
www.jsap.or.jp/english/index.html
Journals

JASCO Booth 309
www.jascoinc.com
Raman; FTIR Microscopes; Microscopes

JEOL USA, Inc. Booth 413
www.jeolusa.com
TEM; SEM; Auger

Kaufman & Robinson, Inc. Booth 1031
www.ionsources.com
Ion Sources; Electron Sources; Power Supplies

KEYENCE Corporation Booth 928
www.keyence.com
Microscopes; 3D Measurement Systems;
Profilers/Roughness Systems

Keysight Technologies Booth 401
www.keysight.com/find/nano
AFM; Nanoindenters; FE-SEM; Parametric Analyzers;
Source Measurement Units

KLA-Tencor Corporation Booth 317
www.kla-tencor.com
Stylus Profiler; Universal Microscope

Kleindiek Nanotechnik Booth 320
www.nanotechnik.com
Nanomanipulators and Micromanipulators for SEM/FIB;
High-end Nanoprobing Solutions;
Nanomechanical Characterization

KP Technology USA Inc. Booth 308
www.kelvinprobe.com
Kelvin Probe; Ambient-pressure Photoemission System;
Surface Photovoltage Spectroscopy

Kurt J. Lesker Company Booth 400
www.lesker.com
Pure Targets and Materials; Vacuum Components;
Thin Film Deposition Systems; Target Bonding Service

Kyocera International Inc. Booth 807
global.kyocera.com
Ceramic Components; Brazed Ceramic Feedthrus

Lake Shore Cryotronics, Inc. Booth 501
www.lakeshore.com
Cryogenic Probe Stations; Hall Effect Measurement Systems;
THz Materials Characterization Systems

Lambda Technologies, Inc. Booth 702
www.microcure.com
Broadband Microwave Laboratory Oven; Variable Frequency
Microwave Tools; Microwave Process Development Services

Laminar Co., Ltd. Booth 1127
www.laminarm.co.kr
Taylor Flow, Continuous Chemical Reactor;
Chemical Materials, Equipment Manufacturer

Leybold USA Inc. Booth 725
www.leybold.com
Vacuum Coating Systems; Vacuum Pumps;
Vacuum Leak Detectors

Linseis Inc. Booth 821
www.linseis.com
Dilatometers; Thermal Conductivity Analyzers;
Simultaneous Thermal Analyzers

Lusix Vacuum Technologies Booth 1110
www.lusix.com
Electron Beam Systems; Thermal Evaporators; Furnaces;
DLC Coating Systems

M. Braun, Inc. Booth 611
www.mbraunusa.com
Gloveboxes; Gas Purifiers

MANTIS-SIGMA Booth 817
www.mantis-sigma.com
UHV Deposition Systems and Sources; UHV SPM; UHV XPS

Mass Applied Science Booth 1102
www.massappliedscience.com
Particle Sizing; Zeta Potential; Viscosity

MatriTek, Inc. Booth 1208
www.matritek.com
Tissue-specific ECM Biomaterials

McGraw-Hill Education Booth 207
accessengineeringlibrary.com
AccessEngineering Web-based Data Visualization Tool

McVac Manufacturing Co. Inc. Booth 621
www.mcvac.com
Thin Film Coating Instruments; Ultra High Vacuum
Components; Welding, Machining, Helium Leak Testing

MDC Vacuum Products, LLC Booth 509
www.mdcvacuum.com
Vacuum Chambers; Safeview Viewport with Light Ring;
XpressStick Gas Stick with MFC

Micro Photonics Inc. Booth 729
www.microphotonics.com
Graphene; Oxford Applied Research; Laue

MicroFab Technologies, Inc. Booth 1205
www.microfab.com
Key Products Jetlab® Printers;
Additive Manufacturing Tools; Printed Electronics Tools

**MilliporeSigma
(Sigma-Aldrich Materials Science)** Booth 1024
www.sigmaaldrich.com
Organic and Printed Electronic Materials; Nanomaterials;
Materials for Energy and Electronics; Biomaterials; Graphene

MMR Technologies, Inc. Booth 1001
www.mmr-tech.com
Hall Effect Systems; Seebeck Systems; Optical Systems;
Liquid Nitrogen Generators

Momentum Press Booth 1301
www.momentumpress.net
Textbooks and Professional Reference Titles

Montana Instruments Corporation Booth 907
www.montanainstruments.com
Cryostation; Magneto-Optic; Cryo-Optic

MTI Corporation Booth 901
www.mtixtl.com
Alloy Melting; Rapid Consolidation Press;
Solid Battery Equipment

NanoAndMore USA Corp. Booth 610
www.nanoandmore.com
AFM Probes; AFM; Sensors

NanoMagnetics Instruments USA, LLC Booth 1101
www.nanomagnetics-inst.com
Scanning Probe Microscopy; Atomic Force Microscopy;
Hall Effect Measurement Systems

Nanomechanics, Inc. Booth 1109
www.insem.com
iNano Nanoindenter; iMacro Nanoindenter;
NanoFlip Nanoindenter

Nanonics Imaging Ltd. Booth 713
www.nanonics.co.il
NSOM/SNOM/SPM; AFM/Raman/TERS;
Multiprobe Systems

Nanoscribe GmbH Booth 906
www.nanoscribe.com
3D Lithography Systems

Nanosurf, Inc. Booth 1010
www.nanosurf.com
Atomic Force Microscopes; Automated Nanomechanical
Analysis; AFM for SEM

NASA Booth 1123
psi.nasa.gov
Open Science; NASA Research; Research Opportunities;
Physical Sciences

National Reconnaissance Office Booth 223
acq.westfields.net
Aerospace; Remote Sensing;
Research & Development Funding

Nature Publishing Group Booth 125
www.nature.com
Medical and Scientific Journals; Online Databases

Neespec GmbH Booth 604
www.neespec.com
Near-field Optical Microscope; nano-FTIR;
Nanoscale IR Microscope

Neocera, LLC Booth 716
www.neocera.com
Pulsed Laser Deposition Systems; Pulsed Electron
Deposition Systems

Netzsch Instruments North America LLC Booth 1025
www.netzsch.com
Thermal Analysis Instrumentation; Contract Lab Testing
Services; Calorimetry

NIST Booth 216
www.nist.gov/srm
Standard Reference Materials; Standard Reference Data;
Instrument Calibrations

Nor-Cal Products, Inc. Booth 416
www.n-c.com
Custom Vacuum Chambers; Vacuum Components; Valves

NT-MDT Co. Booth 923
www.ntmdt.com
SPM/AFM/STM; Raman TERS; Spectroscopy

**Nuclear Science User Facilities,
Idaho National Laboratory** Booth 224
nsuf.inl.gov
Energy; Research Centers and Organizations

Office of Naval Research Booth 1303
www.onr.navy.mil
Science and Technology Research

OptiGrate Corporation Booth 1116
www.optigrate.com
Narrow Line Optical Filters; Volume Bragg Gratings;
Notch and Bandpass Filters

OPTOSENSE LLC Booth 1108
www.optosenselab.com
Lab Furnace; Glove Box; Battery Analyzer

OriginLab Corporation Booth 517
www.originlab.com
Origin Software; OriginPro Software

Oxford Instruments Booth 511
www.oxford-instruments.com
Fermi SPM; E-Spec; Thin Film

Oxford University Press Booth 110
global.oup.com
Publications

PANalytical Inc. Booth 900
www.panalytical.com
Empyren; Advances in XRD; Advances in XRF

Park Systems Inc. Booth 1017
www.parkafm.com
Atomic Force Microscopes—Park NX10, Park NX20
and Park XE7

Particle Sizing Systems Booth 710
www.psscnicomp.com
AccuSizer SPOS Family of Instruments;
Nicom DLS Family of Instruments; Online Monitoring

Pfeiffer Vacuum Booth 825
www.pfeiffer-vacuum.com
Vacuum Pumps; Leak Detection; Mass Spec

Photron Booth 1104
www.photron.com
FASTCAM Mini Series; FASTCAM Motion Analyzers;
High-Speed Cameras

Physics Today Booth 209
www.physicstoday.org
Publications

Pine Research Instrumentation Booth 828
www.pineresearch.com; www.360glassware.com
Electrochemical Laboratory Equipment; Custom Glassware

Plasmaterials, Inc. Booth 524
www.plasmaterials.com
Sputtering Targets; Evaporation Materials;
Backing Plates/Tubes

PolyK Technologies Booth 731
www.polyktech.com
High Voltage Dielectric/Ferroelectric Test Equipment,
Materials and Films; Polymer Processing Machines

Princeton Scientific Corp. Booth 418
www.princetonscientific.com
Metal Crystals; Wire Saw; Optical Components

Protochips Booth 802
www.protochips.com
Atmosphere Gas Cell; Poseidon Select Liquid Cell;
Fusion Heating and Electrical Holder

PVD Products, Inc. Booth 605
www.pvdproducts.com
Pulsed Laser Deposition Systems; Sputtering Systems;
Evaporation Systems

Quantum Design, Inc. Booth 601
www.qdusa.com
PPMS; MPMS; He Liquefier; Crystal Furnace; Lithography;
NanoMOKE; FMR; Spectrometers; SNSPD; Terahertz

QuantumWise A/S Booth 823
www.quantumwise.com
Atomistix Toolkit; Virtual NanoLab

R.D. Mathis Company Booth 616
www.rdmathis.com
Evaporation Sources; Evaporation Materials;
Power Supplies; Gas Purifier

Radiant Technologies, Inc. Booth 903
www.ferrodevices.com
Ferroelectric Testers; MultiFerroic Testers;
Piezoelectric Testers

Razorbill Instruments Ltd. Booth 1211
razorbillinstruments.com
CS100 Cryostrain

Reliable Corporation Booth 1309
www.reliablecorp.com
Sputtering Targets; Evaporative Materials; Precious Metals

Renishaw Inc. Booth 408
www.renishaw.com
Raman Microscopes; Spectrometers

RHK Technology, Inc. Booth 612
www.rhk-tech.com
UHV STM; UHV AFM/STM; Universal SPM Controls

Rigaku Americas Corporation Booth 712
www.rigaku.com
X-ray diffraction and X-ray Fluorescence Instruments
and Components

Rocky Mountain Vacuum Tech, Inc. Booth 420
www.rmvac.com
Vacuum Equipment; Vacuum Components

Royal Society of Chemistry Booth 222
www.rsc.org
Journals; Books; Databases

Royal Society Publishing Booth 120
www.royalsociety.org
Journals

Rtec-Instruments, Inc. Booth 1311
www.rtec-instruments.com
Multi-functional Tribometer; Universal 3D Profilometer

SAES Group Booth 1111
www.saesgroup.com
NexTorr Pumps; Capacitor Pumps; Capacitor HV Pumps

SAGE Publishing Booth 212
www.sagepublishing.com
Books; Journals

Sandia National Laboratories Booth 225
www.sandia.gov
Research User Facilities

SCIENION US, Inc. Booth 806
www.scienion.com
sciTEM; TEM Sample Preparation; *In Situ* Cell Loading

Scienta Omicron, Inc. Booth 913
www.scientaomicron.com
Electron Spectroscopy; Scanning Probe Microscopy;
Materials Growth

Scientific Instruments Inc. Booth 508
www.scientificinstruments.com
Cryogenic Temperature Sensors; Cryogenic Temperature
Controller; Cryogenic Temperature Probe

Seki Diamond Systems Booth 803
www.sekidiamond.com
Microwave Plasma, Hot Filament and Low-Temp Plasma
CVD Systems; Single Crystal Diamond Substrates;
Polycrystalline Diamond Wafers

Semiconsoft, Inc. Booth 1213
www.semiconsoft.com
Thin-Film Measurement Systems; Thin-Film Data Software

Semilab Booth 1112
www.semilab.com
Ellipsometry; Porosimetry; Photoluminescence; DLTS; SRP; Mercury CV

Seren Industrial Power Systems, Inc. Booth 620
www.serenips.com
RF Generators; Automatic Matching Networks

ShenZhen Nanotech Port Co., Ltd. Booth 808
www.nanotubes.com.cn
Carbon Nanotubes; CNT Conductive Paste; CNT Masterbatch

Simune Atomistics S.L. Booth 1125
www.simune.eu
SIESTA PRO; Innovative Solutions for Materials Design

SmarAct Inc. Booth 711
www.smaract.com
PicoScale Interferometer; Nanoflight SEM Stage; SmarPod

Solartron Analytical, AMETEK Advanced Measurement Technology Booth 918
www.solartronanalytical.com
Materials Test System; Cryostats

Solid State Cooling Systems, Inc. Booth 834
www.sscooling.com
Thermoelectric Chillers

Solmates B.V. Booth 1105
www.solmates.nl
Pulsed Laser Deposition Systems; PLD Systems

SPECS Surface Nano Analysis, Inc. Booth 606
www.specs.com
EnviroESCA; Tramea; UHV SPM

SPEX SamplePrep LLC Booth 820
www.spexsampleprep.com
Mixer/Mills; Freezer/Mills

SPI Supplies/Structure Probe, Inc. Booth 1203
www.2spi.com
UV Prep for SEM; Plasma Prep Reactive Ion Etcher; Precision Glass Clutter

Springer Booth 117
www.springer.com
Books; Journals; E-Books

SPS-Europe B.V. Booth 720
www.sps-europe.com
Spin Coater; Ellipsometer; HID Lights

STAIB Instruments, Inc. Booth 717
www.staibinstruments.com
RHEED; Auger; Surface Analysis

Strem Chemicals, Inc. Booth 1013
www.strem.com
Materials and Chemicals; Precursors for CVD/ALD; Nanomaterials

Super Conductor Materials, Inc. Booth 920
www.scm-inc.com
Sputtering Targets; Evaporation Materials; E-Beam Crucibles Liner

SVT Associates, Inc. Booth 411
www.svta.com
Molecular Beam Epitaxy; Atomic Layer Deposition; Pulsed Laser Deposition

Synton-MDP AG Booth 1113
www.synton-mdp.ch
Diamond Tips; Nanoindenter Tips; Stylus Tips

TA Instruments Booth 519
www.tainstruments.com
Thermal Conductivity Meters; Flash Diffusivity Analyzers; Dilatometers

Taylor & Francis Booth 109
taylorandfrancis.com
Journals; Books

TDC Corporation Booth 705
www.mirror-polish.com
Precision Mirror Polishing/Lapping; Precision Manufacturing

Ted Pella, Inc. Booth 516
www.tedpella.com
Microscopy Supplies; Sample Preparation Supplies; Vacuum Coaters

Tektronix, Inc. Booth 1122
www.tektronix.com
Parameter Analyzer; High Current Source Measure Unit (SMU) Instrument; KickStart Software for Measuring High Resistivity

Telemark Booth 824
www.telemark.com
Electron Beam Deposition; Ion Beam Sources; Film Thickness Monitoring

Tescan USA Inc. Booth 811
www.tescan-usa.com
Scanning Electron Microscopes; Focused Ion Beam Workstations; Mineral Analyzers

Thermo-Calc Software Inc. Booth 1030
www.thermocalc.com
Thermo-Calc Tool

Thermo Fisher Scientific Booth 422
www.thermofisher.com/msr
iN10; DXR2xi; iXR; Pathfinder

Thermo Fisher Scientific Booth 423
www.thermofisher.com/elemental
Powder Diffractometer; X-ray Diffractometer; Powder Diffraction

Thermo Fisher Scientific (Alfa Aesar) Booth 425
www.alfa.com
High Purity Metals; Evaporation Materials; Ceramics

THINKY USA, Inc. Booth 904
www.thinky-usa.com
Planetary Centrifugal Mixers; Nano Pulverizers; Nano Premixer

TMC, AMETEK Ultra Precision Technologies Booth 919
www.techmfg.com
Floor Vibration Isolation Systems and Tables

Toho Technology Inc. Booth 1118
www.tohotechnology.com
FLX; TohoSpec 3100; Material Characterization

Toshima Manufacturing Co. Ltd. Booth 708
www.material-sys.com
Sputtering Targets; Li-on Battery; Thin Film

Trion Technology, Inc. Booth 1005
www.triontech.com
Plasma Etch Systems; Plasma Deposition Systems; Stripping Systems

Twente Solid State Technology B.V. Booth 1006
www.tsst.nl
Pulsed Laser Deposition Products; Vacuum Systems; Heaters

US EPA Green Chemistry Program Booth 1300
www.epa.gov/greenchemistry
Presidential Green Chemistry Challenge

US Naval Research Laboratory Booth 126
www.nrl.navy.mil
Materials Science and Technology; Electronics Science and Technology; Chemistry

UC Components Inc. Booth 909
www.uccomponents.com
Fasteners for Vacuum; O-Rings for Vacuum; Fasteners and Seals for Extreme Environments

Ultratech/CNT Booth 707
www.cambridgenanotechALD.com
ALD System; Fiji ALD System; Phoenix ALD System

ULVAC Technologies, Inc. Booth 805
www.ulvac.com
Thermoelectric Material Measuring Equipment; High Temp TRA Furnaces; Vacuum Pumps

University of Manchester, School of Materials Booth 111
www.materials.manchester.ac.uk
Leading UK Higher Education Institution

Vacuum Technology Inc. Booth 623
www.vti-glovebox.com
Glove Box; Gas Purification System; Evaporator

VAKSiS R&D and Engineering Booth 809
www.vaksis.com
Thin Film Vacuum Coating System; PVD Technology; Perovskite Coating System

Vigor Tech USA Booth 829
www.vigor-glovebox.com
Glove Boxes; Purification Systems; Inert Atmosphere Equipment

Wafer World Inc. Booth 1007
www.waferworld.com
Silicon Wafers; Germanium Wafers; GaAs Wafers

Wiley Booth 217
www.wiley.com
Books; Journals

WITec Instruments Corp. Booth 911
www.witec-instruments.com
Confocal Raman Microscopy; Atomic Force Microscopy; NSOM

J.A. Woollam Company, Inc. Booth 1002
www.jawoollam.com
Spectroscopic Ellipsometers; Ellipsometers; Measurements

World Scientific Publishing Co. Booth 122
www.worldscientific.com
Books; Journals

Zurich Instruments Ltd. Booth 305
www.zhinst.com
Lock-in Amplifier; Boxcar Averager; Arbitrary Waveform Generator

Zygo Corporation, AMETEK Ultra Precision Technologies Booth 917
www.zygo.com
Measurement Systems

MRS ENERGY SUSTAINABILITY

A Review Journal

TOPICS



EXPERT

REVIEWS

MRS Energy & Sustainability—A Review Journal publishes reviews on key topics in materials research and development as they relate to energy and sustainability. Review topics include new R&D of both established and new areas; systems integration; and objective application of economic, sociological and governmental models, enabling research and technological developments. The reviews are set in an integrated context of scientific, technological and sociological complexities relating to environment and sustainability.

EDITORS-IN-CHIEF

David S. Ginley

National Renewable Energy Laboratory, USA

David Cahen

Weizmann Institute of Science, Israel

Elizabeth A. Kócs

University of Illinois at Chicago, USA

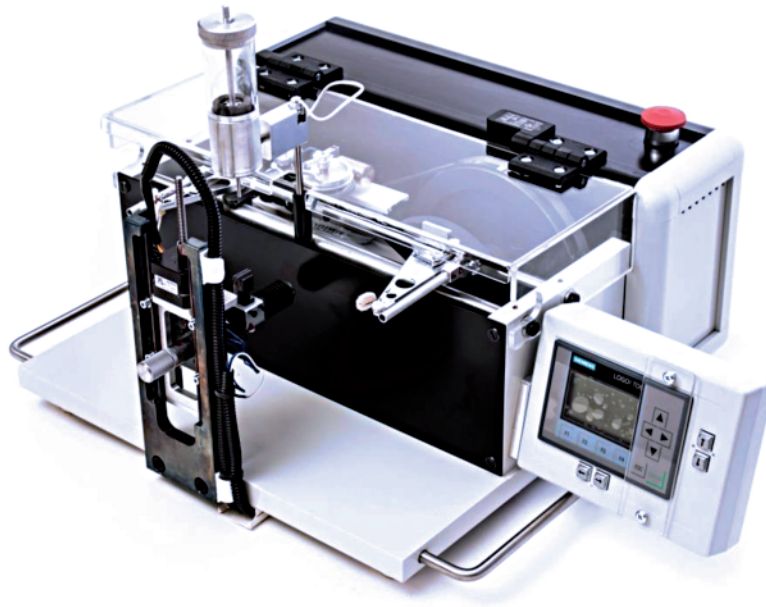
PRINCETON SCIENTIFIC CORP.

Tel. (609) 924-3011

Fax (609) 924-3018

Homepage: www.PrincetonScientific.com

Email: info@princetonscientific.com



Wire Saw WS-25

WS-25 is the newest high precision wire saw in our product line. It is the first wire saw that can cut using the free abrasive method, as well as cut using diamond dotted wire. It is fitted with adjustable sample support with an electronical vertical axis to provide precise sample position before cutting. The WS-25 wire saw has been developed to meet two important requirements: cutting should not introduce deformations or defects, and losses of material should be minimized.

ADVANTAGES

- * Semi-automatic, requires no supervision
- * Can cut semiconductors, ferrites, metals, glasses, and other hard or brittle solids
- * Minimizes material losses (> 30 um)
- * Slices samples perfectly parallel
- * No additional lapping required
- * Can be used with accessories to extend the saw's application in precision cutting

TECHNICAL DATA

- * Sample max dimensions: 40x40 mm
- * Power Supply: 220-250 V/50 Hz or 110 V/60- Hz
- * Tungsten wire diameter: 20-60 um
- * Diamond dotted wire: 100-300 um
- * Wire oscillation frequency: 150-200/min
- * Weight: 48 kg
- * Dimensions: 600x500x250mm

MRS Booth 418

****Mention Coupon Code MRS-2016 and get a 4% discount on your order****

Submission Deadline—January 1, 2017



Achieving Superior Ceramics and Coating Properties through Innovative Processing

The development and implementation of new materials and innovative processing methods provide opportunities to expand and use advanced materials in next generation technologies and devices, to improve their quality and reliability, and to increase manufacturing efficiency. Advanced ceramics are one of the most promising areas in the creation of new generation technologies. Properties and performance of ceramics, composites, and coatings strongly depend on processing routes and their features. While many publications are related to advanced ceramic processing, only a small fraction focus on how processing affects the application properties and performance at particular service conditions. This Focus Issue will be devoted to recent advances in ceramic and coating properties and performance as achieved through innovation in processing of advanced ceramics, composites, and coatings.

Papers will consider aspects of processing on the following topics:

- ◆ novel technology of starting materials preparation;
- ◆ ceramic colloidal processing;
- ◆ novel forming technology of ceramics and composites, including for large-size and complex-shape products;
- ◆ thin and thick ceramic film processing;
- ◆ advanced methods of ceramic and composite coating formation, in particular, for complex-shape components;
- ◆ novel firing technology and sintering features;
- ◆ design-oriented technology, including additive manufacturing, from small to large-scale production.

Application properties may be related, in particular, to wear-, corrosion-, thermal shock-resistance, structural integrity under mechanical and thermal loads, ballistic performance of armor ceramics, particular electrical properties related to fuel cells, insulators, supercapacitors, semiconductors, conductors and sputtering targets, optical transmittance, catalytic properties, permeation of porous structures, and biomedical applications. The papers on the proposed topic will be of interest and importance to specialists from academia, research centers, and industry.

GUEST EDITORS

Eugene Medvedovski, Endurance Technologies Inc., Canada

Nahum Travitzky, Erlangen-Nurnberg University, Germany

Xiaowei Yin, Northwestern Polytechnical University, P.R. China

MANUSCRIPT SUBMISSION

To be considered for this issue, new and previously unpublished results significant to the development of this field should be presented. The manuscripts must be submitted via the *JMR* electronic submission system by **January 1, 2017**. Manuscripts submitted after this deadline will not be considered for the issue due to time constraints on the review process. **Submission instructions may be found at www.mrs.org/jmr-instructions**. Please select "Focus issue: *Achieving Superior Ceramics and Coating Properties through Innovative Processing*" as the manuscript type. **Note our manuscript submission minimum length of 6,000 words**. All manuscripts will be reviewed in a normal but expedited fashion. Papers submitted by the deadline and subsequently accepted will be published in the Focus Issue. Other manuscripts that are acceptable but cannot be included in the issue will be scheduled for publication in a subsequent issue of *JMR*.

jmr@mrs.org
Please contact jmr@mrs.org with questions.

CALL FOR PAPERS