

Submission Deadline—November 1, 2015



## Advanced Materials and Structures for Solar Fuels

Efficient and cost-effective generation of renewable fuels, such as hydrogen from renewable resources like solar energy, is crucial to ensure a sustainable future. Due to the lack of materials and structures, however, current technologies for renewable hydrogen production via photoelectrochemical (PEC) water splitting have significant challenges in efficiency, durability, and cost. In view of their importance in sustainable energy and environmental applications, a compilation of accomplishments in photocatalytic materials research will promote rapid advances of the field.

This *JMR* Focus Issue will present latest developments in photocatalytic materials and structures, with focus on both the fundamental materials science and their applications in solar fuels production.

### Contributed articles are sought in the following areas:

- ◆ Fundamental studies of solar fuels generation via PEC water splitting
- ◆ Semiconductor materials, advanced structures, and systems for solar fuels
- ◆ Surface and interface properties of semiconductor/electrolyte junctions
- ◆ Nano-materials and heterostructures
- ◆ Overlayers, underlayers, etc. for enhanced kinetics and charge transfer
- ◆ Molecular and mesoscopic modifications of photocatalysis
- ◆ Modeling and simulation of semiconductors, interfaces, and transport processes
- ◆ Short reviews of materials and structures

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To be considered for this issue, new and previously unpublished results significant to the development of this field should be presented.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 **November 1, 2015**. 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](http://www.mrs.org/jmr-instructions)**. Please select "Focus issue: *Advanced Materials and Structures for Solar Fuels*" as the manuscript type. **Note our manuscript submission minimum length of 6000 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](mailto:jmr@mrs.org)**  
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CALL FOR PAPERS

Submission Deadline—December 1, 2015



## Advances and Challenges in Carbon-based Tribomaterials

Carbon-based materials have captured broad interest in the materials science community for decades. Carbon-based systems comprise an impressively broad and continually expanding range of materials, from the building blocks of biology to carbon allotropes with extreme and exotic properties such as nanotubes, buckyballs, graphene, and diamondoids.

This *JMR* Focus Issue will highlight the current understanding and remaining challenges for evaluating the potential of carbon-based materials for tribological systems. The most recent findings in the synthesis, characterization, and application of carbon-based materials will be highlighted, as well as future possibilities for new carbon-based tribological coatings.

The aims of this Focus Issue are to inform colleagues in industry and academia about methods, analysis, design advances, and new materials concerning all kinds of carbon-based materials with improved tribological properties or systems, from fundamental research to applied uses, with resulting benefits of longer product/component life, less energy consumption, and reduction in product development time and cost.

Potential papers will feature a mix of experimental, numerical, and/or theoretical articles dealing with all aspects of carbon-based tribomaterials research.

### Contributed papers are solicited in the following areas:

- ◆ Adhesion
- ◆ Friction models
- ◆ New methods and technologies
- ◆ Materials transfer
- ◆ Rough surfaces
- ◆ Thermal stability
- ◆ Tribofilms
- ◆ Wear models
- ◆ Asperity interactions
- ◆ Friction and wear mechanisms
- ◆ Materials characterizations and synthesis
- ◆ Physics of wear
- ◆ Surface engineering and coatings
- ◆ Tribocorrosions
- ◆ Tribotesting

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CALL FOR PAPERS

**Submission Deadline—March 1, 2016**



## Reinventing Boron Chemistry and Materials for the 21st Century

Boron-based compounds are an ideal platform for developing new technologies due to their thermal and chemical stability, mechanical strength, and electrical and magnetic properties. Boron's capability to adopt a wide range of bonding configurations facilitates the creation of structurally-rich compounds with diverse electrical and mechanical properties. This Focus Issue of the *Journal of Materials Research* will highlight exciting recent developments in understanding, designing, and preparing boron-containing materials.

A multitude of potential applications exists for these compounds, including coatings for thermal and wear protection, high-field permanent magnets, grinding media, thermoelectric devices, neutron detectors, and superconductors. To advance these engineering applications, a fundamental understanding of how composition and microstructure can be used to control physical properties is needed, in addition to accessible processing methods with which to reliably produce these materials.

The editors encourage contributed papers concerned broadly with boron-based materials research. Both fundamental and applied subjects are welcome.

### Potential topics of interest include, but are not limited to, the following areas:

- ◆ Processing methods for engineering microstructure and grain boundaries
- ◆ Theoretical modeling and design of boride compounds
- ◆ Development of boron-based electronics for sensors
- ◆ Novel routes for synthesizing boron compounds
- ◆ Boron-containing magnetic materials
- ◆ Methods for the preparation of boride nanomaterials
- ◆ Boron-based materials for ultra high temperature, oxidative, and corrosive environments
- ◆ New boride compositions, phases, and polymorphs
- ◆ Boron materials for energy storage and generation
- ◆ Engineering boron surfaces
- ◆ Properties related to ionic transport and storage

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CALL FOR PAPERS



# CALL FOR PROPOSALS

**PROPOSALS** are now being accepted  
for *JMR* Focus Issues to be published in 2017.

**SUBMISSION DEADLINE—DECEMBER 1, 2015**

Although each regular issue of *JMR* covers a range of materials research topics, Focus Issues are devoted entirely to a single topic and are published several times a year. Focus Issues allow the journal to comprehensively examine the current research in a particular area of interest to *JMR* readers. See [www.mrs.org/jmr-focus](http://www.mrs.org/jmr-focus) for previously published and planned Focus Issues.

### Lead a Focus Issue on your area of expertise!

Proposals should provide:

- **PROPOSED TOPIC**

Topics should be interdisciplinary materials research and focused on the science of the field. Focus Issues should cover emerging and progressing fields in materials or topics that would benefit from comprehensive coverage.

- **PROPOSED GUEST EDITOR NAMES AND FULL CONTACT INFORMATION**

Three to four guest editors, representing the diversity of The Materials Research Society®, are required. Guest editors should be knowledgeable in the field of the proposed topic, able to present a balanced view of the topic, organized, and able to meet deadlines. Previous editorial experience is a plus.

- **OVERALL SCOPE**

Describe the Focus Issue topic in one or two paragraphs, and why a Focus Issue is important at this time. Evaluation will be based on scientific value, presentation quality and plans to attract cutting-edge papers in the field.

- **PROPOSED SCHEDULE TO PRODUCE THE ISSUE**

During what quarter of 2016 (January-March / April-June / July-September / October-December) do you prefer to organize the Focus Issue? For 2017 publication, the Call for Papers should be released by *JMR* at least 12 months before the publication date.

Visit [www.mrs.org/jmr-proposals-2017](http://www.mrs.org/jmr-proposals-2017) for more information and guidelines regarding required elements. **Submit your proposal to the JMR Editor-in-Chief at [jmr@mrs.org](mailto:jmr@mrs.org) no later than December 1, 2015.**

Focus Issue topics for 2017 will be selected by the Editor-in-Chief and Associate Editors by January 30, 2016.

**[jmr@mrs.org](mailto:jmr@mrs.org)**

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2015 **MRS**® FALL MEETING & EXHIBIT  
November 29 – December 4, 2015 | Boston, Massachusetts

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## BIOMATERIALS AND SOFT MATERIALS

- B Stretchable and Active Polymers and Composites for Electronics and Medicine
- C Tough, Smart and Printable Hydrogel Materials
- D Biological and Bioinspired Materials in Photonics and Electronics—Biology, Chemistry and Physics
- E Engineering and Application of Bioinspired Materials
- F Biomaterials for Regenerative Engineering
- G Plasma Processing and Diagnostics for Life Sciences
- H Multifunctionality in Polymer-Based Materials, Gels and Interfaces
- I Nanocellulose Materials and Beyond—Nanoscience, Structures, Devices and Nanomanufacturing
- J Wetting and Soft Electrokinetics
- K Materials Science, Technology and Devices for Cancer Modeling, Diagnosis and Treatment
- L Nanofunctional Materials, Nanostructures and Nanodevices for Biomedical Applications

## NANOMATERIALS AND SYNTHESIS

- M Micro- and Nanoscale Processing of Materials for Biomedical Devices
- N Magnetic Nanomaterials for Biomedical and Energy Applications
- O Plasmonic Nanomaterials for Energy Conversion
- P Synthesis and Applications of Nanowires and Hybrid 1D-0D/2D/3D Semiconductor Nanostructures
- Q Nano Carbon Materials—1D to 3D
- R Harsh Environment Sensing—Functional Nanomaterials and Nanocomposites, Materials for Associated Packaging and Electrical Components and Applications

## MECHANICAL BEHAVIOR AND FAILURE OF MATERIALS

- S Mechanical Behavior at the Nanoscale
- T Strength and Failure at the Micro- and Nanoscale—From Fundamentals to Applications
- U Microstructure Evolution and Mechanical Properties in Interface-Dominated Metallic Materials
- V Gradient and Laminate Materials
- W Materials under Extreme Environments (MuEE)
- Y Shape Programmable Materials

## ELECTRONICS AND PHOTONICS

- Z Molecularly Ordered Organic and Polymer Semiconductors—Fundamentals and Devices
- AA Organic Semiconductors—Surface, Interface and Bulk Doping
- BB Innovative Fabrication and Processing Methods for Organic and Hybrid Electronics
- CC Organic Bioelectronics—From Biosensing Platforms to Implantable Nanodevices
- DD Diamond Electronics, Sensors and Biotechnology—Fundamentals to Applications
- EE Beyond Graphene—2D Materials and Their Applications
- FF Integration of Functional Oxides with Semiconductors
- GG Emerging Materials and Platforms for Optoelectronics
- HH Optical Metamaterials—From New Plasmonic Materials to Metasurface Devices
- II Phonon Transport, Interactions and Manipulations in Nanoscale Materials and Devices—Fundamentals and Applications
- JJ Multiferroics and Magnetoelectrics
- KK Materials and Technology for Non-Volatile Memories

## ENERGY AND SUSTAINABILITY

- LL Materials and Architectures for Safe and Low-Cost Electrochemical Energy Storage Technologies
- MM Advances in Flexible Devices for Energy Conversion and Storage
- NN Thin-Film and Nanostructure Solar Cell Materials and Devices for Next-Generation Photovoltaics
- OO Nanomaterials-Based Solar Energy Conversion
- PP Materials, Interfaces and Solid Electrolytes for High Energy Density Rechargeable Batteries
- QQ Catalytic Materials for Energy
- RR Wide-Bandgap Materials for Energy Efficiency—Power Electronics and Solid-State Lighting
- SS Progress in Thermal Energy Conversion—Thermoelectric and Thermal Energy Storage Materials and Devices

## THEORY, CHARACTERIZATION AND MODELING

- TT Topology in Materials Science—Biological and Functional Nanomaterials, Metrology and Modeling
- UU Frontiers in Scanning Probe Microscopy
- VV *In Situ* Study of Synthesis and Transformation of Materials
- WW Modeling and Theory-Driven Design of Soft Materials
- XX Architected Materials—Synthesis, Characterization, Modeling and Optimal Design
- YY Advanced Atomistic Algorithms in Materials Science
- ZZ Material Design and Discovery via Multiscale Computational Materials Science
- AAA Big Data and Data Analytics for Materials Science
- BBB Liquids and Glassy Soft Matter—Theoretical and Neutron Scattering Studies
- CCC Integrating Experiments, Simulations and Machine Learning to Accelerate Materials Innovation
- DDD Lighting the Path towards Non-Equilibrium Structure-Property Relationships in Complex Materials

X *Frontiers of Material Research*

[www.mrs.org/fall2015](http://www.mrs.org/fall2015)

The MRS/E-MRS Bilateral Energy Conference will be comprised of the energy-related symposia at the 2015 MRS Fall Meeting.

## Meeting Chairs

**T. John Balk** University of Kentucky  
**Ram Devanathan** Pacific Northwest National Laboratory  
**George G. Malliaras** Ecole des Mines de St. Etienne  
**Larry A. Nagahara** National Cancer Institute  
**Luisa Torsi** University of Bari "A. Moro"

## Don't Miss These Future MRS Meetings!

### 2016 MRS Spring Meeting & Exhibit

March 28 - April 1, 2016  
Phoenix, Arizona

### 2016 MRS Fall Meeting & Exhibit

November 27 - December 2, 2016  
Boston, Massachusetts

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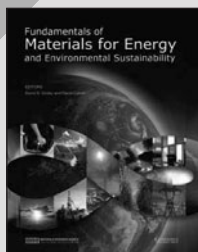
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from the Materials Research Society  
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## Book Collection

TEXTBOOKS



### Fundamentals of Materials for Energy and Environmental Sustainability

**EDITORS:** David S. Ginley and David Cahen

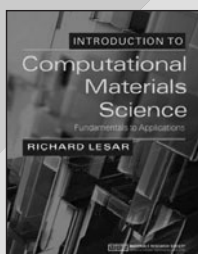
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A unique, interdisciplinary textbook with contributions from more than 100 experts in energy and the environment from around the world.

[www.cambridge.org/ginley](http://www.cambridge.org/ginley)



### Introduction to Computational Materials Science: Fundamentals to Applications

**AUTHOR:** Richard LeSar

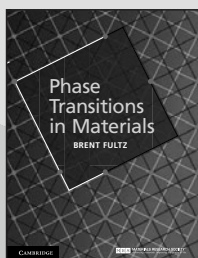
**ISBN:** 9780521845878

**List Price:** \$100.00

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Emphasizing essential methods and universal principles, this textbook provides everything students need to understand the basics of simulating materials behavior.

[www.cambridge.org/lesar](http://www.cambridge.org/lesar)



### Phase Transitions in Materials

**AUTHOR:** Brent Fultz

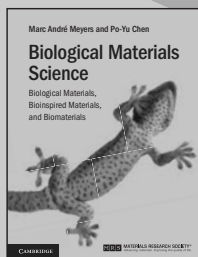
**ISBN:** 9781107067240

**List Price:** \$90.00

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Offering a fresh viewpoint on phase changes and the thermodynamics of materials, this textbook covers the thermodynamics and kinetics of the most important phase transitions in materials science, spanning classical metallurgy through to nanoscience and quantum phase transitions.

[www.cambridge.org/fultz](http://www.cambridge.org/fultz)



### Biological Materials Science

**Biological Materials, Bioinspired Materials, and Biomaterials**

**AUTHORS:** Marc André Meyers and Po-Yu Chen

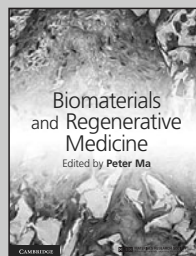
**ISBN:** 9781107010451

**List Price:** \$99.00

**MRS Member Discount Price:** \$79.00

Split into three sections—Basic Biology Principles, Biological Materials, and Bioinspired Materials and Biomimetics—this book presents biological materials along with the structural and functional classification of biopolymers, bioelastomers, foams, and ceramic composites.

[www.cambridge.org/bms](http://www.cambridge.org/bms)



### Biomaterials and Regenerative Medicine

**EDITOR:** Peter Ma

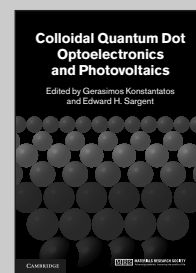
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**List Price:** \$185.00

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Emphasizing basic principles and methodology, this book covers stem cell interactions, fabrication technologies, design principles, physical characterization and biological evaluation, across a broad variety of systems and biomaterials.

[www.cambridge.org/biomaterials](http://www.cambridge.org/biomaterials)



### Colloidal Quantum Dot Optoelectronics and Photovoltaics

**EDITORS:** Gerasimos Konstantatos and Edward H. Sargent

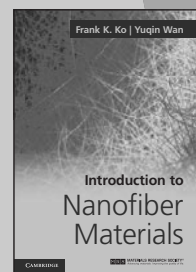
**ISBN:** 9780521198264

**List Price:** \$130.00

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Written in an accessible style by the world's leading experts, this book captures the most up-to-date research in colloidal quantum dot devices.

[www.cambridge.org/colloidal](http://www.cambridge.org/colloidal)



### Introduction to Nanofiber Materials

**AUTHORS:** Frank K. Ko and Yuqin Wan

**ISBN:** 9780521879835

**List Price:** \$99.00

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Presenting the latest coverage of the fundamentals and applications of nanofibrous materials and their structures for graduate students and researchers, this book bridges the communication gap between fiber technologists and materials scientists and engineers.

[www.cambridge.org/nanofiber](http://www.cambridge.org/nanofiber)



### Thermodynamics of Surfaces and Interfaces: Concepts in Inorganic Materials

**AUTHOR:** Gerald H. Meier

**ISBN:** 9780521879088

**List Price:** \$120.00

**MRS Member Discount Price:** \$96.00

This book provides an accessible yet rigorous discussion of the thermodynamics of surfaces and interfaces, delivering a comprehensive guide without an overwhelming amount of mathematics.

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The Society's interdisciplinary approach to the exchange of technical information is qualitatively different from that provided by single-discipline professional societies because it promotes technical exchange across the various fields of science affecting materials development. MRS sponsors two major international annual meetings encompassing many topical symposia, as well as numerous single-topic scientific meetings each year. It recognizes professional and technical excellence, conducts tutorials, and fosters technical exchange in various local geographical regions through Section activities and Student Chapters on university campuses.

MRS publishes symposia proceedings, the *MRS Bulletin*, and other volumes on current scientific developments. The *Journal of Materials Research*, the archival journal spanning fundamental developments in materials science, is published twenty-four times a year by Cambridge University Press for the MRS. *MRS Communications* is a full-color letters and perspectives journal focused on groundbreaking work across the spectrum of materials research. MRS Energy & Sustainability—A Review Journal publishes reviews on key topics in materials research and development as they relate to energy and sustainability.

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