jmr Journal of MATERIALS RESEARCH
FOCUS ISSUE · MAY 2019

Submission Deadline—October 1, 2018

CALL FOR PAPERS

Plasticity and Fracture at the Nanoscales – Advances in *In Situ* Experimentation Techniques Enabling Novel and Extreme Materials/Nanocomposite Design

Plasticity and fracture of materials at the nanoscales can deviate significantly from the same phenomena in bulk properties, which may have important implications if the materials are to be used in real world engineering systems. Nanoscale materials and composites have been known to have important effects related to size, but today many other emerging materials – due to or enabled by novel manufacturing routes – combine nanoscale effects with 3D microarchitecturing to approach extreme limits of materials properties.

This Focus Issue will look at recent advances in the in situ experimentation of plasticity and fracture, especially those that enable the development and design of materials and nanocomposites with enhanced mechanical properties reaching or approaching the extreme limits of materials properties. All fundamental studies on mechanical properties of nanoscale/extreme materials and nanocomposites including *ex situ* and *in situ* SEM/TEM, synchrotron X-ray experiments, as well as modeling and simulations on relevant length scales will be addressed. Nanomaterials/nanocomposites of interest include metals, ceramics, polymers, amorphous materials and their derivatives containing carbon-based materials.

This JMR Focus Issue will provide readers up-to-date information on the impact of these recent experimentation capabilities – the ability to observe directly how plasticity and fracture events interact with microstructures at the nanoscale – and how it could affect and enable novel and extreme materials and nanocomposite design.

Contributing papers are solicited in the following areas:

- *In situ* SEM/TEM analysis of deformation behavior
- *In situ* synchrotron-based experimentation work focusing on deformation behavior
- Other *in situ* experimentation techniques (Raman, EBSD, etc.)
- Effects of interfaces on the mechanical properties of metal-matrix nanocomposites
- Deformation and fracture mechanisms of metals, ceramics, crystalline-amorphous composites
- Graphene or CNT containing composites for high strength applications
- Nanocomposites based on lightweight metals, such as Magnesium
- Hierarchical biocomposite and its fracture/deformation mechanisms
- Fabrication and analysis of 3D or 4D nanocomposites
- Simulation and modeling of mechanical behavior

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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 **October 1, 2018**. Manuscripts submitted after this deadline will not be considered for the issue due to time constraints on the review process. Please select "Focus issue: Plasticity and Fracture at the Nanoscales" as the manuscript type. **Note our manuscript submission minimum length of 3250 words, excluding figures, captions, and references, with at least 6 and no more than 10 figures and tables combined. Review articles may be longer but must be pre-approved by proposal to the Guest Editors via jmr@mrs.org. The proposal form and author instructions may be found at www.mrs.org/jmr-instructions.** 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*.

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

https://doi.org/10.1557/jmr.2018.278

Journal of MATERIALS RESEARCH
FOCUS ISSUE · JUNE 2019

Submission Deadline—November 1, 2018

CALL FOR PAPERS

(Nano)materials for Biomedical Applications

Nanotechnology has been responsible for an unprecedented positive impact in healthcare advances, by merging fundamental and applied sciences as complementary tools envisioning an enhanced quality of life. Recently, a broader spectrum of high performance nanomaterials and material-based nanosystems has been engineered to address challenges in medical and health-related fields. At the same time, there has been a shift in importance from designing exclusively bioinert materials to instead producing complex bioactive building blocks for mimicking targeted functions. This *JMR* Focus Issue is devoted to the latest advances in biomedical nanomaterials, including: (i) different fabrication approaches and applications, (ii) design and characterization of novel biomedical materials and devices as well as their structure-property relationships with biological responses, and (iii) novel (bio)nanomaterials as potential candidates to integrate multifunctional devices targeting self-assembly materials.

Contributing papers are solicited in the following areas:

- Nanotechnology and drug delivery
- Biocompatible materials
- Implants and coatings
- Tissue engineering and regenerative materials
- Fabrication of sensors and biosensors
- Biomimetics
- Materials for medical devices
- Materials in clinical dentistry
- Materials in orthopedics and biomechanics

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Journal of MATERIALS RESEARCH
FOCUS ISSUE • APRIL 2019

Submission Deadline—September 1, 2018

CALL FOR PAPERS

Interconnects and Interfaces in Energy Conversion Materials

One major roadblock to the wide-scale commercialization of state-of-the-art energy materials (e.g., SOFC, high-temperature PV, and high-temperature thermoelectrics) is the great difficulty involved with interfacing these materials with electrical interconnects in a way that results in low parasitic electrical losses and low degradation rates. Many of these materials consist of reactive and sometimes volatile elements from the chalcogen (including oxygen), pnictogen, and halogen groups, which tend to react strongly with metallic interconnect and interface materials that are usually desired for low Ohmic losses at the device level.

This *JMR* Focus Issue will cover advances in the synthesis, processing, and performance of both conventional alloys and unconventional compounds designed for use as electrical interconnects and interfacing materials for these high-temperature energy conversion technologies. Special attention may be given to work relating to experimental and theoretical assessment of the reaction and diffusion kinetics of these interface materials and the volatile, reactive species of energy materials.

Manuscripts are solicited in the following areas:

- Development and performance of *in-situ*-formed diffusion barriers
- Modeling of high-temperature interface evolution (kinetics and properties evolution)
- Reaction kinetics of volatile "p-block" elements with transition metals and alloys
- Mechanical properties of interconnect-energy material interfaces
- Interface degradation mechanisms and mitigation
- Characterization and improvement of electrical and thermal contact/interface resistance

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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.

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Journal of MATERIALS RESEARCH

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

Periodical Rate Postage Paid at New York, NY
and Additional Mailing Offices

Postmaster—Send change of address notice to:

Cambridge University Press
One Liberty Plaza, 20th Floor,
New York, NY 10006

ISSN: 0884-2914