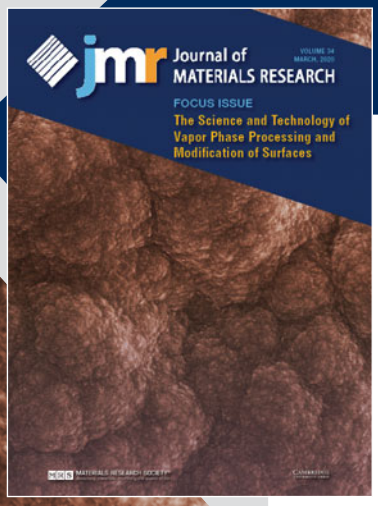
Journal of MATERIALS RESEARCH
FOCUS ISSUE • MARCH 2020

Submission Deadline—August 1, 2019



CALL FOR PAPERS

The Science and Technology of Vapor Phase Processing and Modification of Surfaces

Surface modification tools such as plasma enhanced physical vapor deposition and chemical vapor deposition processes, high energy ion implantation, high-power impulse magnetron sputtering, plasma electrolysis and discharge deposition have resulted in significant improvements in material properties for biomedical devices, MEMS, bearings, and cutting tools. These advances have been enabled by the development of new thin film deposition approaches, epitaxial schemes, multi-structured buffer layers, computation simulations, and new analytical probes to investigate the details of interface chemistry and structure. While many advances have been empirical, scientific understanding of the behavior of such surface modified materials is needed to accelerate further progress.

This *JMR* Focus Issue solicits papers that report advances in the synthesis, processing, and performance of materials enhanced by vapor phase processes. Special attention will be given to papers focused on surface reaction dynamics and film growth, the science and technology of surfaces and interfaces, and the mechanism of property enhancement.

Contributing papers are solicited in the following areas:

- Plasma Surface treatment
- High energy ion implantation
- Utilization of novel buffer layers
- High-power impulse magnetron sputtering
- Plasma electrolysis and discharge deposition
- Novel technologies for hard and super-hard thin films
- Applications of computational modeling
- Analytical tools for interface characterization

GUEST EDITORS

Haitao Ye, University of Leicester, United Kingdom
Chengming Li, University of Science and Technology, China
Sarah Hainsworth, Aston University, United Kingdom

MANUSCRIPT SUBMISSION

To be considered for this issue, unpublished results significant to the development of this field should be presented. The manuscripts must be submitted via the *JMR* electronic submission system by **August 1, 2019**. Manuscripts submitted after this deadline will not be considered for the issue due to time constraints on the review process. Please select *"The Science and Technology of Vapor Phase Processing and Modification of Surfaces"* as the Focus Issue designation. **Please note the 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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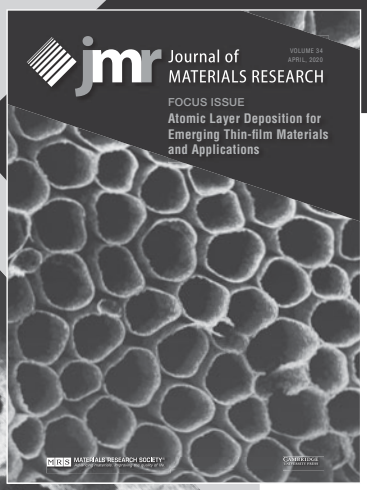
Journal of MATERIALS RESEARCH
FOCUS ISSUE · APRIL 2020

Submission Deadline—September 1, 2019



CALL FOR PAPERS

Atomic Layer Deposition for Emerging Thin-film Materials and Applications

Since the 2000s, Atomic Layer Deposition (ALD) has been widely employed to fabricate thin-film materials for a large variety of applications in microelectronics, optoelectronics, catalysis, biomedicine, gas sensing, anti-corrosion coating, clean-energy technologies (batteries, fuel cells, supercapacitors, solar cells, etc.), and nano- and micro-electromechanical systems (N/MEMS). The characteristic merits of ALD include not only its superior controllability over film thickness, composition, and crystallinity, but also its unique capability for constructing conformal thin-film coatings on complex structures. These merits also underlie the fast expansions of ALD into new areas over the past decades, such as metal-organic frameworks, two-dimensional layered materials, single-atom catalysis, solid-state batteries, and so on. Along with these new research trends, more research efforts are urgently needed to develop new ALD precursors for new processes and novel nanostructured materials toward emerging applications in various areas.

The purpose of this Focus Issue is to provide a research forum to exchange the latest outcomes using ALD for emerging thin-film materials and explore the potentials of ALD materials for future applications.

Manuscripts are solicited in the following areas:

- New ALD processes
- ALD precursor chemistry
- Modeling and growth mechanisms of ALD
- Fabrication of novel nanostructures/nanocomposites by ALD (including MLD)
- Emerging applications of ALD materials
  - Microelectronics
  - N/MEMS
  - Optoelectronics and display applications
  - Clean energy technologies (batteries, fuel cells, solar cells, supercapacitors, etc.)
  - Catalysis
  - Sensors
  - Biomedical applications
  - Anti-corrosion coatings

GUEST EDITORS

Xinwei Wang, Peking University, China
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MANUSCRIPT SUBMISSION

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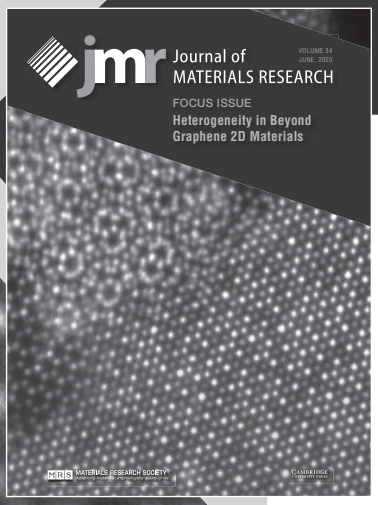

CALL FOR PAPERS

Heterogeneity in Beyond Graphene 2D Materials

Van der Waals (vdW) layered crystals and two-dimensional (2D) materials have shown remarkable physical and chemical properties, indicating a potentially large impact for future electronics and optoelectronics devices, as well as in quantum information science and energy applications. These atomically thin materials, however, also display remarkable heterogeneities and imperfections. At atomic scales, 2D sheets contain point defects including vacancies, intentional dopants, and impurities. At the mesoscopic level, these imperfections include misoriented grains and layers, mixed phases, strain and charge transfer induced by the substrate, absorbates and the dielectric environment. While these heterogeneities are of manufacturing concern for controllable, uniform, and large area synthesis of these materials, they also present opportunities that could lead to new abilities in tailoring the functionalities of 2D and layered materials for future transformative technologies. To fully reveal these opportunities, a synergistic strategy to fundamentally study these 2D materials must be developed, and new characterization approaches must be found and implemented.

This JMR Focus Issue serves to report the latest advances in the area of 2D and layered materials, with emphasis on fundamentally understanding the role of heterogeneities in these materials and heterostructures on their mesoscopic properties and functionalities, the development of paths to control the formation of these heterogeneities through synthesis and processing, and the emerging properties that can be accessed and used in novel application.

Contributing papers are solicited in the following areas:

- Novel properties emerging from heterogeneity.
- Tailoring specific heterogeneities, such as phase, defect type, dopants, and heterostructures through controlled synthesis and processing
- Advances in the characterization of heterogeneity including spatially- and time-resolved spectroscopy and microscopy.
- Predictive modeling and theoretical simulation.

GUEST EDITORS

Kai Xiao, Oak Ridge National Laboratory, USA
Zakaria Y. Al Balushi, University of California, Berkeley, USA
Sefaattin Tongay, Arizona State University, USA

MANUSCRIPT SUBMISSION

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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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