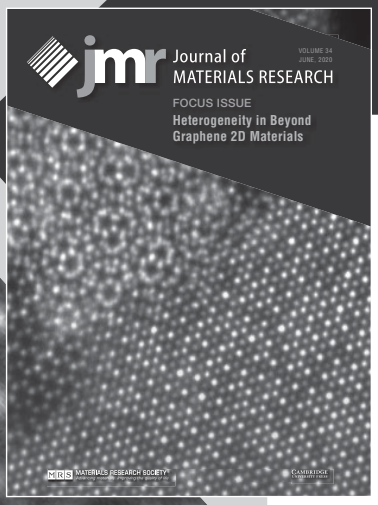
Journal of MATERIALS RESEARCH
FOCUS ISSUE · JUNE 2020

Submission Deadline—November 1, 2019



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

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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, 2019. Manuscripts submitted after this deadline will not be considered for the issue due to time constraints on the review process. Please select *"Heterogeneity in Beyond Graphene 2D Materials"* as the Focus Issue designation. **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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FOCUS ISSUE · JULY 2020

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CALL FOR PAPERS

Interactions of shear transformation bands: characteristics of microstructure and properties

Shear parallel to atomic planes is the natural deformation mode in crystals, and it may take place by dislocation glide, twinning transformation, kinking, or phase transformation. Those shear mechanisms associated with shear localization play a crucial role in the mechanical response and plastic deformation of structural materials, such as Hexagonal Close Packed (HCP) metals, Transformation Induced Plasticity (TRIP) steels and Twinning Induced Plasticity (TWIP) steels. When shear transformation bands interact with other defects, and consequently form a new boundary, this affects subsequent plastic deformation and causes hardening and eventual crack initiation. Therefore, a comprehensive multi-scale study of the role of shear transformations and their interactions on the plastic deformation of metallic aggregates is of scientific interest.

This Focus Issue serves to report the current understanding of interactions between shear transformation bands in structural materials. Comprehensive research linking modeling and simulation with experimental studies, at length scales spanning from the atomistic to the continuum, will fully reveal these interactive mechanisms.

Contributing papers are solicited in the following areas:

- Multi-scale modeling of interaction mechanisms
- Interaction mechanisms in twinned structural materials
- Interaction mechanisms in complex structural materials

GUEST EDITORS

Yue Liu, Shanghai Jiao Tong University, China
Shun Xu, University of Nebraska-Lincoln, USA
Jian Wang, University of Nebraska-Lincoln, USA

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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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