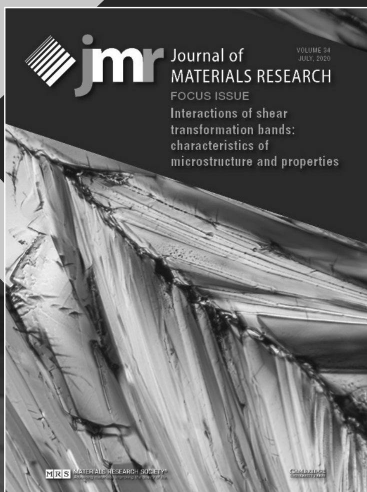
jmr Journal of MATERIALS RESEARCH
FOCUS ISSUE • JULY 2020

Submission Deadline—December 1, 2019



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

MANUSCRIPT SUBMISSION

To be considered for this issue, new and previously unpublished results or review articles significant to the development of this field should be presented. The manuscripts must be submitted via the JMR electronic submission system by December 1, 2019. Manuscripts submitted after this deadline will not be considered for the issue due to time constraints on the review process. Please select *"Interactions of Shear Transformation Bands: Characteristics of Microstructure and Properties"* 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.

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Journal of
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FOCUS ISSUE • AUGUST 2020

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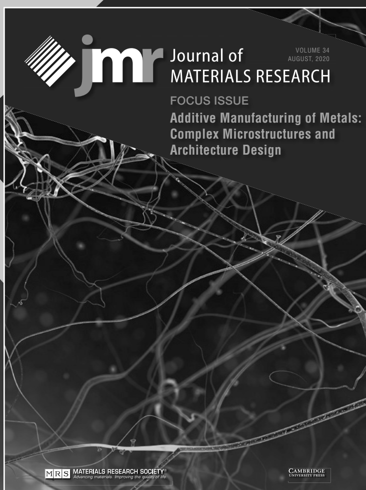

CALL FOR PAPERS

Additive Manufacturing of Metals: Complex Microstructures and Architecture Design

Additive manufacturing (AM) is a disruptive technology, not only because it enables the production of components with complex geometries, but also because it provides unique opportunities for microstructure control and materials design. In contrast to conventional manufacturing technologies such as casting, forging, and hot rolling, AM offers additional degrees of freedom to "architect" materials microstructure across length scales. Both beam-based processes—such as power bed fusion (PBF) and directed energy deposition (DED)—as well as non-beam-based processes—such as cold spray, additive friction stir deposition, and ultrasonic additive manufacturing—unlock new opportunities for the control of microstructure and architecture for desired mechanical and functional properties. Understanding microstructure evolution and the resulting material's behavior is key to developing novel material designs by AM methods.

The goal of this Focus Issue is to highlight research on AM-produced microstructures and their impact on mechanical and physical properties of metallic materials. Both experimental and modeling submissions are encouraged, especially papers in which modeling or theory is applied and validated experimentally. Materials systems of interest include, but are not limited to, structural materials, different types of steels, aluminum, titanium, nickel, copper, cobalt, refractory metals, shape-memory alloys, high entropy alloys, and bulk metallic glasses.

Contributing papers are solicited in the following areas:

- Microstructural evolution during the AM process.
- Microstructure response of AM components to post-processing conditions.
- Simulation of microstructure stability and evolution during or post the AM process.
- Novel alloy design tailored for AM.
- Architecture design in using AM methods.
- Microstructure and property relationship of the AM components.
- Artificial intelligence aided design for the microstructure or architecture optimization.

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Yu Zou, University of Toronto, Canada
Hang Yu, Virginia Tech, USA
Matteo Seita, Nanyang Technological University, Singapore

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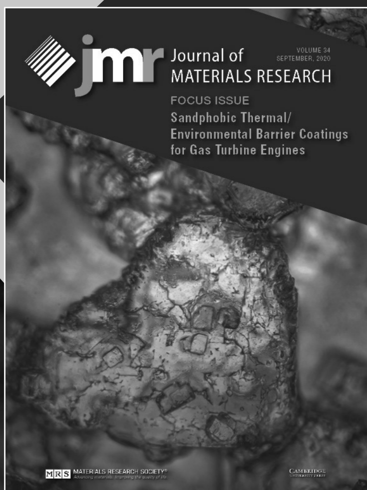

CALL FOR PAPERS

Sandphobic Thermal/Environmental Barrier Coatings for Gas Turbine Engines

Particulate entrainment into gas turbine engines (GTEs) for fixed wing and vertical lift aircraft is a significant challenge for aviation. In the past, this resulted in erosive damage from hard particulates, i.e., foreign object damage (FOD). Most GTEs have erosion-resistant coatings to improve durability and reduce the operational impact of FOD. However, modern gas turbine engines operate at significantly higher temperatures, which has given rise to a new problem for GTEs: hot tribocorrosion and deposition from sand, dust, salt, and ash. Upon entering the hot section, small/fine particulates melt, impinge, and adhere to the thermal barrier coatings (TBCs) and can infiltrate the porous coatings, solidifying into a glassy calcia-magnesia-alumino-silicate (CMAS) coating, which can degrade the TBC. Operating in particulate-laden environments (densely populated, desert, or volcanically active regions) significantly degrades safety and increases the maintenance burden of military and civilian assets.

This Focus Issue will highlight research on sand ingestion into gas turbine engines and potential mitigation strategies. Both modeling and experimental submissions are encouraged. Materials of interest include, but are not limited to: TBCs, environmental barrier coatings (EBCs), hybrid coating systems.

Contributing papers are solicited in the following areas:

- Chemical reactions of small particulates, and their constituents, interacting with T/EBCs
- Thermal and mechanical properties of glassy CMAS materials interacting with T/EBCs
- Simulation of particulate impact and deposition onto T/EBCs
- Simulation of infiltration of glassy CMAS compounds into T/EBCs and the resultant physicochemical interactions
- Novel T/EBC material selection and microstructural design to mitigate CMAS adhesion and infiltration

GUEST EDITORS

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