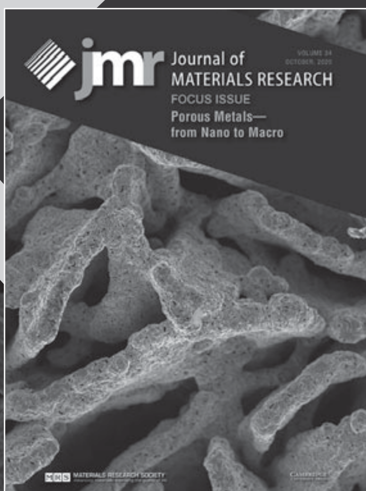
Journal of
MATERIALS RESEARCH
FOCUS ISSUE · OCTOBER 2020

Submission Deadline—March 1, 2020



CALL FOR PAPERS

Porous Metals—from Nano to Macro

Porous metals have applications in nearly every field of technology, from energy to the environment and from health and safety to transportation and electronics. Manufacturing processes allow tailoring of the micro-, meso- and macrostructure (architecture) of porous metals, in addition to characteristics such as surface finish, flaw population, residual stresses, and compositional fluctuations. Development and innovation in manufacturing are key factors in enabling porous metallic components that possess the desired porosity features (e.g., pore size, fraction, shape, orientation, and connectivity, as well as their distribution and gradients) tailored to achieve a particular set of properties (e.g., mechanical, physical, processability) and price.

Research on porous, foamed, or hollow metals and alloys has grown significantly in the last decade, especially on three new fronts: (i) *nanoporous metals*, usually created via dealloying methods; (ii) *macroporous metallic scaffolds*, fabricated via additive manufacturing and (iii) ultralight cellular metals (<0.01 g/cm^3) created by electrolytic or electroless deposition on removable templates. Existing areas of research in *microporous metals* (e.g., fabricated by gas entrapment or space-holder replication) also continue to evolve rapidly. This Focus Issue will highlight processing, microstructure, properties, and performance of porous metals and alloys, and welcomes innovative research using modeling and/or experimental approaches.

Contributing papers are solicited in all areas of porous metallic materials and structures, with emphasis on the following areas:

- Development of new production methods, microstructures and architectures
- New alloys for porous structure
- Expanded use of existing alloys

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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To be considered for this issue, new and previously unpublished results or review articles significant to the development of this field should be presented.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 March 1, 2020. Manuscripts submitted after this deadline will not be considered for the issue due to time constraints on the review process. Please select *"Porous Metals-- from Nano to Macro"* 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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Please direct questions to jmr@mrs.org

Journal of MATERIALS RESEARCH
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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

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