jmr Journal of MATERIALS RESEARCH
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EXTENDED SUBMISSION DEADLINE—August 1, 2016

CALL FOR PAPERS

Aberration Corrected Transmission Electron Microscopy

Spherical and chromatic aberration correctors in transmission and in scanning transmission electron microscopes (TEM/STEM) have become commercially available in recent years. They are comprised of electromagnetic multipoles driven by ultra-stable power supplies in conjunction with faster and more efficient hard- and software for image acquisition, analysis, and alignment. This technology has significantly improved the spatial resolution, down to the size of the Bohr radius under certain conditions so that the atomic scattering in the sample can limit the resolution, rather than the microscope.

Focus now needs to shift towards new scientific areas that can be addressed with this novel equipment, taking into account the improved resolution, reduced thermal drift, novel electron detectors, and larger pole-piece gaps, due directly or indirectly to the advent of aberration correction. The parameter space for operation has become much more complex, so operators need to carefully plan experiments to find the best way to extract meaningful data. In particular, the high voltage should be optimized to minimize radiation damage. Better resolution may involve higher electron doses but imply more beam damage. Increased stability allows fast experiments with highly focused electron probes. More sensitive detectors can be used to test new data acquisition schemes as well as to reduce the electron dose. Consideration must be given as to whether the fascinating *in-situ* studies of the kinetics of atomic growth mechanisms now possible will allow meaningful inference to be drawn on thermodynamic properties representative of the bulk. *In-operando* studies of specimens in their engineered application environment (i.e. in gaseous or liquid atmosphere, under electrical bias, strain, illumination, etc.) can be conducted at nano-scale resolution.

This Focus Issue will include imaging, spectroscopy, and diffraction based (S)TEM applications to materials science problems with planar or focused illumination.

Contributed articles are particularly sought in the following areas:

- Resolution vs. quantification issues in quantitative high-resolution imaging
- Quantitative spectroscopy for local measurements of chemistry or electronic properties
- Limitations due to radiation damage
- Comparing studies by planar and focused illumination: evaluating dose vs. dose rate effects
- Applications of chromatic aberration correction, monochromation, and low energy studies
- Applications of improved electron detectors and novel acquisition schemes
- *In-situ* strain measurements and *in-operando* catalysis studies

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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 **August 1, 2016.** Manuscripts submitted after this deadline will not be considered for the issue due to time constraints on the review process. **Submission instructions may be found at www.mrs.org/jmr-instructions.** Please select "Focus issue: *Aberration Corrected Transmission Electron Microscopy"* as the manuscript type. **Note our manuscript submission minimum length of 6000 words.** 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.

MATERIALS RESEARCH SOCIETY®

About the Materials Research Society

The Materials Research Society (MRS®) is a not-for-profit scientific association founded in 1973 to promote interdisciplinary goal-oriented basic research on materials of technological importance. Membership in the Society includes over 16,000 scientists from industrial, government, and university research laboratories in the United States and abroad.

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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MRS is an Affiliated Society of the American Institute of Physics and participates in the international arena of materials research through associations with professional organizations.

For further information on the Society's activities, contact MRS Headquarters, 506 Keystone Drive, Warrendale, PA 15086-7573; telephone (724) 779-3003; fax (724) 779-8313.

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