

Submission Deadline—September 15, 2014



Radiation Damage and Effects Characterization: State of the Art, Challenges, and Protocols

To enable the development and optimization of advanced materials for in-reactor use in advanced nuclear fission and fusion reactors, and to be able to develop predictive models of irradiation-induced microstructure evolution in these materials, it is essential to understand the mechanisms of radiation damage formation, accumulation, and evolution in these materials. Characterization of radiation damage and effects can be difficult for a variety of reasons associated with the available techniques and/or the materials of interest.

Due to the dynamic nature of irradiation-induced phenomena, the development of *in situ* characterization techniques is necessary to provide a more accurate depiction of radiation damage evolution under irradiation. Three-dimensional tomography and atomic-scale characterization are needed to better characterize radiation damage structures and interface processes. Whether because of the radioactivity induced in neutron irradiated samples or the short depth of penetration of ion irradiation, characterization of radiation damage and effects must be done in small volumes, which calls for the development of small-scale testing of irradiated materials. This Focus Issue is dedicated to the most recent advances in the characterization of radiation damage and effects in nuclear materials (fuels, structural materials, waste forms, and diagnostics/sensors materials).

Contributed articles are sought on the characterization of:

- ◆ Radiation damage formation and evolution (e.g., cluster, loop, dislocation)
- ◆ Changes in microstructure such as bubble and void formation
- ◆ Micro and nanochemistry of irradiation-induced phenomena (e.g., radiation-induced segregation, GB enrichment/depletion, solute segregation at loops)
- ◆ Phase transformations under irradiation
- ◆ Mechanical property changes due to irradiation

Using techniques including (but not restricted to):

- ◆ TEM, *in situ* TEM, TEM tomography of radiation damage
- ◆ Atom probe tomography
- ◆ Synchrotron radiation characterization, *in situ* synchrotron techniques
- ◆ Small scale testing of irradiated materials

Also welcome are papers on multi-scale modeling of radiation damage which can provide a better understanding of damage formation and evolution under irradiation, especially when coupled with characterization experiments.

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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 September 15, 2014. 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: Radiation damage and effects characterization: state of the art, challenges, and protocols" 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*.

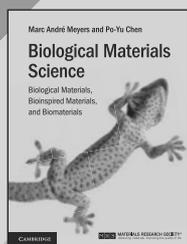
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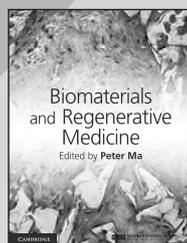
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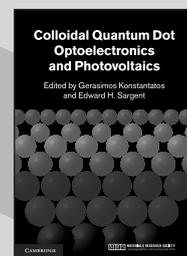
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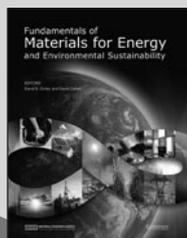
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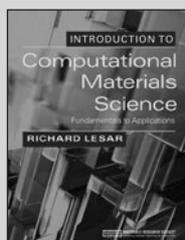
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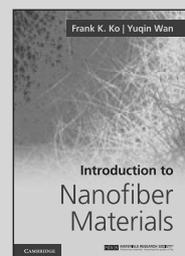
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