

# Special Issue

## Radiation Damage in Materials: Coupled Extreme Environments

### Message from the Guest Editors

Understanding radiation damage effects in materials used in complex real-world extreme environments has been an ongoing challenge for several decades. The complexity stems from not only the fundamental particle–solid interactions and the subsequent damage recovery dynamics after collision cascades, which involve a large range of both spatial and temporal length scales, but also the transmuted impurities that are unavoidable from accompanying nuclear processes (e.g., helium incorporation) and their interactions with both intrinsic and extrinsic defects through damage recovery and defect evolution processes. Adding to the complexity is the co-existence of other extreme environments (thermal, mechanical, chemical, etc.) that materials often face in addition to radiation and their synergistic effects on material performance. Whether it be in space applications or terrestrial nuclear power, the overlapping stressors created by these coupled extreme environments can result in deleterious and often unexpected failures. **Keywords**

- extreme environments
- radiation effects
- high temperature
- corrosion
- mechanical
- ion irradiation

---

### Guest Editors

Dr. Yongqiang Wang

Materials Science & Technology Division, Los Alamos National Laboratory, Los Alamos, NM 87544, USA

Dr. Khalid Hattar

Center for Integrated Nanotechnologies, Sandia National Laboratories, Albuquerque, NM 87185, USA



# Materials

---

an Open Access Journal  
by MDPI

---

Impact Factor 3.2

CiteScore 6.4

Indexed in PubMed



[mdpi.com/si/77143](http://mdpi.com/si/77143)

*Materials*  
Editorial Office  
MDPI, Grosspeteranlage 5  
4052 Basel, Switzerland  
Tel: +41 61 683 77 34  
materials@mdpi.com

[mdpi.com/journal/  
materials](http://mdpi.com/journal/materials)



---

### Deadline for manuscript submissions

closed (10 October 2022)



# Materials

an Open Access Journal  
by MDPI

Impact Factor 3.2  
CiteScore 6.4  
Indexed in PubMed



[mdpi.com/journal/  
materials](http://mdpi.com/journal/materials)

## About the Journal

### Message from the Editor-in-Chief

*Materials* (ISSN 1996-1944) was launched in 2008. The journal covers twenty-five comprehensive topics: biomaterials, energy materials, advanced composites, advanced materials characterization, porous materials, manufacturing processes and systems, advanced nanomaterials and nanotechnology, smart materials, thin films and interfaces, catalytic materials, carbon materials, materials chemistry, materials physics, optics and photonics, corrosion, construction and building materials, materials simulation and design, electronic materials, advanced and functional ceramics and glasses, metals and alloys, soft matter, polymeric materials, quantum materials, mechanics of materials, green materials, general. *Materials* provides a unique opportunity to contribute high quality articles and to take advantage of its large readership.

---

### Editor-in-Chief

Prof. Dr. Maryam Tabrizian

1. Department of Biomedical Engineering, Faculty of Medicine and Health Sciences, McGill University, Montreal, QC H3A 2B6, Canada
2. Faculty of Dentistry and Oral Health Sciences, McGill University, 3640 Rue University, Montreal, QC H3A 0C7, Canada

---

### Author Benefits

#### Open Access:

free for readers, with article processing charges (APC) paid by authors or their institutions.

#### High Visibility:

indexed within Scopus, SCIE (Web of Science), PubMed, PMC, Ei Compendex, CaPlus / SciFinder, Inspec, Astrophysics Data System, and other databases.

#### Journal Rank:

JCR - Q2 (Metallurgy and Metallurgical Engineering) /  
CiteScore - Q1 (Condensed Matter Physics)

