Special Issue

Tackling Materials Failure: Scale Bridging for Structural Integrity

Message from the Guest Editors

As the Second Law of Thermodynamics suggests, failure is an intrinsic characteristic of any materials system. Given its prevalence, one would assume that assessing a materials system's capability to endure is relatively straightforward; however, this is not the case. The proverbial *butterfly effect* is an appropriate moniker for failure as delicate and pernicious events rooted in the lower-length scales can evolve almost unpredictably to severely compromise the structural integrity of a materials system. For example, in metallic systems, seemingly innocuous dislocations at the atomic scale can evolve into life-limiting cracks in a myriad of ways. Some dislocations might nucleate microcracks whose stress intensities are amplified by micron-sized voids, thereby facilitating ductile crack propagation. Others might initiate microcracks that evolve synergistically with oxidation, creep, and/or fatigue loading. In organic materials systems, physiological processes, such as the up-regulation of proteins (e.g., in cell membrane repair), can act to strengthen or even heal the system, making the question of failure both stochastic and highly non-linear.

Guest Editors

Prof. Dr. Aida Nonn

Faculty of Mechanical Engineering, OTH Regensburg, Galgenbergstr. 30, 93053 Regensburg, Germany

Dr. Albert Cerrone

Department of Civil & Environmental Engineering and Earth Sciences, University of Notre Dame, Notre Dame, IN 46556, USA

Deadline for manuscript submissions

closed (20 June 2023)

Materials

an Open Access Journal by MDPI

Impact Factor 3.2
CiteScore 6.4
Indexed in PubMed

mdpi.com/si/143138

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

mdpi.com/journal/materials

Materials

an Open Access Journal by MDPI

Impact Factor 3.2
CiteScore 6.4
Indexed in PubMed

mdpi.com/journal/materials

MDPI

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)