Special Issue

Nanoscale Tribophysics and Electromechanical Coupling in Functional Materials

Message from the Guest Editor

In recent years, nanoscale tribophysical and tribomechanical studies have increasingly adopted a multiphysical approach to mechanically manipulate material multifunctionality, integrating friction analysis with the emerging electrical and electrochemical properties of materials. Advanced techniques such as atomic force microscopy (AFM) have demonstrated that mechanical contact at the single-asperity level not only generates frictional forces but also activates phenomena such as triboelectricity, piezoresistivity, flexoelectricity, the switching of ferroelectric polarization, phase transitions, the mechanical gating of ferroelectric field-effect transistors, force-induced photovoltaic effects in centrosymmetric crystals, and the mechanical control of charged defects in complex materials. These effects are particularly relevant in multifunctional materials where the coupling between mechanical stress and electrical response can be engineered. This Special Issue aims to present the latest experimental and theoretical advancements in the field of tribomechanics and electromechanical coupling at the nanoscale.

Guest Editor

Dr. Andrea Gerbi
CNR-SPIN Institute for Superconductors, Innovative Materials and Devices, Corso F. M. Perrone 24, 16152 Genova, Italy

Deadline for manuscript submissions

27 January 2026

Nanomaterials

an Open Access Journal by MDPI

Impact Factor 4.3
CiteScore 9.2
Indexed in PubMed

mdpi.com/si/246204

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

mdpi.com/journal/nanomaterials

MDPI

Nanomaterials

an Open Access Journal by MDPI

Impact Factor 4.3
CiteScore 9.2
Indexed in PubMed

mdpi.com/journal/nanomaterials

MDPI

About the Journal

Message from the Editor-in-Chief

Nanoscience and nanotechnology are exciting fields of research and development, with wide applications to electronic, optical, and magnetic devices, biology, medicine, energy, and defense. At the heart of these fields are the synthesis, characterization, modeling, and applications of new materials with lower nanometer-scale dimensions, which we call “nanomaterials”. These materials can exhibit unusual mesoscopic properties and include nanoparticles, coatings and thin films, metal–organic frameworks, membranes, nano-alloys, quantum dots, self-assemblies, 2D materials such as graphene, and nanotubes. Our journal, *Nanomaterials*, has the goal of publishing the highest quality papers on all aspects of nanomaterial science to an interdisciplinary scientific audience. All of our articles are published with rigorous refereeing and open access.

Editor-in-Chief

Prof. Dr. Eugenia Valsami-Jones
School of Geography, Earth and Environmental Science, University of Birmingham, Birmingham B15 2TT, UK

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, CAPlus / SciFinder, Inspec, and other databases.

Journal Rank:

JCR - Q2 (Physics, Applied) / CiteScore - Q1 (General Chemical Engineering)