Special Issue

Bridging Scales: From Metals and Alloys to 2D Materials in Tribology and Corrosion

Message from the Guest Editors

The performance and longevity of engineering materials are fundamentally governed by their resistance to degradation in demanding environments. This Special Issue, "Bridging Scales: From Metals and Alloys to 2D Materials in Tribology and Corrosion", aims to explore the intricate interplay between mechanical wear (tribology) and chemical/electrochemical attack (corrosion), with a specific focus on the role of hydrogen and the emergence of novel 2D materials. Metals and alloys—the workhorses of industry—are persistently challenged by synergistic degradation mechanisms. Processes such as corrosion, stress corrosion cracking (SCC), wear, and hydrogen embrittlement are major causes of catastrophic failure. In recent years, two-dimensional (2D materials) like graphene, MXenes, and h-BN have emerged as revolutionary materials for surface engineering. Their exceptional properties offer unprecedented opportunities for developing next-generation protective coatings, lubricants, and corrosion inhibitors. This Special Issue seeks to bridge the traditional knowledge of metallurgy with the novel capabilities of 2D materials to address these multifaceted challenges.

Guest Editors

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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.

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