Special Issue

Laser-Assisted Surface Modification to Enhance Tribological Performance Under Extreme Conditions

Message from the Guest Editors

Surface engineering plays a pivotal role in addressing the escalating demands for materials capable of withstanding extreme operational environments, such as high mechanical loads, elevated temperatures, corrosive media, and abrasive wear. Laser-assisted surface modification (LASM) has emerged as a transformative technology, enabling precise control over surface topography, microstructure, and chemistry to tailor friction, wear resistance, and lubrication properties. This Special Issue focuses on advancing LASM techniques—including laser texturing, cladding, shock peening, and hybrid processes—to optimize tribological performance in applications ranging from aerospace and nuclear energy to biomedical implants and renewable energy systems. [...] We invite contributions exploring novel LASM methodologies, multi-scale characterization of modified surfaces, and computational modeling to bridge the gap between process parameters and tribological outcomes. Submissions addressing challenges in tribological adaptability linked to extreme conditions are particularly encouraged.

Guest Editors

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Deadline for manuscript submissions

31 December 2025

Lubricants

an Open Access Journal by MDPI

Impact Factor 2.9
CiteScore 4.5

mdpi.com/si/240227

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Message from the Editor-in-Chief

Friction, wear, and lubrication are tribological phenomena that govern the behavior of interacting surfaces in a wide range of machine components. Understanding the physical and chemical nature of these phenomena is critical to achieving long component lifetime and economical operation. Research in the field of tribology is highly interdisciplinary, and encompasses the fields of physics, chemistry, engineering, and mathematical modeling. *Lubricants* invites contributions on new advances in all areas of tribology for publication as peer-reviewed research articles, reviews of current research, letters, and communications. We are committed to providing timely reviews of all articles submitted. Please consider sharing your work with the scientific community through publication in *Lubricants.*

Editor-in-Chief

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