Special Issue

Fatigue and Fracture Mechanisms of Advanced Metallic Materials

Message from the Guest Editors

With the rapid development of additive manufacturing, welding technologies, and novel structural alloys, new opportunities and challenges have emerged in understanding their fatigue and fracture behavior. Moreover, the increasing demand for lightweight, high-strength, and durable materials in aerospace, transportation, and energy applications requires systematic studies that integrate both fundamental mechanisms and practical engineering solutions. This Special Issue welcomes contributions addressing the processing–structure–property–performance relationships in advanced metallic materials under cyclic loading. Topics of interest include, but are not limited to, the following:

- Fatigue and fracture mechanisms in additively manufactured and welded metallic structures.
- In situ and advanced testing methodologies for characterizing fatigue crack initiation and growth.
- The role of extreme environments (temperature, corrosive media, radiation, etc.) on fatigue resistance.
- Application of machine learning and data-driven approaches in fatigue life prediction and damage assessment.
- Microstructural design concepts for fatigue performance enhancement.

Guest Editors

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About the Journal

Message from the Editor-in-Chief

Metallic materials play a vital role in the economic life of modern societies; contributions are sought on fresh developments that enhance our understanding of the fundamental aspects related to the relationships between processing, properties and microstructure – disciplines in the metallurgical field ranging from processing, mechanical behavior, phase transitions and microstructural evolution, nanostructures, as well as unique metallic properties – inspire general and scholarly interest among the scientific community.

Editor-in-Chief

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