

Special Issue

Advances in Thermo-Based Fatigue Research of Metals and Alloys

Message from the Guest Editor

Comprehending fatigue damage mechanisms and offering accurate methods for predicting fatigue life are paramount for the advancement of modern industry. In essence, fatigue is the evolutionary process of material microstructure towards degradation, which is an irreversible thermodynamic process accompanied by energy dissipation. Most of the dissipated energy is converted into heat, leading to temperature variations in the material experiencing fatigue over time and space. Analyzing such a self-heating phenomenon and establishing its correlation with the fatigue damage process represents a highly promising avenue of research, providing profound insights into fatigue mechanisms and expediting the assessment of fatigue resistance. In this Special Issue, we invite contributions that delve into fatigue failure utilizing thermo-based methodologies, encompassing theory, experiments, and numerical simulations of metals and alloys. Additionally, we extend a warm welcome to articles employing thermodynamic approaches to analyze fatigue-related issues of metals and alloys, including lifespan predictions based on energy methods, among others.

Guest Editor

Dr. Qiang Guo

Department of Mechanical and Aerospace Engineering, University of California, San Diego, La Jolla, CA 92093, USA

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Editorial Office

MDPI, Grosspeteranlage 5

4052 Basel, Switzerland

Tel: +41 61 683 77 34

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About the Journal

Message from the Editorial Board

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.

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Department of Materials Science and Engineering, College of Engineering & Applied Science, University of Wisconsin-Milwaukee, 3200 N. Cramer Street, Milwaukee, WI 53211, USA

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