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Metal Plasticity and Fatigue at High Temperature

Guest Editors:

Prof. Dr. Luciano Moro
Politechnic Department of Engineering and Architecture (DPIA), University of Udine, 33100 Udine, Italy

Dr. Jelena Srnec Novak
Faculty of Engineering & Centre for Micro- and Nanosciences and Technologies, University of Rijeka, Vukovarska 58, 51000 Rijeka, Croatia

Prof. Dr. Denis Benasciutti
Polytechnic Department of Engineering and Architecture (DPIA), University of Udine, via delle Scienze 206, 33100 Udine, Italy

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Message from the Guest Editors

The presence of high temperatures usually induces some material plasticity in the most stressed region of the system, which, combined with cyclic loading variation, may lead to low-cycle fatigue failure. In order to estimate the component fatigue life in such demanding operative conditions, a complete characterization of the high-temperature material behavior under cyclic loading should be performed. Moreover, a reliable structural durability approach, which includes experimental results in numerical and/or predictive models, needs to be developed as well. The choice of the most appropriate material model to be used in simulations, or even calibrating the model to experimental data, often represents the most critical step in the whole design approach. Experimental techniques and modeling have to be properly managed to guarantee the reliability of the estimated fatigue life.

The purpose of this Special Issue is to collect papers aimed at providing state-of-the-art knowledge on the topic of metal plasticity and the fatigue strength of metals operating at high temperatures, with an emphasis on both experimental characterization and the numerical modeling of material behavior.

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Editors-in-Chief

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

Prof. Dr. Yong Zhang
Beijing Advanced Innovation Center of Materials Genome Engineering, State Key Laboratory for Advanced Metals and Materials, University of Science and Technology Beijing, 30 Xueyuan Road, Beijing 100083, China

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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Contact Us

Metals Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland

Tel: +41 61 683 77 34
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