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Trends in Plasticity of Metals and Alloys

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Message from the Guest Editors

The last few decades have seen a considerable progress in the development of high performance metals and alloys that have microstructures and plastic behaviors with a high level of complexity. Ultrafine-grain materials, high-entropy alloys, and metallic glasses have been the focus of research and are gaining a place in the industry. Concurrently, the collective, heterogeneous, and self-organized nature of plastic deformation, manifesting itself on mesoscopic scales, has been generally recognized. Such progress demanded the development of advanced multiscale modeling frameworks (Ab-Initio, molecular dynamics, discrete dislocation dynamics, strain gradient models, etc.), experimental characterization tools (in-situ TEM, DIC, nanoindentation, micropillar testing, etc.) and analyses of the observed and simulated complex spatiotemporal behaviors, which aim at establishing process–microstructure–property links and bridging gaps from the elementary atomic-scale mechanism, up to the laboratory sample dimension. This Special Issue aims at synthetizing recent progress and trends in the area of plasticity of metals and alloys.

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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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