Special Issue

Grain Size and Additive Technologies Effects on Mechanical Properties of Alloys

Message from the Guest Editor

Nano- and sub-microcrystalline states in structural materials open up unique opportunities for obtaining a new level of mechanical properties: super-strength at a sufficiently high level of plasticity, hardness, low-temperature and high-speed superplasticity, low- and multi-cycle fatigue, and wear resistance. Currently, such materials are widely used in the field of operating temperatures for parts of aviation and space equipment, the chemical industry, engineering equipment, medical implants, etc. The most promising methods for creating bulk sub-microcrystalline materials are severe plastic deformation methods such as equal-channel angular pressing (ECAP), torsion under high pressure, comprehensive pressing, as well as methods that combine SPD with various heat treatment modes. The sub-microcrystalline structure of metals formed by such methods, are characterized by the presence of a large number of microdefects. The prospect of using sub-microcrystalline materials with such an internal structure as structural materials establishes the importance of comprehensively studying the laws of their deformation behavior in a wide range of strain rates.

Guest Editor

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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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