



metals



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Dislocation Mechanics of Metal Plasticity and Fracturing

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Message from the Guest Editor

Dear Colleagues,

The modern understanding of metal plasticity and fracturing began in the 1920s with the pioneering work, first, on crack-induced fracturing and, secondly, on dislocation-enhanced crystal plasticity. Modern counterparts of this work are fracture mechanics as invented by Irwin and dislocation mechanics initiated in large part. No less important was the breakthrough development of optical characterization of sectioned polycrystalline metal microstructures begun in the late 19th century. A major current effort is to match computational simulations of metal deformation/fracturing behaviors with experimental measurements made over extended ranges of metal microstructures and over varying external conditions of stress-state, temperature, and loading rate. The relationship between such simulations and the development of constitutive equations for a hoped-for predictive description of material deformation/fracturing behaviors is an active topic of research. The purpose of this SI is to offer a publication venue for current reports on the two subjects of understanding metal failures and understanding corresponding deformation strengths relating to metal processing.



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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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