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Microstructure-Informed Numerical Simulations to Predict the Performance of Materials

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Message from the Guest Editors

Dear Colleagues,

The microstructure plays a very important role in determining the performance of materials. The interplay between the performance and the microstructure is of great interest, since it offers the ability to tailor materials for desired properties. Numerical simulations as alternate effective tools for experiments are capable of bridging the microstructure at different spatial and temporal scales to the performance of materials, with the benefits of low-cost and efficiency. This Special Issue is, thus, aimed at presenting various numerical modeling techniques, including, but not limited to, the first-principle, molecular dynamics, Monte Carlo, cluster dynamics, dislocation dynamics, phase-field, finite element, and machine learning methods, for linking the microstructure at all scales to the properties of metallic materials, including, but not limited to, the fracture toughness, strength, hardness, brittleness, ductility, fatigue, thermal conductivity, thermal stability, corrosion resistance, electrical conductivity, magnetic coercivity, and magnetic hysteresis.

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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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