



Structural Phenomena in Metallic Materials for Demanding Applications

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Message from the Guest Editor

The ever-increasing requirements of industry and commerce on the performance and longevity of components produced from metallic materials have encouraged the research and development of innovative engineering materials based on iron/steel and nonferrous metals, as well as metal-based composites. The properties of modern materials and alloys ensue from their structures. Structural phenomena, such as substructure development, volumes and types of grains boundaries, twinning, texture formation, as well as the possible occurrence of residual stress and mutual diffusion of the individual phases, non-negligibly affecting the performance of metallic components, can primarily be affected by their chemical and phase composition, and the applied preparation/production technology.

At the beginning of the production process, the material is affected by the manufacturing method. The selected parameters of casting, additive manufacturing, or powder metallurgy processing all influence the structures and properties of the final material. Among the favorable ways to effectively enhance the properties of metallic materials is also grain refinement [...]





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