

Special Issue

Phase Transitions and Heat Treatment of Steels

Message from the Guest Editor

Steels are the most widely used metallic materials by human beings currently. The commercially available steels possess a very wide range of mechanical properties (e.g., the ultimate tensile strength ranges from 100 to 5500 MPa) arising from their microstructure complexity. The key reason why there are various microstructures in the steel is phase transformation can occur during heat or thermo-mechanical treatments, which is the only metal to play with carbon in diverse phases. The transformation can occur either by breaking all the bonds and rearranging the atoms into an alternative pattern (reconstructive transformation) or by homogeneously deforming the original pattern into a new crystal structure, i.e., displacive or shear transformation. Many essential properties of steels depend on the atomic mechanism of phase change. The Special Issue focuses on the phase transformation and novel heat treatment process design of steels, especially those related to the mechanical properties. Warmly welcome contributions from researchers all over the world. I hope this work will deepen our understanding and promote the progress of the subject.

Guest Editor

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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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