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Reversed Transformation in Iron-Based Alloys

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Deadline for manuscript submissions:
closed (30 September 2021)

Message from the Guest Editors

Reversed transformation from product phase (BCC, BCT, or HCP) to austenite has also been regarded as a critical reaction to optimize mechanical properties of iron-based alloys.

Austenite reversion, which can occur via diffusional transformation or displacive transformation, is applied to control mechanical properties in DP/CP steel, medium/high-Mn steel, Q&P steel, and hot-stamp steel. The size and chemical composition of reversed austenite will determine the stability and plastic mechanisms of retained austenite. Shape memory effect (SME) or super elasticity (SE) occur via HCP-to-FCC displacive transformation in iron-based shape memory alloy (Fe-SMA). A superelastic strain of more than 13% is achieved by BCT-to-FCC transformation. As well as coupling-reversed transformation with various metallurgical principles such as precipitation, dislocation engineering, or recrystallization. The aim of this Special Issue is to collect recent research in reversed transformation in iron-based alloys, including phase transformation, mechanical behavior, materials design, modelling and simulation, characterizations, and future challenges.

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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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Journal Rank: JCR - Q2 (*Metallurgy and Metallurgical Engineering*) / CiteScore - Q1 (Metals and Alloys)

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