Special Issue

State-of-the-Art of Inclusion/Precipitate Engineering in Steels

Message from the Guest Editor

Non-metallic inclusions and precipitate behaviors in liquid- and solid-state steels and alloys significantly influence the materials' cleanliness and mechanical and corrosion properties. Two terminologies regarding the control of non-metallic inclusion behaviors exist: “Clean Steel Technology” and “Oxide Metallurgy”. Recently, the boundary of these two concepts started to overlap, and it is better to use one concept, i.e., “Inclusion/Precipitate Engineering”, to describe the correlation of processing, structure, and property regarding the particle behaviors in metallic materials. The control of inclusions in state-of-the-art processes, e.g., additive manufacturing, is also included in this concept. Finally, machine learning-based methods start to be applied to classify inclusion types and analyze the statistical features.

This Special Issue aims to collate state-of-the-art work focusing on the ’inclusion/precipitate engineering in steels’; both advanced experimental characterization and multiscale simulation research are welcome.

- non-metallic inclusion
- steels
- precipitate
- characterization
- simulation
- artificial intelligence

Guest Editor

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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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