

Thermo-Mechanical Processing and Additive Manufacturing of Steels

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1. Introduction and Scope

In recent decades, some new classes of metallic and composition materials have been developed, which all possess a unique combination of the strength, ductility, corrosion resistance, high-temperature properties, etc. Despite this fact, steels remain among the most important constructional materials. The new trend in steel manufacturing is based on the ongoing demands for reducing energy consumption and saving high-cost elements during the industrial production of the different complex components. Novel processing technologies, such as additive manufacturing and thermo-mechanical processing of steels, or modification of the steel compositions aim to reach the desired “composition/processing/properties” trade-off.

The aim of this Special Issue is to cover a broad scope of contributions on the microstructural/properties characterization of the steels fabricated by additive manufacturing methods and/or thermo-mechanical processing techniques.

2. Contributions

The contributions in the Special Issue cover a wide range of research topics on advanced material characterization of additively manufactured austenitic Cr-Ni steels [1,2] and Steel/Copper bimetal [3] and microstructural design of the ferritic [4] and austenitic steels [5,6], and Fe-based high-entropy alloy [7] by the different thermal-mechanical treatments.

3. Conclusions and Outlook

The contributions open the perspective for steel microstructure manipulation and design using manufacturing methods and thermo-mechanical processing, as well as advanced material forecast to establish the best “composition/processing/properties” combinations for different applications.

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