Special Issue

Phase Transformations and Structure/Property Relationship in Duplex Austenitic-Ferritic Stainless Steels

Message from the Guest Editor

It is well known that thermal aging and/or thermomechanical treatments of austenitic–ferritic (□/□) duplex steels lead to more than a dozen secondary phases (carbides, nitrides, Frank–Kasper phases (□, □, R), π, □ and Laves phases) essentially taking place inside the □-ferrite grains and/or at the □/□ interfaces. The latter phases, play an important role in the control of the microstructure and, consequently, in-service properties (mechanical, corrosion, etc.) of these materials. Topics addressed in this Special Issue may include but are not limited to: Microstructure: Thermal aging, thermodynamic and kinetic calculation; Precipitation: Carbides, Nitrides, Secondary phases (□, □, R, π, □, Laves phases); Mechanical properties: plasticity, constitutive law, fatigue, etc.; Characterization Techniques: EBSD, SKPFM, TEM, atom probe tomography, mechanical and crystallographic phase mapping, etc.; Corrosion: Stress corrosion, pitting corrosion, etc.; Surface treatments: Nitriding, plasma immersion ion implantation, etc.; Powder metallurgy: SPS (spark plasma sintering), cold spray, etc.

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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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