Special Issue

Microstructure and Performances of Superalloys

Message from the Guest Editor

Ni-based superalloys are key materials in aerospace and energy sectors due to their high-temperature strength, creep resistance, and corrosion resistance. They are essential for components like aero-engine turbine blades and nuclear reactor parts. Traditional processes like casting face precision and uniformity limitations, while advanced techniques such as precision casting, additive manufacturing, and powder metallurgy enable flexible fabrication of complex parts and improved material consistency. Precise control of microstructures—γ′ phase size, distribution, and grain boundary phases—directly determines service life and reliability in harsh conditions. This Special Issue invites submissions on: 1. development of advanced forming processes; 2. mechanisms of microstructure control; 3. optimization of comprehensive properties; and 4. process–microstructure–property correlation models. We welcome innovative research featuring "low energy consumption, low cost, and high performance," and technological breakthroughs for specific applications. This initiative aims to facilitate academic exchange, accelerate technology translation, and boost innovation in Ni-based superalloys.

Guest Editor

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Message from the Editor-in-Chief

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.

Editor-in-Chief

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