Special Issue

Advances in Superalloys and High Temperature Intermetallics

Message from the Guest Editors

Superalloys are a group of nickel, iron–nickel, and cobalt alloys used in jet engines and industrial gas turbines. These alloys have excellent heat-resistant properties and microstructural stability at elevated temperatures. Nickel-based superalloys can operate for long periods of time at temperatures up to 1000 °C, which makes them suitable for the hottest sections of gas turbine engines. Superalloys are used in gas turbine components, such as high-pressure turbine blades, discs, combustion chamber, afterburners, and thrust reversers. In aircraft manufacturing, lightweight materials have always been of great importance. Intermetallic material is a game-changing material. More recently, additive manufacturing (AM) has been attracting industrial attention. AM is being used to fabricate end-use products in aircraft engines, industrial gas turbines, and automobiles. However, despite the vast accumulated research and development results, research challenges remain, e.g., manufacturing process optimization, further improvement of material properties, reducing the scrap or further enhancing the environmental friendliness for gas turbine applications.

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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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