

Special Issue

Advances in Research on Single-Crystal Superalloys

Message from the Guest Editors

Superalloys are high-performance metals designed for operation at >70% of their melting point. Based on nickel, cobalt, or iron, they offer exceptional mechanical strength, creep resistance, and oxidation resistance, making them essential for jet engines, marine turbines, and nuclear reactors. Their unique properties derive from complex microstructures via advanced manufacturing. Traditionally, investment casting produces single-crystalline (SX) products, eliminating grain boundaries to boost creep resistance for turbine blades. Yet, additive manufacturing (AM) like laser powder bed fusion (L-PBF) and electron beam melting (EBM) now enables complex geometries and internal cooling channels unattainable by casting. Nonetheless, challenges remain, including hot cracking and necessary post-processing heat treatments to stabilize the γ -phase. Current research focuses on optimizing composition and manufacturing parameters.

Considering different development directions and requirements for single-crystalline superalloys, you are welcome to present your research results in the Special Issue of *Crystals* entitled "Advances in Research on Single-Crystal Superalloys".

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About the Journal

Message from the Editor-in-Chief

Welcome to *Crystals*, the journal dedicated to the fascinating world of crystallographic research! Crystals are more than mere decorative elements; they hold the key to understanding the fundamental structure of matter. Our mission is to explore the crucial significance of this research across various fields. From medicine to technology, chemistry to geology, crystals play a vital role. Their structure provides insights into new advanced materials, innovative drugs, and groundbreaking technologies. Through *Crystals*, we delve into the microscopic world to discover solutions that will shape the future. Join us on a journey through the crystal, where science merges with beauty and innovation.

Editor-in-Chief

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