Crystals

an Open Access Journal by MDPI

CiteScore: 5.0
Impact Factor: 2.4

Special Issue Reprint

Microstructure and Mechanical Behaviour of Structural Materials

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Metallic materials have long been integral to structural applications, spanning from advanced aerospace and automotive industries to common household items. The performance of these materials is inherently linked to their microstructure, which governs their mechanical properties. Understanding the microstructure–property relationship is therefore essential for optimizing the performance and reliability of structural components across diverse applications. This Special Issue features cutting-edge research articles, including full-length papers, and comprehensive reviews, that focus on the microstructural characterization, mechanical property evaluation, and deformation behavior of commercial and advanced structural materials. We aim to provide a platform for novel insights and innovative approaches in the following areas:

- Microstructure evolution during processing and its influence on mechanical properties;
- Multiscale characterization and simulations to understand mechanical behavior;
- The relationship between alloy composition, heat treatment, and resultant properties;
- Deformation mechanisms and failure analysis in metals and alloys;
- Applications of metallic materials in advanced structural designs.

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