Special Issue

Intermetallic Compounds and Their Composites Materials

Message from the Guest Editors

Owing to their long-range ordered crystal structures, intermetallic compounds uniquely integrate metallic and covalent bonding characteristics. This confers exceptional properties such as a superior strength-to-melting-point ratio, oxidation resistance, irradiation stability, and hydrogen–metal interaction performance—often an order of magnitude higher than those of conventional alloys. Intermetallic matrix composites (IMMCs) have emerged as next-generation strategic materials designed for "structure–function integration under extreme environments." By employing ordered intermetallic phases as a structural skeleton and diverse reinforcements as toughening and functional units, IMMCs simultaneously achieve high temperature capability, specific strength, irradiation resistance, hydrogen embrittlement immunity, and structural designability within a single material system. This Special Issue invites contributions that focus on advanced processing technologies, mechanical properties, microstructural characterization and mechanism analysis, first-principles calculations, as well as extreme-service environments and engineering applications of intermetallic compounds and their composites.

Guest Editors

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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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