Special Issue

Advanced High-Performance Aluminum Alloys: Modification, Microstructure and Mechanical Properties

Message from the Guest Editor

This Special Issue aims to compile cutting-edge research on strategic modification methods, microstructure evolution, and mechanics–property relationships in high-performance Al alloys. We focus explicitly on the following:

- **Modification:** Grain refinement, precipitation control, and hybrid reinforcement.
- **Microstructure:** Phase transformations, defect engineering, and interface dynamics.
- **Mechanical Properties:** Strength, toughness, creep, and fatigue behavior.

Original research and review articles are welcome. Key themes include (but are not limited to) the following:

- **Al Alloy Design:** Compositional innovations (e.g., Sc/Zr-modified, multi-principal element alloys).
- **Processing Techniques:** Additive manufacturing, severe plastic deformation, and thermo-mechanical treatments.
- **Microstructural Characterization:** Advanced microscopy (HRTEM, EBSD) and synchrotron/neutron analysis.
- **Property Optimization**: Corrosion–wear synergy, high-strain-rate behavior, and recyclability.
- **Modeling and Simulation:** Multiscale computational approaches linking processing and microstructure properties.

We look forward to receiving your contributions.

Guest Editor

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Message from the Editor-in-Chief

Materials (ISSN 1996-1944) was launched in 2008. The journal covers twenty-five comprehensive topics: biomaterials, energy materials, advanced composites, advanced materials characterization, porous materials, manufacturing processes and systems, advanced nanomaterials and nanotechnology, smart materials, thin films and interfaces, catalytic materials, carbon materials, materials chemistry, materials physics, optics and photonics, corrosion, construction and building materials, materials simulation and design, electronic materials, advanced and functional ceramics and glasses, metals and alloys, soft matter, polymeric materials, quantum materials, mechanics of materials, green materials, general. *Materials* provides a unique opportunity to contribute high quality articles and to take advantage of its large readership.

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