

## Preface

This special edition focuses on advanced alloy development and processing routes, considering the results of mechanical, thermophysical, and thermomechanical testing, as well as microstructural control and deformation characteristics. The contributions cover a broad spectrum of materials, including magnesium alloys, aluminium alloys, various high-entropy alloys, and superalloys. The examined treatment processes include hot forming, twin-roll casting, directional solidification, high-pressure die casting, powder metallurgy, spark plasma sintering, and additive manufacturing. Attention is also given to lamellar and ultra-fine-grained microstructures, two-phase extruded alloys, and extra-hardening mechanisms.

The edition highlights modern approaches to alloy design, properties analysis and processing technologies for high-performance structural applications.