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Solidification and Casting of Metals and Alloys

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Recent advances and developments in solidification have enabled the casting production of superalloys, aluminum, magnesium, titanium, and copper alloys with unique microstructures. And, recent developments in processing technology have also improved the productivity and reliability of some metal castings. These developments have all stemmed from a steadily improving understanding of the science of solidification metallurgy, as well as an appreciation of the microstructural control using advanced solidification processing. In addition, numerous works have investigated both experimental and analytical/computer modeling aimed at disclosing the fundamental aspects of metallurgical processes, phase formation, and growth within liquid melts, and the software developed was used to clarify the solidification process.

Accordingly, this Special Issue entitled “Solidification and Casting of Metals and Alloys” seeks to provide an overview of the latest developments in the various aspects of solidification metallurgy. Specifically, we aim to cover (a) metallurgical control of the composition and microstructure of metals or castings; (b) micro- and macrosegregation mechanisms, as well as the microstructural evolution of solidification microstructures; (c) multi-scale experiments and simulations for solidification using different calculated methods; (d) fundamental aspects such as nucleation, grain growth, and the development of the mushy zone; and (e) thermal and compositional effects on the development/avoidance of casting defects, etc.

