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Strengthening Mechanisms in Metallic Materials

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Deadline for manuscript submissions:
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Message from the Guest Editor

Dear Colleagues,

The mechanical properties originate from the alloy composition and processing history and through the microstructure development. Quite often, a successful processing technology was designed to utilize a particular strengthening mechanism: grain refinement, phase balance, precipitation or solid solution strengthening. This could be determined by particular product requirements, the available equipment, cost, or company tradition. However, new challenges for further property enhancement require a review of the capacity of strengthening mechanisms. Are the precipitates more effective than solute atoms? What is the most reasonable size of grains in a polycrystalline alloy? What state of dislocation structure is required and what criteria define this? How many phases of microstructure do we need? Will the multi-principle element alloys become the future of alloy chemistry? Will the rolling and forging disappear, and will casting, powder pressing and 3D printing dominate in the technology space? Research articles, communications or reviews on these questions are very welcome to this Special Issue, irrespective of alloy composition or processing technology.

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Message from the Editorial Board

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.

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