Special Issue

State of the Art: Ferrous Powder Metallurgy

Message from the Guest Editor

As you know, the driving force of any manufacturing process utilizing metal powders as the base material is the minimization of residual porosity to improve mechanical properties. Densification can be achieved via multiple strategies related to particle consolidation, sintering as well as post-sintering operations. On the other hand, approaches can also be devised to mitigate the detrimental effect of porosity on the mechanical properties of powder metallurgy (PM) components. Among these, we can identify the optimized combination and proportion of alloying elements or the use of heat treatments, for example. Ferrous materials constitute by far the most important alloy system in the PM industry. Owing to the near-net shape ability of powder-based manufacturing processes, PM ferrous components are increasingly replacing wrought steels in numerous applications. Nevertheless, to support the growth in the use of PM steel parts, it is essential to maximize their mechanical properties while maintaining production costs below those of more conventional fabrication processes.

Guest Editor

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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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