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Machining of Advanced Cutting Materials: Fundamentals, Modeling and Applications

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Message from the Guest Editor

Although advanced tool materials possess unique physical and mechanical properties such as high hardness, wear resistance, and heat resistance, their machinability is so low that it complicates manufacturing cutting tools and cutting inserts. At the same time, the development of new efficient technologies for machining cutting tools made of advanced materials is critically important due to the requirements around the accuracy and roughness of the tool surface being machined.

The most common tools are cutters and drills with the cutting edge of a complex shape. Typically, such tools are endowed with a helical groove, whose shape and machining technology are largely controlled by the hardness and strength of the tool material, which in turn strongly depends on its chemical composition, structure and grain size, with the latter being a critically important parameter controlling the tool curvature radius.

We invite contributions on the machining of complex surfaces, including visualization of the contact between the workpiece and the cutting edges, grinding, electroerosion, milling, and other processes involved in shaping and application of advanced cutting materials.

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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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