



Advances in New Multifunctional Hard Materials

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Message from the Guest Editors

Dear Colleagues,

Cemented carbides composed of WC and Co provide an excellent combination of hardness, fracture toughness and wear resistance. Nevertheless, the hard metal industry has become interested in the partial or total substitution of W and Co, not only due to economic factors—impinged by their use in Li-ion batteries in the automotive industry and their classification as CMRs (Critical Raw Materials)—but also health concerns (REACH-UE and NTP-US programs).

In recent years, there have been several publications about alternative metallic binders, such as Fe, Ni and HEAs (High-Entropy Alloys); alternative ceramic phases, such as titanium and tungsten borides, niobium carbide, titanium, vanadium, and tantalum carbonitrides; and HECs (High-Entropy Carbides). Recently, the additive manufacturing of hard metals, especially using the binder jetting technique, seems to be an alternative to traditional powder metallurgy. The good performance of these new materials depends on the tailoring of several factors, such as the starting powders, processing route, and microstructure, which lead to optimum mechanical properties for specific applications.





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Message from the Editor-in-Chief

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