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*Special Issue Reprint*

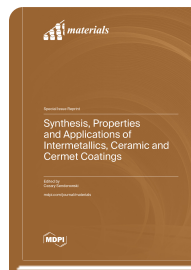
## **Synthesis, Properties and Applications of Intermetallics, Ceramic and Cermet Coatings**

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This Special Issue focuses on various synthesis methods of intermetallics, ceramics and composite materials in the form of both protective coatings and bulk materials. The coatings have been produced by D-gun, APS, arc and cold spraying of Fe-Al powders and by sintering of a mixture of Fe and Al powders with the addition of mullite and  $\text{Al}_2\text{O}_3$  ceramics, which reinforce the composite structure after insitu formation under conditions of the SHS process. Another composite crystal structure has been produced by magnetron sputtering and heat treatment of the  $\text{HfV}_2\text{-HfV}_2\text{O}_7$  coating with temperature-independent thermophysical properties as a material with anomalously increasing thermoelastic constants at negative thermal expansion of the  $\text{HfV}_2\text{O}_7$  oxide. A multifunctional porous anodic alumina (PAA) ceramic coating for photonic applications has been fabricated by the aluminium anodising process, revealing the effect of temperature on the quality of the distributed Bragg reflector (DBR) structure. Another direction is aluminides synthesized in the CVD process on nickel-based superalloys MAR 247 and Haynes 282 manufactured by direct metal laser sintering, which were subjected to structural, thermal stability, wear resistance and fatigue strength testing using the unconventional non-destructive, eddy current method.



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