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Post-Treatment by Pulsed High-Energy Fluxes

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**Unstructured Finite Element Modeling Thermally Sprayed Cermet Coatings
Post-Treatment by Pulsed High-Energy Fluxes**

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Abstract

Thermal spraying of cermet coatings made of composite powders which particles consist of ultrafine carbide inclusions in metal or metal alloy matrix gives wide opportunities of creation of coatings for extreme application conditions. However, the high content of carbide inclusions in the cermet particles is the reason of their low level deformation at impact with substrate or coating surface that results in porosity of plasma as-sprayed layer. Decrease in coating porosity at simultaneous increase of its bond strength with substrate is possible by means of subsequent pulsed high-energy treatment. The problem consists in binder melting at minimum impact on carbide inclusions and substrate. Because the experimental development of this technology is rather multivariate procedure, a preliminary computer optimization is very perspective. The computing experiments were carried out, which allowed to optimize power density in a single pulse and its duration depending on thickness and porosity of the deposited TiC-NiCr layers.

Key words: cermet powder, binder, ultrafine carbide inclusions, splat, thermally sprayed coating, porosity, pulsed high-energy treatment, finite-element modeling.

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