

PHYSICAL ANALOGY WITH SUPPRESSION OF POROSITY IN ELECTRIC SINTERING OF CERAMICS AS APPLIED TO ULTRA-FINED DIAMONDS OF METAL COATINGS OF TOOL ABRASIVES FOR ELECTRIC EROSION DIAMOND GRINDING

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During diamond-spark grinding (DSG), for example, when organizing the supply of current to the cutting zone according to the scheme [1], the flow of electric current in the volume of the metal coating of diamond grain is accompanied by an increase in density of electric field. Electric field tension E is around hollow nanoparticles of ultradispersed diamonds (UDD), which entail a violation of the homogeneity of the electric field and the occurrence of a temperature gradient ∇T due to a change in current density ($J_{e2} > J_{e1}$, Figure 1), and perceived similarly to pores in the technologies of electroconsolidation of ceramics under pressure. It is according to the method of spark-plasma sintering, with an increased probability of discharge attacks and suppression of of gas-filled cavities inside diamond nanoparticles, initiation of ozone, which realizes increased oxidative activity due to carbon capture, etc. [2].

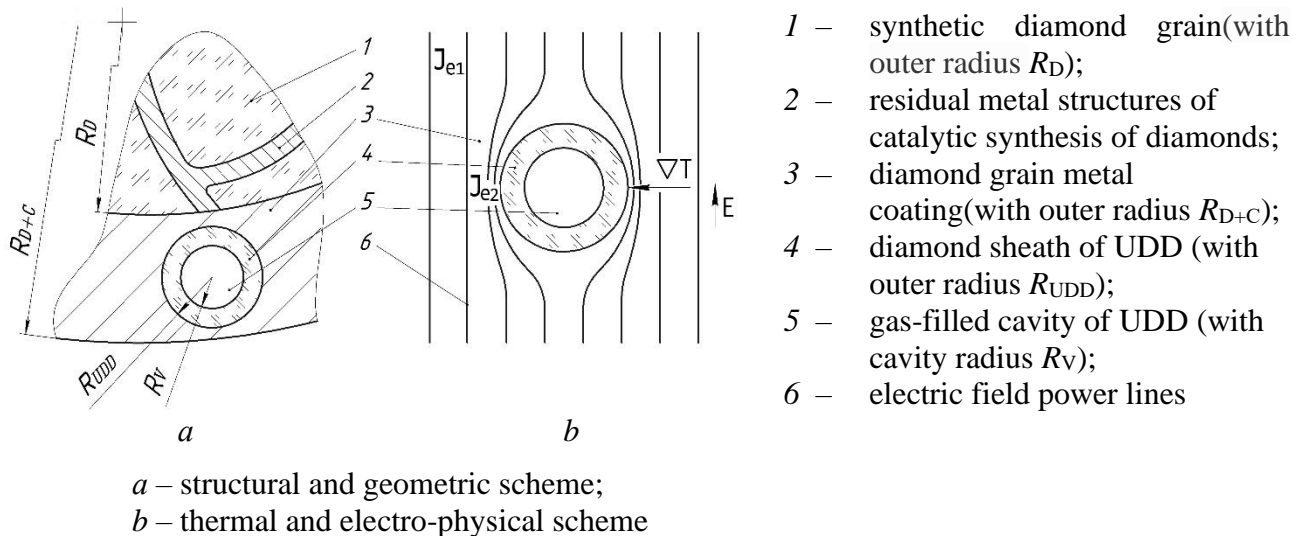


Fig. 1. UDD in metal coating of diamond grain of DSG tool

References:

1. Fadeev V. A. (1995) *Diamond grinding of hard metals with the introduction into the cutting zone of DC additional energy*: tesis for PhD degree. Kharkov State Polytechnic Univ., Kharkov, 273 ps. (in Russian).
2. Gevorkyan, E. S., and Yu. G. Gutsalenko (2010) Genesis expansion of tungsten semicarbide in tungsten ceramic tool composites of hot pressing with electrical consolidation of nanopowders based on monocarbide. *Bulletin of NTU "KhPI"*, Iss. 53, pp. 19-30 (in Russian).