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MULTIPHYSICS PROCESSES AT SPARK EROSION TREATMENT OF CONDUCTING GRANULES

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Abstract

The computer modeling and analysis of the coupled electrical, thermal processes and thermal stresses in conducting granules during their spark erosion treatment are carried out. The non-linear properties of the material and phase (solid-liquid) transition at melting point are taken into account. The dependence of the volume of molten and evaporated material as well as the maximum values of temperature and equivalent tensile stress in the granule on the duration of heat flow is revealed. The two thermal sources such as surface heat flow owing to the passage of pulsed current and volume heat source due to resistive heating are considered. The Joule's losses are determined by electric problem solving. The simulation of granule cooling after the end of current pulse is performed. The paper presents the realization of the approach to

determine the optimum value of the pulse duration, starting from which the greatest production of powdered particles from destructed granule material taking into account the technological requirements is expected. References 15, figures 5, table 1.

Key words: spark erosion of metal granules, electrical and thermal processes, non-linear characteristics, equivalent tensile stress (von Mises stress), multiphysics modeling.

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