

Development of FEM - programs for modeling the synthesis of anisotropic materials by powder metallurgy with electric heating

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Abstract

A computer program has been created that makes it possible to analyze the features of the spatial distribution of Joule heat in two-phase matrix systems with round inclusions. The program uses the finite element method and is implemented in Fortran code. It was found that at certain points of the two-phase medium, the specific power of the Joule heat is determined. The magnitude of the unevenness of the heat distribution exhibits the ability to level. It was found that the location of the points at which the set parameters for a given structure pm are set depends on the ratio between the conduction of the matrix and the inclusion and the local mutual arrangement of the inclusions. The processes of sintering powder materials using electric heating are considered. It was found that as a result of selective sedimentation, the possibility of the formation of anisotropic structures is turned on. The features of the processes of contact electrical materials based on mixtures of copper and tungsten are discussed. It is assumed that the processes of local heating can initiate the sedimentation of copper particles. In this case, groupings of particles can be formed, oriented along the direction of the heating electric current. The possibility of synthesizing materials similar to composite fiber systems is shown. It is proposed to use computer simulation programs to support heat treatment processes using electric heating.

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