INCLUSIONS IN METALLIC MATERIALS AS ORIGIN FOR MICROCRATERS FORMATION AT A PULSED ELECTRON-BEAM SURFACE MELTING

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In the present work, the effect of difference between thermal properties of the base material (matrix) and inclusion on the temperature behavior of the target in the regions of inclusion locations has been considered. The calculations were based on the solution of two-dimensional nonlinear nonstationary heat equation. It has been shown that the most strong effect on the temperature field takes the difference between heat conductivities of the matrix and inclusion.

The simulations of temperature fields have been carried out on the real systems matrix-inclusion, namely, stainless steel 316 L/manganese sulfide (SS 316L/MnS), TiNi/Ti_2Ni, TiNi/TiC. The temperature distribution and phase diagrams, calculated for the specified systems, are in a good accordance with the experiments. The results obtained allows suggestion on the origin of microcraters appearing at the irradiated surface as a result of thermocapillary convection in overheated sites of location of inclusions.