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EFFICIENCY OF THE MODEL WITH HIGH TEMPERATURE GRADIENTS

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In the paper, a theoretical model was used and studied, which considers various mechanisms of target energy transfer during ion-plasma treatment, and the dependence of the temperature change on the ion energy in the copper target for different interaction times t was obtained. The maximum surface temperature is reached at the end of the thermal action of the ion. In this case, the highest temperatures correspond to the interaction time $t_1 = 1{,}1\tau_b$, while at the same time, the temperature does not increase significantly when the interaction time increases.

Also, thanks to the developed mathematical model, the structures of the temperature fields during the ion-plasma treatment of copper with a large number of oxygen ions for different particle penetration depths were obtained (Fig. 1).

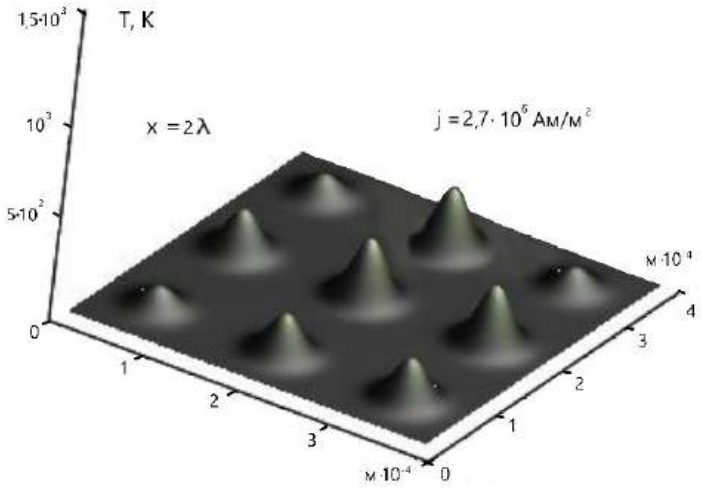

Fig. 1. Temperature distribution during the action of oxygen ions on copper at different depths, with a current density of $J = 2.7 \cdot 10^6$ A/m^2

Conducted studies of temperature fields during ion-plasma treatment of copper with oxygen ions show that it is possible to create temperature fields with high temperature gradients in a given plane $x = 0{,}5\lambda_m$, at a current density of $J = 2.7 \cdot 10^6$ A/m^2 with fairly high temperature stress indicators (108 N/ m), which will contribute to the formation of stable nanostructures.