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**THE MATHEMATICAL MODEL OF THE INITIAL STAGE OF SURFACE  
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The paper presents a mathematical model of the initial stage of ion implantation into the metal surface. The model takes into account the finiteness of relaxation times of heat and mass flows. It was established that the interrelation between mechanical and diffusion waves leads to the distortion of deformation (and stress) wave profile, and the concentration distribution does not correspond to pure diffusion process.

**Keywords:** *mathematical model, ion implantation, diffusion, mechanical stress.*