

# About the mechanism of reverse deposition of titanium ablation products from laser erosion plasma

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A microrelief is formed on a titanium surface as a result of laser evaporation of it by nanosecond pulses. Wherein the surface of the microrelief is covered with a porous oxide layer formed by agglomerates of nanosized particles. The building mechanism of this layer is underexplored. Meanwhile, the formation of an oxide coating with a porous nanorelief is of great applied significance in the treatment of the titanium medical implants surface, since it promotes wetting by blood plasma and the attachment of proteins and other bioelements to the implant surface at the early stages of osseointegration. In the present work, the mechanism of nanorelief formation due to the reverse deposition of evaporation products after their oxidation in the atmosphere on the surface of the initial substrate is qualitatively considered. The chemical composition of the oxide layer has been studied. The relationship between the parameters of laser action during multipulse processing and the characteristics of the formed nanorelief is established. Theoretical estimates of the amount of back-deposited material are given as a function of the power density and duration of nanosecond pulses, obtained by solving the Boltzmann kinetic equation by direct statistical modeling.