

ACTION OF PULSED LASERS ON TITANIUM TARGET: SURFACE EFFECTS

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Abstract. The interaction of lasers with metals has been studied for decades, and has been especially intensified lately, due to the development of new, efficient pulsed lasers. Titanium has a number of excellent properties, making it applicable in various modern technologies. Treatment and processing of titanium is possible with various techniques, and the application of lasers gives a special quality, such as high precision machining or obtaining specific structures on the surface which cannot be generated by other methods.

During our research, surface processing of titanium was conducted by various pulsed lasers: nanosecond CO₂ laser, picosecond Nd:YAG laser and femtosecond Ti: sapphire laser. In order to find the optimal conditions for surface modification of titanium, the influence of different laser parameters (wavelength, pulse duration, pulse energy, etc.), as well as the influence of the ambient, was examined. The titanium samples were irradiated in different environments, ie. in air, oxygen, nitrogen, carbon dioxide, helium and in vacuum, which affected the chemical composition and morphology of the target surface.

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