

ACTION OF PULSED LASERS ON TITANIUM TARGET: SURFACE EFFECTS

JOVAN CIGANOVIĆ, MILOŠ MOMČILOVIĆ, SANJA ŽIVKOVIĆ,
JELENA STASIĆ and MILAN TRTICA

*VINČA Institute of Nuclear Sciences
– National Institute of the Republic of Serbia
University of Belgrade, PO Box 522 11351 Belgrade, Serbia
E-mail jovanc@vinca.rs*

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.

Acknowledgments

This research was supported by the Ministry of Education, Science and Technological Development of Republic of Serbia; Grant number 451-03-68/2022-14/200017.

References

- Ciganovic, J., Stasic, J., et al.: 2012, Appl. Surf. Sci., **258**, 2741-2748.
Trtica, M., Batani, D., et al.: 2013, Laser Part. Beams, **31**, 29-36.
Ciganovic, J., Zivkovic, S., et al.: 2016, Opt. Quantum Electron. **48**, 133.
Ciganovic, J., Matavulj, P., et al.: 2017, Russ. J. Phys. Chem. A, **91**, 2696-2701.
Trtica, M., Stasic J., et al.: 2018, Appl. Surf. Sci., **428**, 669-675.