

# Surface modification of metallic samples by nanosecond duration laser

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The study of the structure and properties of the subsurface layer is extremely important in the development of technologies for laser forging (laser shock peening), laser modification or laser cleaning of the surface of metal alloys. The samples of Zr-1Nb and Ti-6Al-4V alloy were treated through 2 mm thick water layer using ytterbium fiber laser with a wavelength of 1064 nm, pulse duration 200 ns and pulse energy up to 1 mJ, the diameter of the focused spot on the sample surface near 30  $\mu\text{m}$ . Using the methods of optical and scanning microscopy, the morphology of the modified surface of the samples was described, and a quantitative assessment of its microrelief formed as a result of evaporation and melting of a thin layer of material subjected to laser processing was carried out. Durometric studies have established the hardening of the subsurface layer. As a result of laser processing, a microrelief is formed on the surface, formed by craters, which appear in places of “micro-explosion” under the action of a single pulse. Process conditions lead to ultra-fast crystallization of the surface modified layer. The research was conducted with the support of the Russian Science Foundation (project No. 21-79-30041).