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EFFECT OF DUAL IMPLANTATION OF IONS ON PHYSICAL AND CHEMICAL, AND MECHANICAL PROPERTIES OF VTi-6 AND VTi-22 ALLYS SURFACES

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New results of investigating structure and physical-mechanical properties of near-surface of titanium alloy after ions (N-Ni, W-Mo и W-Zr) implanting and subsequent thermal annealing at the temperature of 550^0C for 2 hours are presented in this work.

The use of high dose and intensive implantation results in drifting the maximum of implanted ions concentration profile closer to the surface, because of sputtering processes intensification. High dose and intensive implantation is such implantation of ions (HDIII) in the process of which the rate of getting the dose is around 10^{16} sm^{-2}/min., and the concentration of implanted ions is tens up to 100 and more atomic percent while the density of ion current at the target is from units up to tens mA at the pulse duration of 100-200 μs.

Conducted investigations point at decreasing the value of friction coefficient along with the growth of the dose of bombing ions N^+ at the energy of 40 keV for Ti-Al; Ti-Mo; Ti-Ni systems. For Ti-Au systems the $1x10^{17}$ sm^{-2} dose irradiation results in small increase of friction coefficient, but the dose increase up to $3x10^{17}$ sm^{-2} decreases its value up to 40% in comparison with the virgin sample, and as the authors believe, such friction coefficient change is connected with the material strengthening and decreasing the value of adhesive interaction.

Dual implantation and titanium alloys Cu-Ni; Fe- Zr leads up to the change of microhardness which is connected first of all with strengthening of surfaces because of martensite phases and fine-dispersed carbides and oxicarbides forming. In the process of implanting Hf ions into titanium alloys we found almost 80% increase of fatigue resistance comparing with the virgin sample. It is known that W, Mo, Zr are used as allying element for the increase of strength and improved merits of constructional materials.

For the analysis of element structure of samples we used method RBS of helium ions and protons with the energy of 2.035 MeV and 2.012 MeV correspondingly, focused-beam microscopy with microanalysis WDS.

Keywords
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profile