

INVESTIGATION OF THE PROCESSES OF OBTAINING THIN OXIDE FILMS ON TITANIUM ALLOY Ti6Al4V IN SUCCINIC ACID SOLUTIONS

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The research data relating to the peculiarities of the formation of the thin interference-colored oxide films on the Ti6Al4V alloy in amber acid water solutions have been given. The research done resulted in kinetic dependences that show the changes in the cell voltage during the electrolysis and that allow us to track the dynamics of the formation of the oxide layer on the alloy. For the acid concentration of 0.5 to 5 g/dm³ and the current density of 0.8 to 1.5 mA/cm² the continuous oxide film is not formed on the alloy surface and the specified cell voltage value is not attained and it is conditioned by the formation of titanium oxides at intermediate oxidation levels. An increase in j_a up to the values of 2 mA/cm² and higher with simultaneous increase in the acid concentration exceeding 5 g/dm³ conditions a linear behavior of kinetic dependences and it is indicative of the formation of continuous oxide films on the alloy surface.

The obtained data are confirmed by electrochemical measurement data that enabled the establishment of the availability of the areas on polarization curves that correspond to the formation of intermediate oxides. The experimental data obtained for the alloy oxidation in the stationary galvanostatic mode are indicative of that the alloy oxidation rate at $j_a > 2$ mA/cm² is linearly proportional to the current density. The obtained data allow us to assert that the choice of the modes for the anodic oxidation of alloy required for the development of the technology of the electrochemical oxidation of titanium implants should be based on the research data of the functional properties of obtained coatings.

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