

Nanometric Titanium Oxide Films: Composition And Properties

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Currently nontraditional methods are very often applied to form surface layers that have special properties that differ of those the base material has. The progressive direction of modern technology is corrosion protection of metal surfaces. Despite the fact that titanium is a metal resistant from the point of view to corrosion in the most harsh environments, it intensively corrosives in H₂SO₄ water solutions. The paper [1] proposes electro-spark alloying (ESA) method for the formation of Pd depositions to enhance the corrosion resistance of titanium surface. The results show that the corrosion resistance in H₂SO₄solutions of the processed surfaces increases by 1÷2 orders. The present paper proposes a method of formation nanometric oxide films on the surface of titanium and its alloys by applying electrical discharges in impulse (EDI). Processed surface layer consists mainly of titanium oxides and nitrates in the amorphous state, which leads to the passivation of the surface and, as a result, to the increase of surface electrical resistance by 10⁷ times and to the increase of corrosion resistance up to 100 times in H₂SO₄ solutions.

1.Kornienko L.P., Chernova G.P., Mikhailov V.V., Gitlevich A.E. The use of electro-spark alloying method to increase the corrosion resistance of titanium surface. *Electronic Processing of Materials*, 2011, 47(1), pp. 14-23.