

Titanium oxide nanotube arrays prepared by anodic oxidation on Ti-35Nb-4Sn and Ti-35Nb-4Zr alloys

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Abstract

Titanium alloys, due to their excellent mechanical, physical and biological performance, are finding ever-increasing application in biomedical devices [1]. The growth of a self-ordered nanotubes of titanium oxide layer on the surface of titanium alloy implants is a strategy used to improve osseointegration in orthopedic and orthodontic devices. TiO₂ nanotubes are formed by the simultaneous anodic reaction and chemical dissolution due to the fluoride species present in the electrolyte [2]. In the present study, the formation of self-organized TiO₂ nanotubes by an anodization process using an aqueous solution containing 0.3 to 0.5 wt. % hydrofluoric acid on Ti-35Nb-4Sn and Ti-35Nb-4Zr alloys (wt.%) is described. The morphological and structural evaluation were carried out using scanning electron microscopy technique and x-ray diffraction analysis. The effects of heat treatment for nanotubes of titanium oxide crystallization on Ti-Nb-Sn and Ti-Nb-Zr alloys on the phase transformation, elastic modulus and hardness Vickers of the substrate were also investigate.

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References

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