

Fabrication of TiO₂ nanotubes on the ultra fine-grained titanium substrates for dental application. / K. Hajizadeh, S. H. Nemati, A. Hadjizadeh. / Nano Studies. – 2015. – # 12. – pp. 53-60. – eng.

Medical engineering is looking for metallic biomaterials with strong mechanical properties, high biocompatibility, ability for easy surface modification and loading drugs for the applications as the orthopaedic implants and for hard tissues engineering. Titanium (Ti) based materials, are the most appropriate choices for this purpose, because of their unique TiO₂ passive layers. However, these substrates have weak mechanical strength, osseointegration and antibacterial properties. For solving these problems one solution is to process their microstructure from coarse grain to ultrafine grain to increase both their mechanical and surface energy, and the use of surface modification techniques, in order to generate very specific surfaces with TiO₂ nanotubes. This is due to the fact that TiO₂ nanotubes in various diameters and lengths enhance bone bonding, cellular response and are good reservoirs for loading drugs and antibacterial agents. This article reports the production and characterization of nano structured titanium substrates with improved mechanical properties, followed by anodizing surface modification technique, used to produce TiO₂ nanotubes on the ultrafine grained titanium. These TiO₂ nanotubes will be loaded with appropriate drugs for dental application. Fig. 6, Ref. 8.

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