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Lactoferrin and collagen type I as components of composite formed on titanium alloys for bone replacement

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Abstract:

During anodization, the properties of the oxide layer depend on the chemical composition of the titanium alloy and on the parameters applied during surface treatment. The properties of the anodized surfaces influence their further functionalization. In this paper, ceramic multilayer coatings were formed on the Ti-6Al-7Nb, Ti-13Nb-13Zr, and Ti-15Mo alloys. A silica layer with wollastonite particles was formed on all the previously anodized Ti alloy samples. Using scanning electron microscopy, Raman spectroscopy, and X-ray diffractometry, respectively, the surface morphology, chemical composition and phase composition of the hybrid ceramic layers were investigated. In addition, the adhesion and hardness of the coatings were determined. The contact angle of the coatings was between 90.0±0.2° and 114.3±5.9°, and the surface roughness was less than 2 μm. The modified surfaces were immersed in solutions containing protein-like collagen type I or lactoferrin. The