

BIOMATERIALS

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Formation and characterization of biomimetic calcium phosphate coatings on nanostructured surfaces of anodized titanium

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Biomimetic coating procedure was used to deposit a bioactive layer of hydroxyapatite (HA) on the surface – modified titanium by anodization process. The anodization was performed on the clean surface of titanium under three different voltages of 80, 100 and 130v using HF as the electrolyte. The morphology, structure and topography of the anodized substrates were evaluated by Scanning Electron Microscopy (SEM) or Field Emission Scanning Electron Microscopy (FE-SEM), X ray Diffraction (XRD) and Atomic Force Microscopy (AFM), respectively. Biomimetic coatings were deposited on the surface of anodized titanium using a two-stage procedure by immersion in two concentrated Simulated Body Fluids (SBF) with different concentration of Mg^{+2} and HCO_3^{-2} ions under physiological conditions. The results showed that an increase in anodization voltage tends to produce a porous surface with circular pores toward a columnar layer of rutile. The surface roughness of anodized surfaces was increased by increasing voltage. Biomimetic coating procedure was caused to form a HA layer which was proved by XRD, FTIR and SEM. The HA layer formed on the anodized titanium surface has a whisker-like morphology. The crystallinity of HA layer was increased by an increase in voltage. The findings indicate that the anodized titanium at high voltages may be suitable substrate for biomimetic coating procedure.

Biography

Shaghayegh Javadi did her Master's degree in Biomedical Engineering. Her thesis is about biomaterial coating and focused on best coating method of biomaterials. She has researched on different pretreatment for surface modification of titanium. She has used anodizing process with combination of alkali treatment for surface modification of titanium. The result of her search and experiments showed that the anodized titanium at high voltages may be suitable substrate for biomimetic coating procedure.

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