

Nanostructured film grown on Ti-Fe-Nb-Sn ultrafine eutectic alloy surface by anodization process

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In recent years it has highlighted the β -titanium alloys, due to its lower elastic modulus similar to that of human bone. More recently, nanostructured alloys containing amorphous or ultrafine-grained matrix showed superior properties when compared with its crystalline counterpart of coarse grains. Currently there is a trend characterized by the development of nanostructured materials with suitable mechanical properties and highly functional. This work shows the early develop of a new biofunctional metallic material, titanium-based, with adequate mechanical properties and surface modification aiming their usage as biomaterial implantable. Thus, cast of Ti-Nb-Fe-Sn were obtained by rapid solidification in millimetres plate shape. Analysis by X-ray diffraction shows the presence of β -Ti matrix with intermetallic phases. Scanning electron microscopy revealed the dendritic microstructure of the cast. After anodization process was possible to identify the tubular nanostructure arranged as coral-like. In this sense, Ti-Nb-Fe-Sn alloy is very interesting by their low elastic modulus (~ 80 GPa), as compared to the Ti-6Al-4V alloy, which is the most widely used in biomedical area. In addition, the nanostructured surface may enhance the growth process cellular, approaching the concept of biofunctional metallic materials.