

Biomaterial with a metallic coating for biomedical applications

This technology consists of a metallic-coated biomaterial with useful properties for the manufacture of implants and biomedical devices, generated by immersion of a titanium-based metallic substrate in a molten aluminium-silicon alloy.

Description and essential characteristics

The biomaterial is composed of a titanium-based substrate having a biocompatible metallic coating with high hardness and corrosion resistance, which makes it especially suitable for biomedical applications—in particular, for the manufacture of biomedical devices and implants.

The metallic coating, primarily composed of aluminium, silicon and titanium in specific weight ratios, provides the biomaterial with hardness values of about 3 GPa at room temperature, and elastic modulus values of about 100-150 GPa.

The grain size and thickness of the coating are lower than 1 and 10 microns, respectively, and the coating is dense, uniform, and tightly adhered to the substrate, making the biomaterial harder and more ductile.

The method for obtaining the biomaterial consists of immersing a titanium or titanium alloy-based substrate in a bath of molten aluminium-silicon alloy. The procedure includes preheating the metallic substrate prior to immersion, a heat treatment subsequent to immersion, and finally a chemical and/or physical surface treatment of the product.

The final properties of the metallic-coated biomaterial will be influenced by a number of parameters, such as composition of the molten bath, temperature, immersion time and heat treatments before and after immersion.

Competitive advantages

The physical and chemical properties of the metallic-coated biomaterial make it especially attractive for biomedical applications, particularly for the manufacture of biomedical devices and implants.

The method for obtaining the biomaterial provides a hard, corrosion resistant and biocompatible coating free of vanadium or any toxic substance.

The coating is dense, uniform and tightly adhered to the substrate and presents outstanding values of hardness and elastic modulus at room temperature. In short, the coating provides the biomaterial with higher hardness and ductility values.

Type of collaboration sought

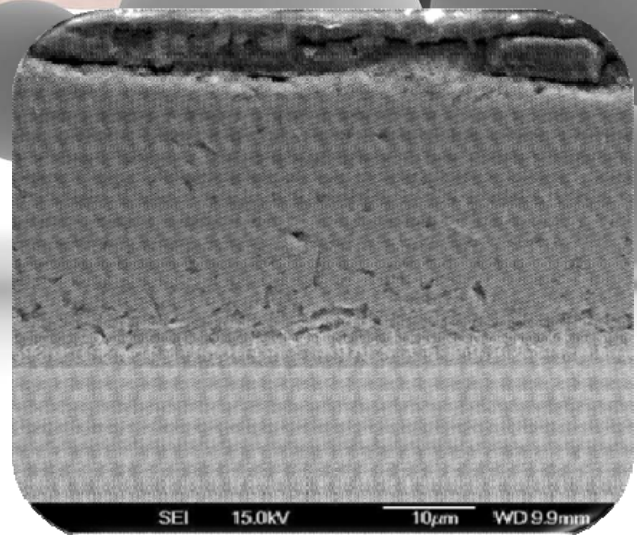
Cooperation is sought with any Party interested in partnering, licensing or investing in the technology, whether it be an investor to fund the project, a partner interested in getting involved in any of the various phases until its placement on the market, a patent licensee, etc. Organisations potentially interested in this technology are those devoted to the manufacture, commercialisation and/or distribution of biomedical devices and implants; as well as universities, hospitals, research centres and all types of institutions interested in biomaterials for manufacturing implants, biomedical devices, etc.

Current stage of development

R&D Phase

Current state of intellectual property

Spanish patent P201030949, granted in April 2013.
International patent application PCT/ES2011/070400.



Cross-section (SEM) of the substrate after immersion in Al-12,6%Si

For further information, please contact

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