ELECTROCHEMICAL ASSISTED DEPOSITION OF HYDROXYAPATITE AND POLYGLUTAMIC ACID ONTO STAINLESS STEEL SUBSTRATES.

Nerea Ormategui, Iraida Loinaz, Jose A. Pomposo, Hans J. Grande
New Materials Department, CIDETEC, Parque Tecnológico de San Sebastián,
Paseo Miramón 196, E-20009 Donostia-San Sebastian, Spain
E-mail: normategui@cidetec.es

The study of bioactive materials suitable to be used as artificial bone or teeth substitutes and bone repairing materials is one of the most interesting fields in the biomedical area.

Natural bone has excellent mechanical properties such as high fracture toughness and high flexibility. These properties are achieved by specific microstructure of natural bone that is composed of collagen and inorganic apatite.

On the other hand, metals and their alloys are the most widely used implant materials due to their good mechanical properties although in contact with body fluids they corrode. To avoid this process a good alternative is to coat the metal with apatite-polymer hybrids as a mimic of bone with enhance bioactivity respect to metallic substrate. In this case, hydroxyapatite (HAP) polyglutamic acid hybrids have been electrochemically deposited. HAP is known because of its biocompatibility and osteoconductive properties, and can act as an interface between the substrate and the bone or teeth favoring the bone bonding. Glutamic amino acid residue content in matrix proteins is considered to be an important requeriment involved in the nucleation of HAP crystals which plays a key role in the control of orientation and growth of the crystals.

Electrochemically assisted deposition is an attractive method for biomedical implant formation. A number of advantages and important possibilities of this method have been suggested.

In this communication, we report the electrochemical deposition of hydroxyapatite with polyglutamic acid onto stainless steel surfaces and its subsequent characterisation using X-ray photoelectron spectroscopy (XPS), Fourier infrared spectroscopy FTIR, contact angle and optical microspectroscopy and AFM.

References:

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[2] Diana D. Glawe, Francisco Rodríguez, Morley O. Stone, and Rajesh R. Naik, Langmuir, **vol. 21**, (2005) 717-720.
[3] Elisa Boanini, Paola Torricelli, Massimo Gazzano, Roberto Giardino, Adriana Bigi, Biomaterials, **vol. 27**, (2006) 4428-4433.

Figures:

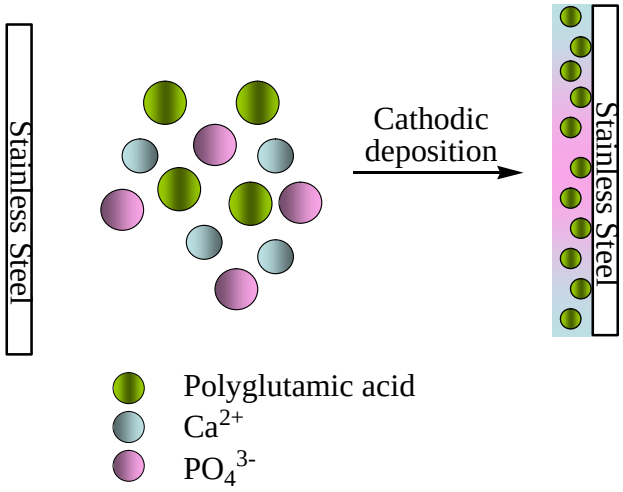

Figure 1: Scheme of the deposition method

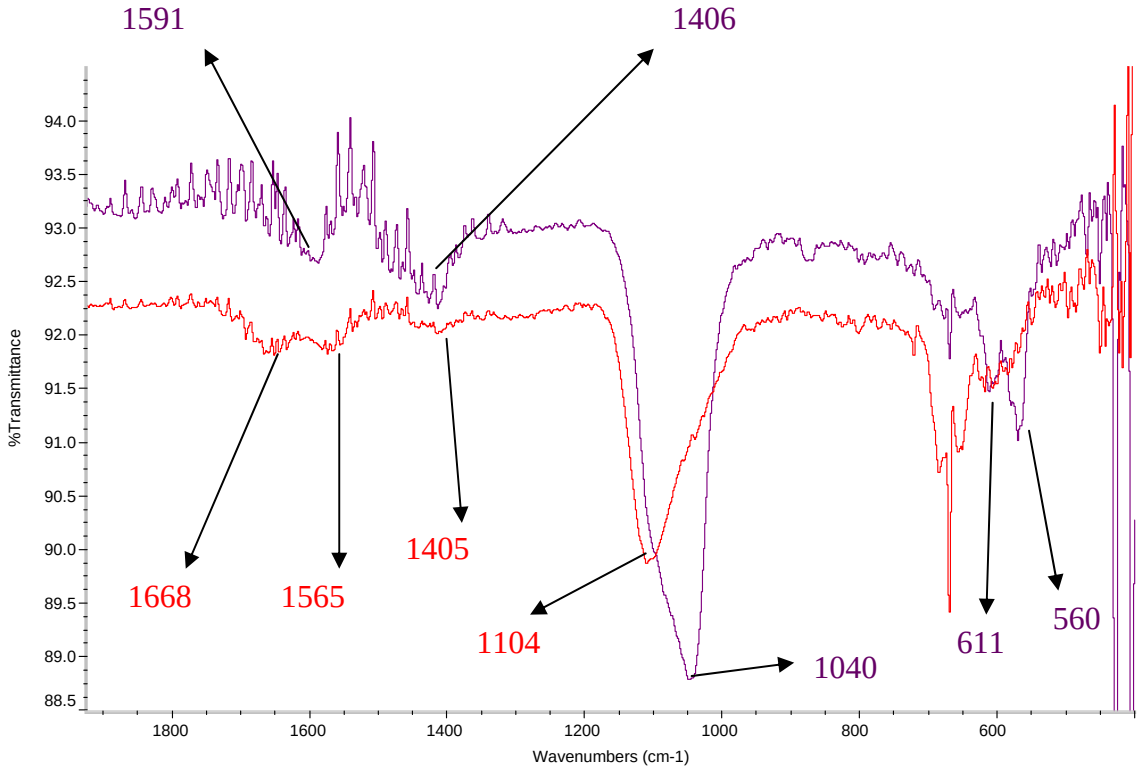

Figure 2: FTIR spectrum of hydroxyapatite coating deposited on stainless steel (violet) and FTIR spectrum of hydroxypatite and polyglutamic acid coating deposited on stainless steel (red).