

Functionalized Biomimetic Nanohydroxyapatite for Biomedical Applications

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i+Med is cooperative society of scientists established in 2014 and focused on the development and commercialization of biomedicine solutions for the controlled release of drugs, vitamins, growth factors and other active compounds.

i+Med develops own products as well as drug products and medical devices for third parties. The company holds two patents on nanogels with biomedical applications, and manufactures medical devices with CE Marking.

The main research lines of the company include controlled release, functional coatings, active nanoparticles and biomaterials. In this regard i+Med produces biomimetic nanohydroxyapatite (nHAp) and functionalized nanohydroxyapatite for biomedical applications [1].

nHAp is a natural mineral produced by the organism. I+Med has applied a synthesis method that mimics the physiologic biosynthesis conditions to get biomimetic nanoparticles avoiding toxic residues. The main property, apart from the nanometric size that helps to get better into the inner layers of the tooth enamel, is their spheroidal shape that increases the biocompatibility (Figure 1). The product will be used as active ingredient with remineralizing and antibacterial properties for use in Odontology.

An analogous approach has been employed for the synthesis of F, Mg, Ga and Ag functionalized nHAp. This kind of nHAp display applications not only in Odontology but also in Prosthetics and

Traumatology. The latter is due to their antibacterial properties which prevents infections in prosthesis implantation and their ability to promote bone growth (osteogenesis).

The nHAp produced by i+Med are characterized by XRD (Figure 2), TEM, SEM; FTIR, XPS, and ICP-MS. Moreover they comply with ISO13779-3:2018 Implants for surgery — Hydroxyapatite — Part 3.

References

- [1] K. Lin, J. Chang. Hydroxyapatite (HAp) for biomedical applications. Woodhead Publishing, 2015, 3.

Figures

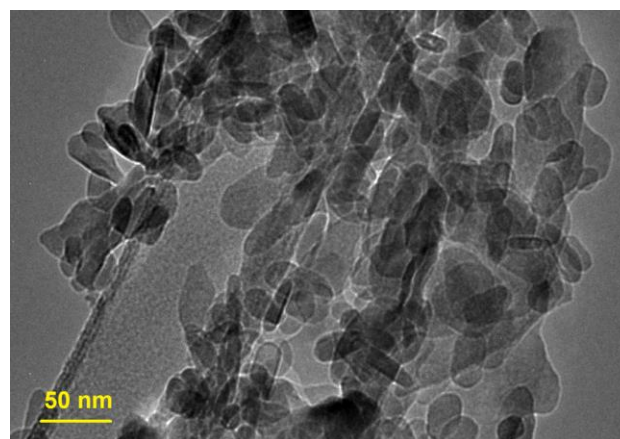


Figure 1: TEM image of synthesized nHAp.

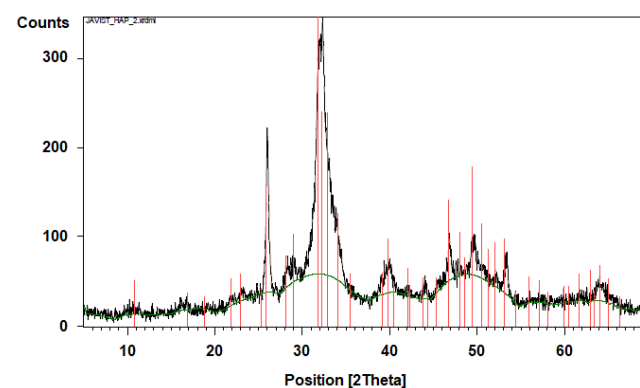


Figure 2: XRD of obtained nHAp