

## ELABORATION AND CHARACTERIZATION OF A COMPLEX COATING ON Ti WITH TiO<sub>2</sub> NANOTUBES, FUNCTIONALIZED SINGLE CARBON NANOTUBES, HYDROXYAPATITE AND IRON

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**Abstract.** *The aim of this work is elaboration and characterization of a complex coating on Ti with TiO<sub>2</sub> nanotubes, functionalized single carbon nanotubes, hydroxyapatite (HA) and iron (Fe). The single carbon nanotubes (SWCNTs) were functionalized with carboxyl groups (SWCNT-COOH) and TiO<sub>2</sub> nanotubes were elaborated by anodization. The complex hybrid material with iron immobilized was obtained by chronopotentiometric method. The electrodeposited HA/ SWCNT-COOH/Fe coatings were investigated for two different concentration of Fe as 0.01 and 0.025 M respectively. The coating structures were studied by X-Ray Diffraction. Surface analysis was completed with contact angles determination in order to establish the hydrophilic/hydrophobic balance. Electrochemical determinations were followed by potentiodynamic measurements conducted in Hank solution and by electrochemical impedance spectroscopy investigations(EIS). As biological hemolysis experimentes were performed, and no sign of evident toxic effect was observed.*

**Keywords:** TiO<sub>2</sub> nanotubes, SWCNTs, hydroxyapatite, electrochemical tests, hemolysis.

### 1. Introduction

One of the most important topic of 21 century is the bioimplant design in order to obtain materials with remarkable properties. Those can be used in bone and joint replacements, fixation devices or dental implants to make our life easier.

There are many types of materials used to manufacture implantable devices, each one of them having special purposes depending on their compoition. They can be

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