CARBON NANOTUBES FUNCTIONALIZATION FOR BIOMEDICAL APPLICATION

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Carbon nanotubes (CNTs) may become a promising material for biomedical applications: tracking of cells, chemical and biological sensing, bioactive agent delivery and tissue engineering are some examples. All of those properties need the functionalization of CNTs to be addressed and developed.

The present study shows several functionalizations of CNTs developed at Inasmet to generate new functional biological nanointerfaces. These chemical modifications of CNTs will be described:

- CNTs have been covalently attached to PLLA for the fabrication of scaffolds for bone regeneration. The incorporation of CNTs not only provides structural reinforcement but also electrical conductivity that may aid in directing cell growth[1].
- CNTs incorporation in ceramic material for prostheses fabrication requires a good dispersion. In this case, nanozirconia partially coated multi-wall carbon nanotubes (MWNT) have been obtained to improve the interface zirconia/CNTs by hydrothermal synthesis[2].
- A novel process of wrapping single-wall carbon nanotubes (SWNTs) with Poly Methyl Methacrylate (PMMA) by a catalytic reaction has been developed. This functionalization provides high amount of anchorable points for further attachment of biomolecules [3].

These materials have been nano-structurally characterized by several techniques SEM, RAMAN, XPS and FTIR.

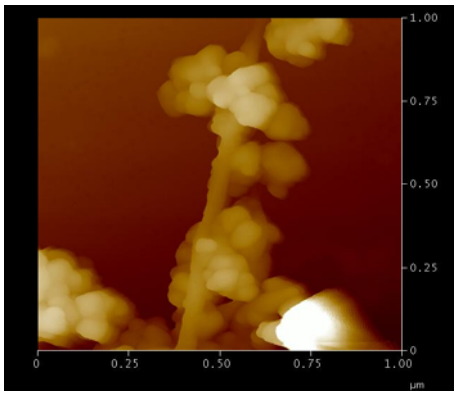
References:

[1] Olalde, Beatriz; Aizpurua, Jesus; García, Ainara; Bustero, Izaskun; Obieta, Isabel; Jurado, María Jesús, accepted in The Journal of Physical Chemistry C

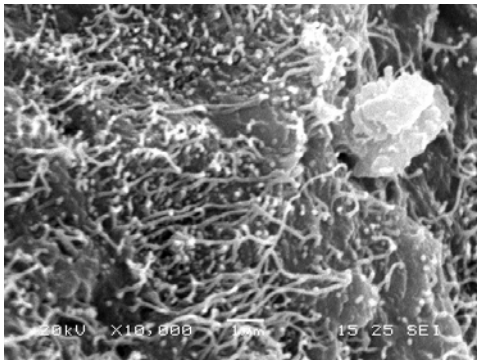
[2] N. Garmendia, L. Bilbao, R. Múñoz, G. Imbuluzqueta, A. García, I. Bustero, L. Calvo-Barrio, J.Arbiol and I. Obieta, Journal of Nanomaterials and Nanotechnology (2008), In Press..

[3] García-Gallastegui A., Obieta I., Bustero I., Imbuluzqueta G., Arbiol J., Miranda J.I. and Jesus M. Aizpurua, accepted in Chemistry of Materials.

Figures:



AFM image of MWNT partially coated with nanozirconia



SEM image of carbanionic CNTs coated with PMMA