

CARBON NANOTUBES FOR BIOLOGICAL DEVICES

Authors: *García A., Bustero I., Muñoz R., Goikotxea L., Obieta I.*

FUNDACIÓN INASMET, Mikeletegi Pasealekua, 2, E-20009 (San Sebastián) Spain
E- mail: aigarcia@inasmnet.es
<http://www.inasmnet.es>

Interest in carbon nanotubes (CNT) has grown at a very rapid rate in the last decade. Their interesting physical and chemical properties open attractive possibilities in many application areas. INASMET is researching in the use of CNTs as biological devices. This requires a thorough understanding of the influence of the synthesis parameters on the electrical properties and the development of an effective purification process to improve the biocompatibility of synthesized CNTs.

MWNT have been synthesized by the Chemical Vapor Deposition (CVD) method using methane as carbon source and Ni –Al₂O₃-SiO₂ as catalyst. The influence of the variation of certain reaction parameters such as gas flow, temperature and reaction time in the structural, physical and chemical characteristics of the CNTs has been studied.

In addition, a purification process to eliminate the catalyst, amorphous carbon and graphite-like particles that involves gaseous oxidative process and acid treatments has been developed. The efficiency of each purification step has been determined by analytical techniques. In the other hand, the electrical behaviour of synthesized and purified CNTs has been studied.

Finally, it has been developed a methodology to test the biocompatibility of CNTs using fibroblast cell line (ISO 10993-5). Every purification step has been studied from the biocompatibility point of view.

Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM)/Energy Dispersive X ray Spectroscopy (EDX), Raman Scattering, Termogravimetric analysis (TGA), Inductively Coupled Plasma Atomic Spectroscopy (ICP-AES) and X-ray Diffractometer (XRD) are, among others, the characterization techniques employed in this work.

References:

- (1) Iijima S., Nature, 354, 6348 (1991)
- (2) Kong J., Franklin M., Zhou C., Chapline M., Peng S., Chon K., Dai H., Science, 287, 622 (2000)