Christmas Lecture

Prof. Maurizio Prato

December 15, 2016 12.00h

Nanomedicine Chemistry and Nanotechnology: Synergies for a Better World

Nanometer-scale structures represent a novel and intriguing field, where scientists and engineers manipulate materials at the atomic and molecular level to produce innovative materials for making composites and for electronic, sensing, and biomedical applications. Carbon nanomaterials, such as carbon nanotubes and graphene, constitute a relatively young class of materials exhibiting exceptional mechanical and electronic properties, and are also promising candidates for gas storage and drug delivery.

Processing of these novel building blocks is severely limited by a number of inherent problems: purification from a variety of impurities, difficult manipulation and low solubility in standard solvents are only some of these problems. For these reasons, several strategies have been devised to make carbon nanostructures "easier" materials. In particular, chemistry plays a fundamental role, since it leads to functionalized carbon nanostructures, which are much more easily processible and offers the possibility of introducing the desired functions, useful for practical applications.

During this talk, we will discuss how carbon nanotubes are ideal substrates for neuronal growth. Not only nanotubes are compatible with neurons, but especially they play a very interesting role in interneuron communication, opening possibilities towards applications in spinal cord repair therapy.

In addition, in combination with catalysts of different nature, carbon nanostructures can serve for many scopes. Experiments aimed at the production of molecular hydrogen, ideal for clean energy generation, will be described.

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