EURYI Awards 2004

Press Information

Dr. Nikolaos TAGMATARCHIS

– Chemistry –

Project:

Functionalisation of Carbon Nanotubes Encapsulating Novel Carbon-Based Materials

The development of carbon nanotubes chemistry through the synthesis of soluble functionalised carbon nanotubes encapsulating carbon-based materials enhances the opportunities to fabricate and manipulate novel nanostructures with tailored properties and represents an important challenge in the exploitation of their potential for future technological applications ranging from nanoelectronics to composite materials with improved functional characteristics. Owing to their size and geometry, carbon nanotubes provide a unique opportunity for nanoscale engineering of novel one-dimensional systems created by self-assembly of molecules inside the hollow core of carbon nanotubes. Accommodation of fullerenes within carbon nanotubes represents the smallest scale of hybrid structures in carbon-based materials. As the electronic, magnetic, conducting and photophysical properties of the encapsulated fullerene materials can be modulated by chemical substitution either on the carbon-cage by a nitrogen atom leading to azafullerenes, or by endohedral doping with metal atom(s), clusters or carbides leading to endohedral metallofullerenes, respectively, the corresponding outstanding properties of carbon nanotubes are expected to be altered and/or enhanced in a concerted fashion. The current proposed research program has as broader goals to contribute to the design, synthesis and identification of novel hybrid carbon-based nanostructured materials necessary to increase the wealth and welfare of society and to lead to the production of new innovative materials potentially useful in technological applications and essential for European Industry to remain competitive. The development of fundamental knowledge and long term research into understanding phenomena, mastering processes and developing research tools in the rapidly growing field of nanotechnology as well as the transfer of technology to industry will be promoted.

Comments:

This is an outstanding proposal at the cutting edge of the carbon-nanotube field. The project is ambitious but feasible. Combination of skill in synthetic organic chemistry with talent in nano-science is unique. The expected result could certainly improve competitiveness of European research in material science, and be of particular importance for Greek science.

The candidate has demonstrated excellent capability for conducting first rate research in several well known laboratories in Europe as well as in Japan. He combines excellence in synthetic organic chemistry with outstanding nanoscale science. He may clearly become world leading in the field.

The proposal is devoted to the development of carbon nanotubes chemistry using recently developed synthetic strategies. The main goal is to functionalise carbon nanotubes to achieve novel nanostructures with tailored properties. This will produce new materials with improved functional characteristics that will be eventually transferred to industry. The quality of the applicant together with the quality of the proposal make the prospect of success large.

The host institution in Athens is a centre of excellence in nano-structured inorganic and organic-inorganic hybrid materials. The implementation of this proposal within the activities of the research centre will benefit both the candidate and Greece.

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