BNC TUBES
Project ID: 33350
Funded under: FP6-NMP

Novel, Heteroatomic Boron, Nitrogen and Carbon Nanotubes (BNC Tubes)

From 2007-02-01 to 2010-07-31

Project details

<table>
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<tr>
<th>Total cost:</th>
<th>EUR 3 034 000</th>
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<tr>
<td>EU contribution:</td>
<td>EUR 2 500 000</td>
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<tr>
<td>Coordinated in:</td>
<td>Finland</td>
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<th>Topic(s):</th>
<th>NMP-2004-3.4.1.3-1 - Three dimensional nano-structures based on elements other than carbon</th>
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<tr>
<td>Call for proposal:</td>
<td>FP6-2004-NMP-TI-4 See other projects for this call</td>
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| Funding scheme:      | STREP - Specific Targeted Research Project                                                      |

Objective

This project aims to develop novel, continuous, chemical vapour deposition (CVD) based synthesis methods for three dimensional regular nanostructures in the form of hetero-atomic nanotubes (NTs) composed of boron, nitrogen and carbon: BN, N-doped carbon, B-doped carbon and mixed B-N-C nanotubes. In doped nanotubes either or both boron and nitrogen atoms replace carbon atoms within the structure and are covalently bound. The main target is to control the electrical properties of nanotubes (i.e. metallic or n- or p-semiconducting), with special attention to control the number of layers: 1 (SWNT), 2 (DWNT) or several (MWNT).

The important industrial potential is demonstrated by developing transparent, conductive, flexible nanotube mats. We will explore the optical (i.e. band gap), electrical conductivity, electron field emission as well as non-linear optical properties of produced nanotubes. A significant dedicated modelling aspect is included. We will study NT synthesis using system level computational fluid/aerosol dynamics methods and investigate NT properties based on detailed atomistic modelling using ab initio, molecular dynamics and Monte Carlo simulations. Metrology issues include the development as well as comparison of advanced transmission electron microscopic (TEM) and scanning tunnelling (STM) methods to determine the atomic structure and non-linear optical properties of produced nanotubes.

The project team has 9 world-class, multidisciplinary partners in the field, including the Helsinki University of Technology, CNRS, Oxford University, Facultés Universitaires Notre-Dame de la Paix, University of Oulu and Prokhorov General Physics Institute of Russian Academy of Sciences as well as major companies Hewlett-Packard and ARKEMA and an SME, Beneq Oy.

Related information

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<tr>
<th>Result In Brief</th>
<th>Novel nanotubes made of more than one type of atom</th>
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<tr>
<td>Report Summaries</td>
<td>Final Report Summary - BNC TUBES (Novel, heteroatomic boron, nitrogen and carbon nanotubes)</td>
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