

# 15<sup>th</sup> International Conference on Nanosciences & Nanotechnologies



3-6 July 2018, Thessaloniki, Greece

[www.nanotecnology.com](http://www.nanotecnology.com)

**Last Minute Poster Submission Deadline: June 3, 2018**

## NANOELECTRONICS, PHOTONICS, PLASMONICS & NANOENERGY

• Photonics & Nano-optoElectronics • Energy Storage • Materials, Devices & Applications • Processes & Characterization • Theoretical & Computational approaches • Commercialization in Nanoelectronics and Energy • Special Sessions

## NANOMATERIALS, NANOFABRICATION, NANOENGINEERING & NANOCONSTRUCTION

• Carbon Related Materials • Polymer Nanotechnologies • Nanomaterials • Nanofabrication & Characterization • Biomaterials at Nanoscale • Theoretical & Computational approaches • NanoConstruction & Building Materials • Session on Integration of Nanomaterials into existing Production lines • Special Sessions & Round Tables • Session on New Solutions to support the monitoring of the concentration of engineered nanomaterials in indoor workplaces and urban areas

## NANOMEDICINE

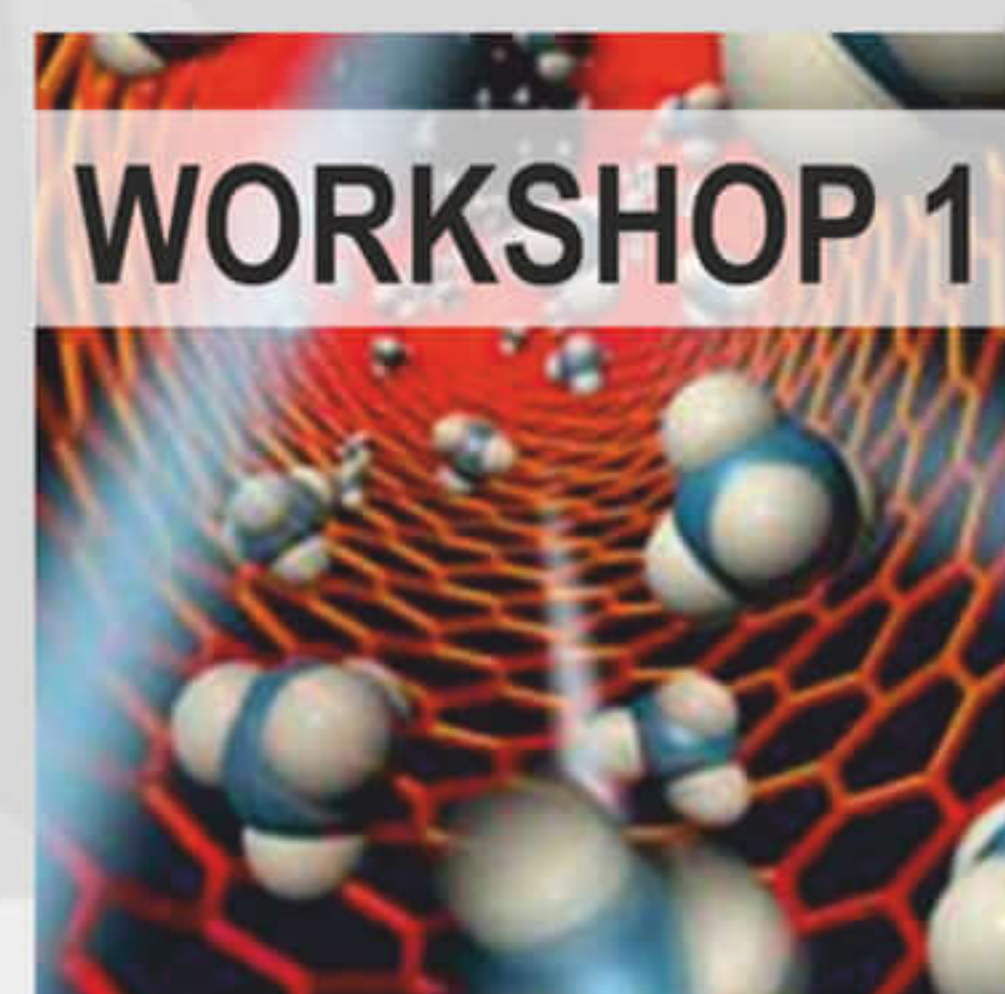
• Basics related with Medicine, Biology & Nanotechnology • Nanomaterials in any form • Clinical Applications • Update on Preclinical/Clinical trials • Nanotoxicity, Risk Assessment & Ethics • Commercialization in Nanomedicine • Session on Current Challenges in 3D Bioprinting • Special Sessions & Round Tables

## BIOSENSORS AND BIOELECTRONICS \*

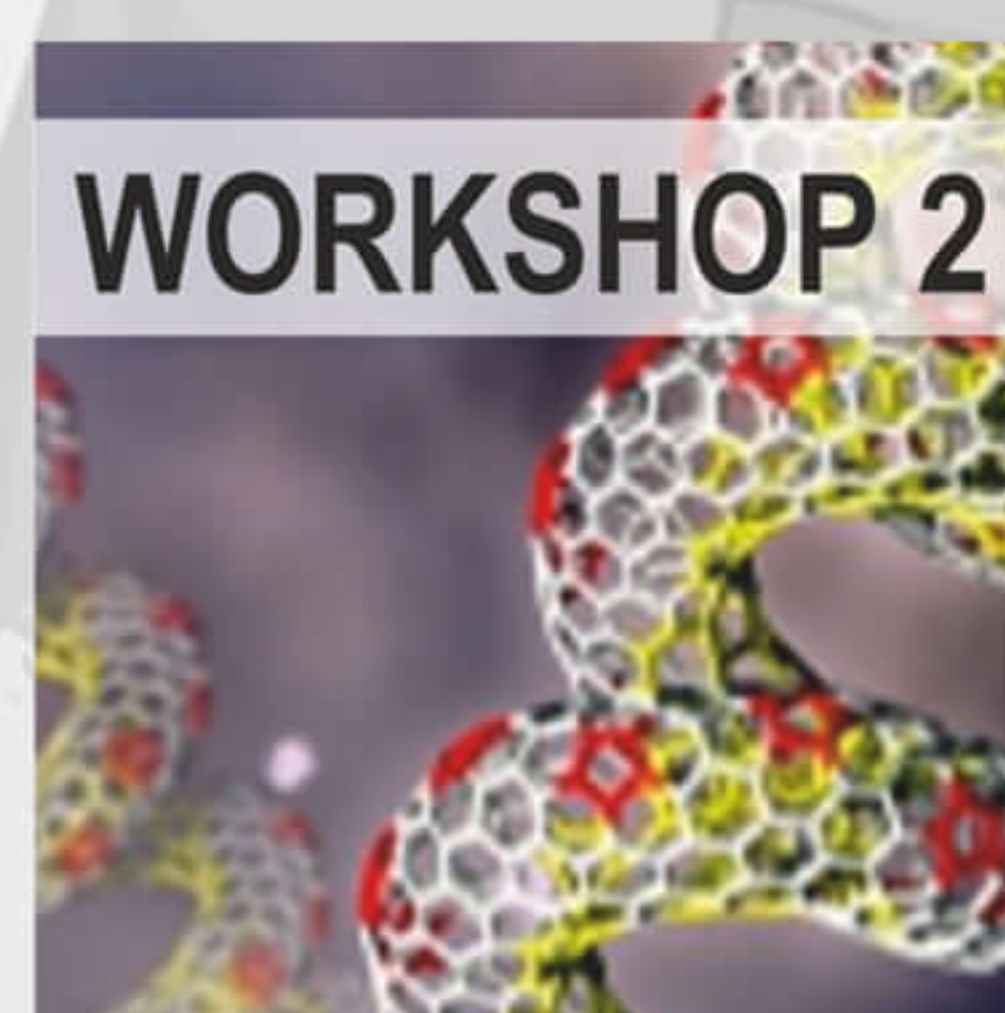
• Fundamentals from Materials to Biology & Medicine • Biosensors & Bioactuators • Biological & Clinical Applications • Commercialization in Biosensors & Diagnostic Systems • Special Sessions & Round Tables

## GRAPHENE & RELATED MATERIALS \*

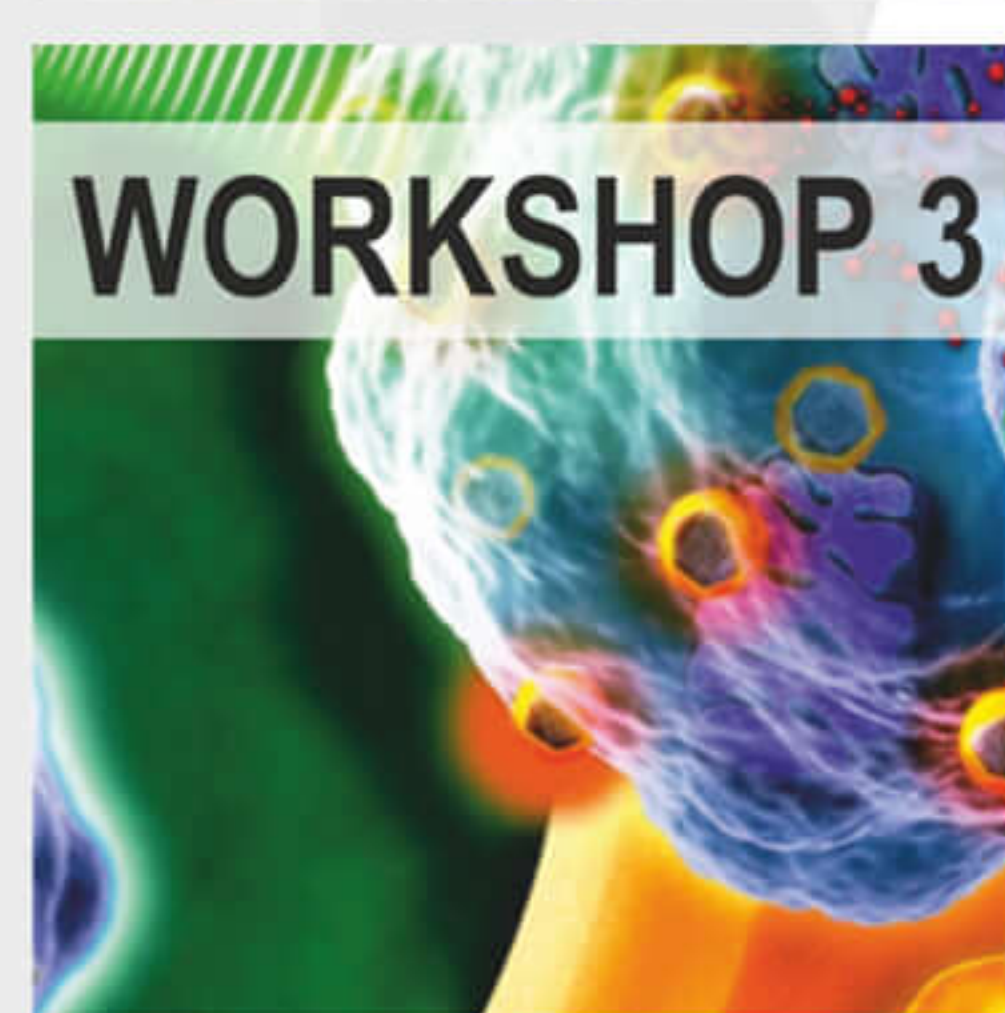
• Graphene growth, synthesis & integration • Chemistry & Growth kinetics • Transfer of graphene to host substrates • Graphene Properties • 2D nanomaterials & heterostructures • Impurity & Doping • Interfaces & Excitons • Large area production • Applications of graphene • Market commercialization



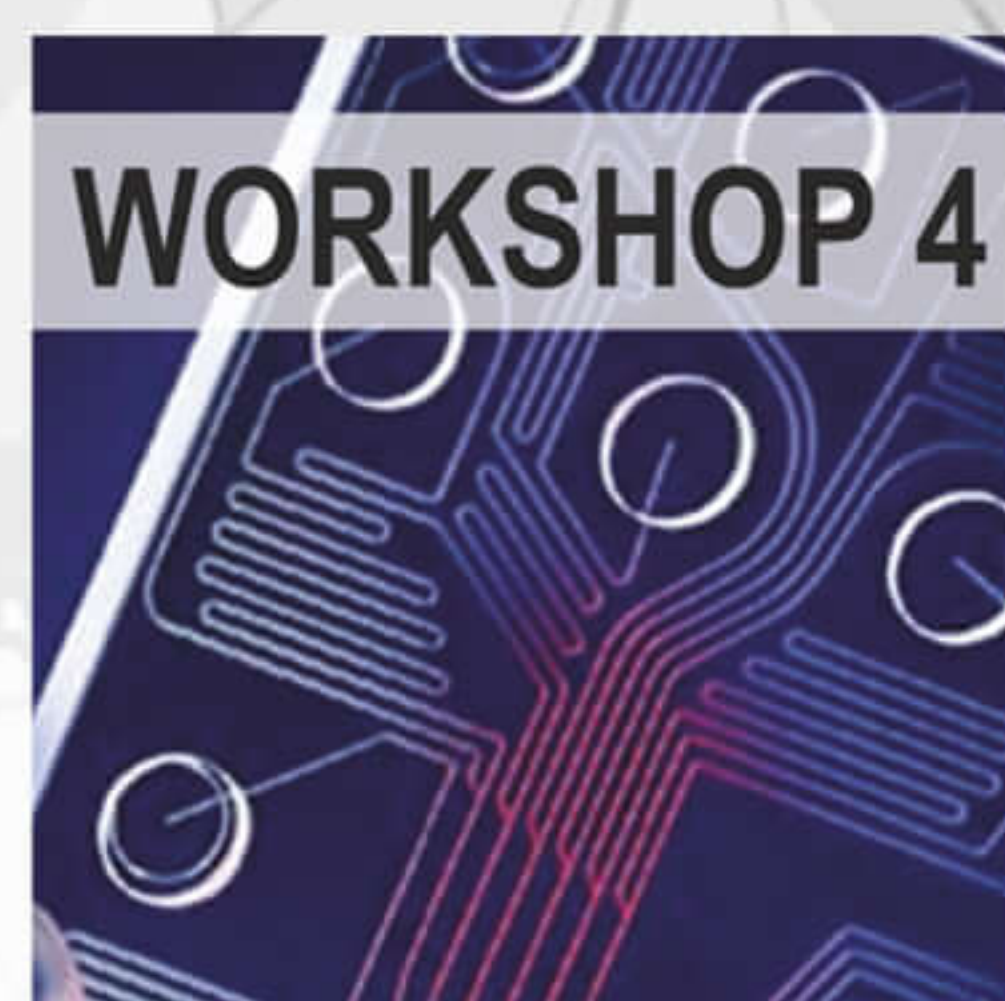
WORKSHOP 1



WORKSHOP 2



WORKSHOP 3



WORKSHOP 4



WORKSHOP 5

## PARALLEL EVENTS - SPECIAL WORKSHOPS & SESSIONS

- International workshop on 3D Printing, 3D Bioprinting, Digital & Additive Manufacturing \*
- EU Projects on Nanotechnologies, Advanced Materials for OPVs and Perovskites \*
- Computational Modeling Workshop \*
- New Business Development & Commercialization Workshop \*

\*(common in NN18 & ISFOE18)

Supported by:



Conference

**NN18**

3-6 July 2018

Symposium

**ISFOE18**

2-5 July 2018

Workshop

**I3D18**

2-6 July 2018

Summer Schools

**ISSON18**

30 June-7 July 2018

Exhibition

**EXPO18**

2-6 July 2018



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# 15<sup>th</sup> International Conference on Nanosciences and Nanotechnologies (NN18), 3-6 July 2018, Thessaloniki, Greece

## PRELIMINARY PROGRAM

08:00 -	Registration					
08:45-09:00	Welcome and Opening Remarks S. Logothetidis, NN18 Chairman					
09:00-11:00	WS1: Nanoelectronics 1 Chair: N.T. Kemp, J. Fairfield Room: Crystal Hall					
09:00-09:30 KEYNOTE	Massive Scale-Up of Cluster Beam Deposition (CBD) to produce Novel Functional Nanomaterials Richard E. Palmer <i>Swansea University, UK</i>	09:30-11:00	Graphene 1 (Joined Session of NN18 & ISFOE18) Chair: Room: Dock Six II	09:30-11:00	WS2: Thin Films 1 Chair: Room: Dock Six 1	09:30-11:00 Workshop on EU Projects on Nanotechnologies & Advanced materials for OPVs and Perovskites (ISFOE18 & NN18) (Room: Timber Hall 1) Chair: tba
09:30-10:00 INVITED	Towards anisotropically etched silicon-based rectangular and triangular nano-FETs S. Rollo <i>Luxembourg Institute of Science and Technology, Luxembourg</i>	09:30-10:00 INVITED	Title to be announced soon Dr. Francesco Bonaccorso <i>Istituto Italiano di Tecnologia, Italy</i>	09:30-10:00 INVITED	Control of nanostructures on silicon surfaces H. Asaoka <i>Japan Atomic Energy Agency, Japan</i>	09:30-09:45 Project FOF SmartLine: Smart In-line metrology and control for boosting the yield and quality of high-volume manufacturing of Organic electronics A. Laskarakis <i>Aristotle University of Thessaloniki, Greece</i>
10:00-10:30 INVITED	Memristors with optically tunable STDP synaptic plasticity: a route to hierarchical control in artificial intelligent systems N.T. Kemp <i>University of Hull, United Kingdom</i>	10:00-10:30 INVITED	TBA George Deligeorgis <i>FORTH IESL, Greece</i>	10:00-10:30 INVITED	TBA Claus Rebholz <i>University of Cyprus, Cyprus</i>	09:45-10:00 Project NMBP CORNET tbc <i>Aristotle University of Thessaloniki, Greece</i>
10:30-10:45	Innovative regulatory monitoring by nanostructured MOX sensors from the iSCAPE project for Improving the Smart Control of Air Pollution in cities A. Skouloudis <i>Joint Research Center, European Commission, Italy</i>	10:30-10:45	Epitaxial graphene sensor for ultra-low NO2 concentrations for environmental monitoring C. Melios <i>National Physical Laboratory, UK</i>	10:30-10:45	Growth of nitrides on graphene/SiC B. Pecz <i>Hungarian Academy of Sciences, Hungary</i>	10:00-10:15 InSCOPE: Open-access pilot line to accelerate industrial uptake of hybrid printed electronics G. Arutinov <i>Holst Centre, The Netherlands</i>
10:45-11:00	Modeling and Simulation of Tunable Software-Defined Metasurfaces A. Pitiakis <i>Foundation for Research and Technology Hellas, Greece</i>	10:45-11:00	The effect of concentration of plasma functionalized graphene nanoplatelets on the rheological and print performance of conductive inks A. Claypole <i>Swansea University, UK</i>	10:45-11:00	An innovative, one step processing of functional nanocomposite coatings prevents the operator from exposure to nanoparticles C. Vahlas <i>Université de Toulouse, France</i>	10:15-10:30 Project TranspEnergy: color-on-demand solar modules Rana Adel <i>Eurecat, Spain</i>
10:30-10:45						10:30-10:45 MAESTRO Marie Skłodowska-Curie Action ITN: Making Perovskites Truly Exploitable A. Kaltzoglou <i>NCSR Demokritos, Greece</i>
10:45-11:00						10:45-11:00 To be confirmed
11:00 – 11:30	Coffee Break NN18 Poster 1 (SEE POSTER PROGRAMME) – Exhibition-Networking - EXPO FORUM					

WS2 Posters (All Days)	
<b>P2-01</b>	Electrical Properties of SmB6 Thin Films Prepared by Pulsed Laser Deposition I. Batko Institute of Experimental Physics, Slovakia
<b>P2-02</b>	Preparation of Soft Magnetic Composites Based on Permalloy and Modified Resin Ferrite Nanofibres M. Batkova Institute of Experimental Physics, Slovakia
<b>P2-03</b>	Hot Wire Deposition of MoS2 films on flexible polyimide/metal substrates and their use as flexible strain sensors G. Papadimitropoulos, National Center for Scientific Research "Demokritos", Greece
<b>P2-04</b>	Carbon nanotubes and multi-walled boron nitride nanotubes for aerospace engineering Efsthios V. Liakos, Athanasios C. Mitropoulos, George Z. Kyzas Eastern Macedonia and Thrace Institute of Technology, Greece
<b>P2-05</b>	Applications of surface engineering techniques based on plasma electrolysis processes in the field of nuclear materials V. A. Andrei ELSSA LABORATORY SRL, Romania
<b>P2-06</b>	Electrochemical behaviour of alumina ceramic films developed on Zr-2.5% Nb by microarc oxidation in plasma electrolysis V. A. Andrei ELSSA LABORATORY SRL, Romania
<b>P2-07</b>	Synthesis and characterization of TiO2 (doped-undoped) nanocrystals through sol-gel and hydrothermal methods C. Lazau National Institute of Research-Development for Electrochemistry and Condensed Matter, Romania,
<b>P2-08</b>	Super Resolution Imaging of Silicon Chips Sorin Laurentiu Stanescu LIG Nanowise Ltd, U.K.
<b>P2-09</b>	Oblique Light Scanned Particle Lens Array Automatic System for Nano/Micro Patterns Texturing of Surfaces Sorin Laurentiu Stanescu LIG Nanowise Ltd, U.K.
<b>P2-10</b>	NTX18-ABS-tzBubToVCssEJsbs A study of the seed-trapping layer by methyl derived self-assembled monolayers for electroless cobalt alloys Sung-Te Chen Hsiuping University of Science and Technology, Taiwan
<b>P2-11</b>	Development of Refractive-Index-Matched MTO/Ag/MTO Multilayer Film on PET Substrate Sangmoo Yoon and Guneik Jang Chungbuk National University, Korea
<b>P2-12</b>	Engineering Carbon Dots for Multicolor Emission Alas, M.O, Mersin University, Turkey
<b>P2-13</b>	Preparation of Fluorescent Carbon dot (CD) Thin Films for Energy Applications ALAŞ, M.O Mersin University, Turkey
<b>P2-14</b>	Thin films of Cu2ZnSnS4 obtained by spray pyrolysis of colloidal nanocrystals A. Tanushevski University "Sts.Cyril and Methodius", Skopje
<b>P2-15</b>	Study of corrosion resistance of fine films of zinc doped with aluminum (ZnO/ZnMgO/ZnO:Al) Cardoso. W. S. Instituto de Ensino Superior e Formação Avançada de Vitória –Brazil
<b>P2-16</b>	Obtaining of carbon-metal nanocomposite films in low temperature plasma M.K. Dosbolayev, Al-Farabi Kazakh National University, Kazakhstan
<b>P2-17</b>	The peculiarities of steel samples hardening after pulse plasma processing A. Zhukeshov, Al-Farabi Kazakh National University, Kazakhstan
<b>P2-18</b>	Effect of residual stress on corrosion behaviour of nano-crystalline Ni-Cu alloy thin films deposited by magnetron co-sputtering Mukesh Kumar Shree Guru Govind Singh Tricentenary University Gurgaon India
<b>P2-19</b>	Self-organized growth of Ge nanowire meshes in Al2O3 matrix Basioli L. Ruđer Bošković Institute, Croatia
<b>P2-20</b>	Structure and electrical properties in self-ordered Ge-based quantum dots embedded in different matrices Nekić N. Ruđer Bošković Institute, Croatia
<b>P2-21</b>	Formation of GemSen+/- clusters via laser ablation synthesis from Ge-Se mixtures-a way to understand structure of Ge-Se glasses: Laser Desorption Ionization time-of-flight Quadrupole Ion Trap Mass Spectrometry F. Huang

## **Carbon nanotubes and multi-walled boron nitride nanotubes for aerospace engineering**

Efstathios V. Liakos, Athanasios C. Mitropoulos, George Z. Kyzas

*Hephaestus Advanced Laboratory, Eastern Macedonia and Thrace Institute of Technology, Kavala  
65404, Greece*

**Abstract:** Carbon nanotubes (CNTs) have been prepared at room temperature. Graphite powder was immersed in a mixed solution with nitric and sulfuric acid with potassium chloride. After heating up to 70 °C for 3 days leaving them to the air, then, multi-walled carbon nanotubes (MWCNTs) bundles are produced. After that, we will convert the CNTs to Multi-Walled Boron Nitride Nanotubes (MWBNNNTs) with the substitution reaction. This technique is called CNT-substituted reaction. After the substitution reaction, we set the MWBNNNTs-raw material to an aqua tenside solution and after that we will make US-Treatment (bath/sonotrode) {step 2}. After these two steps, the process contained centrifugation {step 3} and MWBNNNTs suspension filtration {step 4} to obtain the MWBNNNTs buckypaper sheets. The characterization techniques contain SEM, TEM, XRD, FTIR, SAXS. The above nanomaterials were used for aerospace engineering applications and tests in laboratory.



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***This is to certify that  
George Kyzas***

Has participated with the Poster Presentation

*Carbon nanotubes and multi-walled boron nitride nanotubes for aerospace engineering  
(Efsthios V. Liakos, Athanasios C. Mitropoulos, George Z. Kyzas)*

in the

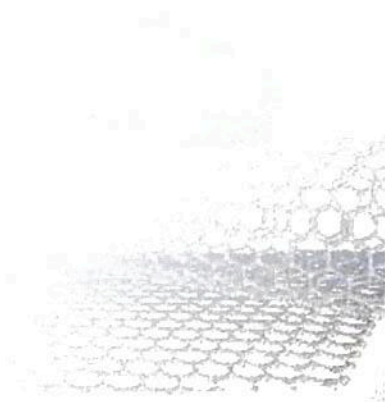
***15<sup>th</sup> International Conference on Nanosciences & Nanotechnologies (NN18)***  
held in ***Thessaloniki, July 3-6, 2018***

*Friday, July 6, 2018*

Chair of NN18

**NANOTECHNOLOGY 2018**  
Int. Conferences & Exhibition  
Nanotechnologies & Organic Electronics  
& Nanomedicine  
30 June - 7 July 2018

Professor S. Logothetidis





# Carbon nanotubes and multi-walled boron nitride nanotubes for aerospace engineering

Efstathios V. Liakos, Athanasios C. Mitropoulos, George Z. Kyzas

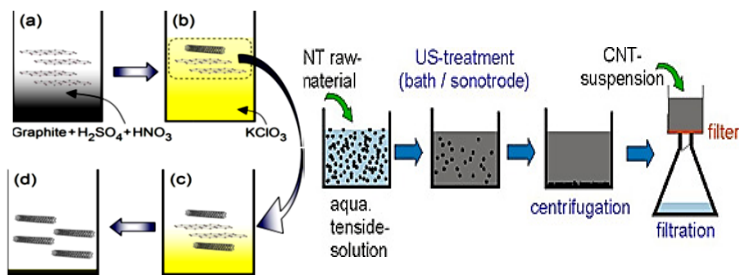
Hephaestus Advanced Laboratory Eastern Macedonia and Thrace Institute of Technology, Kavala, Greece

## Abstract / Aim / Novelty

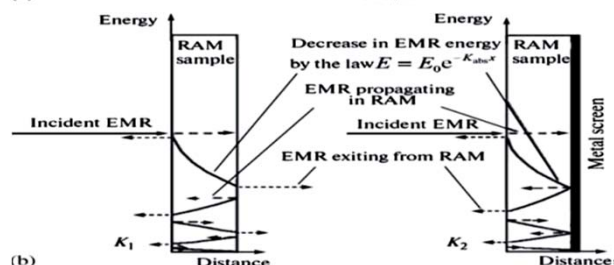
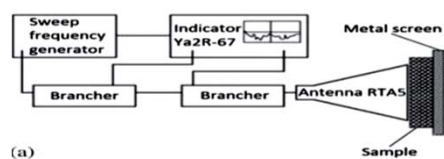
CVD, PVD, Arc – Discharge and other techniques are very expensive to synthesize MWCNTs and MWBNNTs. So, in this work we produce these nanomaterials (at room temperature) with a cost-effective method. The major aim of this research is to synthesize aerospace nanomaterials with a novel synthesis method, which is suitable for industrial production scale. The novelty of this process is that we use the Araldite aerospace resins MY 0510 CH and MY 720 CH to stick the two different types of buckypaper (BP) sheets in order to give various and specific properties. Its worth to note that the number of the MWCNTs – BP and MWBNNTs – BP layers played the most important role (in order to give the analogous properties). Moreover, we used nanodiamonds to enhance the properties of the nanomaterials.

## Synthesis

Graphite powder was immersed in a mixed solution with nitric, sulfuric acid and potassium chloride. After heating up to 70 °C for 3 days leaving them to the air, then, multi-walled carbon nanotubes (MWCNTs) bundles are produced. After that, we convert the MWCNTs to MWBNNTs with the substitution reaction. This technique is called CNT-substitution reaction. After the substitution reaction, we add the MWBNNTs-raw material to an aqua tenside solution and after that we make US-Treatment (bath/sonotrode) {step 2}. After these two steps, the process contained centrifugation {step 3} and MWBNNTs suspension filtration {step 4} to obtain the MWCNTs and MWBNNTs buckypaper sheets.



## Characterizations

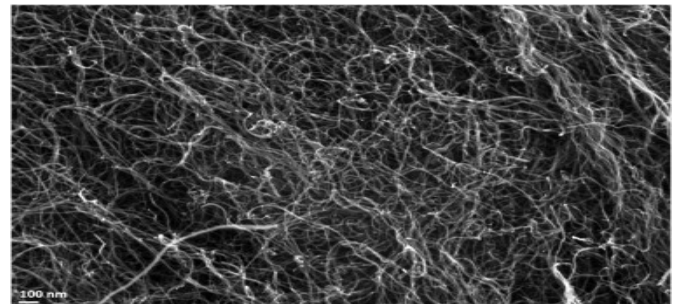
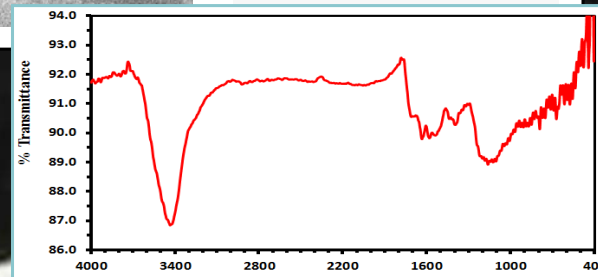
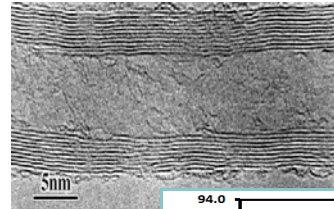


The characterization techniques contain SEM, TEM, XRD, FTIR, AFM and SAXS, TGA, and Panoramic Meter R2-69.

## Applications



Stealth Properties Radiation Shielding Properties Electromagnetic Radiation Shielding Properties



## Conclusions/Results

The produced radio-absorbing materials (RAMs) with CNTs and BNNTs buckypapers absorb the electromagnetic radiation (EMR) and used in stealth applications. The EM wave simulations and measurements were conducted to evaluate the EM wave absorbing performances of the radar absorbing structure. Except from stealth, radiation and electromagnetic radiation shielding properties these buckypaper sheets for the reason that are very flexible, can also used as aerospace suits, with scope to increase the human presence in space for longer times under these dangerous conditions. The result is a thick sheet with very good properties against radiation, which can replace the belongings RAMs like as radar absorbing sandwich constructions as for example CNTs, PMI foam and carbon epoxy composites.