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H2020-MSCA-RISE-2016-734164 Graphene 3D

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Newsletter No. 1

MULTIFUNCTIONAL GRAPHENE-BASED NANOCOMPOSITES WITH ROBUST ELECTROMAGNETIC AND THERMAL PROPERTIES FOR 3D-PRINTING APPLICATION

Published in December 2017

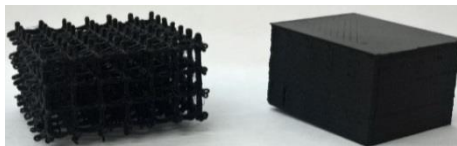
Project Results

During the first project year, NanoTechLab Ltd. and IPCB-CNR (Pozzuoli) have produced 22 compositions and filaments from PLA with 1.5-12 wt.% graphene and MWCNT, based on Robust design pre-planning (UniSa). Test samples were prepared (at IMech and NanoTechLab Ltd.) and labeled by novel QR Code (at UniSa). The electrical and dielectric properties were fully characterized (UniSa). Data on structure-morphology, SEM/TEM (IPCB, Pozzuoli), Raman spectra (MackGraphe, INP-BSU), electromagnetic properties in GHz and THz regions (INP-BSU), thermal conductivity (SU, UniSa) and surface mechanical properties (IMEch) are partly collected. Novel modeling concepts for bi-filler materials and cellular structures were proposed (INP-BSU, UNamur). The first results are very optimistic. Our optimized 12 wt.% filament with graphene and MWCNT has twice higher electrical conductivity, while 9 wt.% has comparable conductivity to that of benchmark Black Magic Conductive Graphene/PLA Filament (having 14-16 wt.% filler contents).



The novel filament is cheaper than the Black Magic one, because of the low filler contents and the use of cheap raw materials: graphene nanoplates and MWCNT, produced by TimesNano (China).

The filament material is printable. Two models of cellular structures are already designed by UNamur and



successfully printed at NanoTechLab Ltd. The properties of cellular structures will be further characterized for proving the modeling concept.

Continue reading on verso...

Partner Organizations:

- Institute of Mechanics, Bulgarian Acad. Sci. Bulgaria (Coordinator)
Prof. Rumiana Kotsilkova
- CNR / Institute for Polymers, Composites and Biomaterials-Italy
Dr. Clara Silvestre
- NARRANDO SRL – Italy
Prof. Paolo Ciambelli
- UNIVERSITE DE NAMUR–Belgium
Prof. Philippe Lambin
- UNIVERSITA DI SALERNO – Italy
Dr. Patrizia Lamberti
- NANOTECHLAB Ltd. – Bulgaria
Dr. Evgeni Ivanov
- Ilia Vekua Sukhumi Institute of Physics and Technology – Georgia
Dr. Ekaterina Sanaia
- Institute for Nuclear Problems, Belarusian State University–Belarus
Dr. Polina Kuzhir
- SICHUAN UNIVERSITY - (SKLPME-SU), P.R. China
Prof. Hesheng Xia
- MACK GRAPHE, Instituto Presbiteriano Mackenzie– Brazil
Dr. Ricardo Donato

Project Coordinator:

Prof. Rumiana Kotsilkova
IMEch-BAS, Bulgaria
kotsilkova@imbm.bas.bg

Research Manager:

Prof. Philippe Lambin
UNamur, Belgium
philippe.lambin@unamur.be

Secondments Manager:

Dr. Clara Silvestre
IPCB-CNR, Italy
clara.silvestre@ipcb.cnr.it

Dissemination Manager:

Dr. Patrizia Lamberti
Uni Salerno, Italy
plamberti@unisa.it

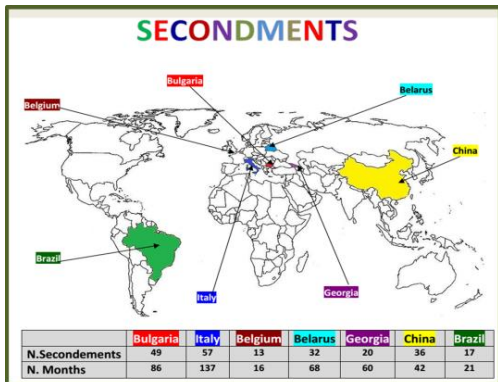
Exploitation Manager

Dr. Evgeni Ivanov
NANOTECHLAB, Bulgaria
ivanov_evgeni@yahoo.com

TC Representative

Dr. Polina Kuzhir
INP-BSU, Belarus
polina.kuzhir@gmail.com

Progress of secondments:



Realized in 2017	Planned to 2018	Planned for 2019 - 2020
57	231	199
Number Months for Secondments		

Dissemination of Project Results in 2017:

- Project publications in IF journals: **5**
- Open access publications: **2**
- Submitted publications under review: **5**
- Presentations and Invited talks at Int. Conferences: **4**
- Internal Seminars at Partners' Organizations: **17**
- Seconded Researchers: **6 ESRs** and **25 ERs**

Public and Society:

Website of Graphene 3D Project is launched and made visible in 6 other Partners' Websites, Google and Research Gate. Eight presentations were given in 2017 on Graphene 3D project objectives and results at larger scientific community in Italy, China, Brazil, Israel, Estonia and Bulgaria. Seventeen Internal Seminars were organized at the Host organizations to monitor the work of the seconded researchers. A press communication about the Graphene 3D project is published in "Academic Press" in Bulgaria.

Passed Events:

- Kick off meeting at EC, 24-25 January 2017, Brussels
- MB&MC Meeting "6th month Progress Report, WP2 results, and next planning", 17-21 July 2017, Sofia, Bulgaria

Upcoming Events:

International Workshop on "Nanocomposite polymers for 3D-printing of high-tech structures" will be organized on 22 – 23 May 2018 at UNamur, in Namur, Belgium. About 10 speakers inside and outside of the Consortium and Poster presentations from ERs/ESRs will be invited. General Assembly meeting and "Mid Term Review meeting with the EC" will take place on 24th and 25th of May 2018 at UNamur, followed by debriefing on 26th May with the Management Board and the GA.

WP Leaders:

WP1: Project Management and Coordination

Prof. Rumiana Kotsilkova
IMEch-BAS, Bulgaria
kotsilkova@yahoo.com

WP2: Processing and rheological control of nanocomposites

Dr. Marino Lavorgna
CNR / IPCB, Italy
mlavorgn@unina.it

WP3: Characterization of hybrid structure and morphology

Dr. Clara Silvestre
CNR / IPCB, Italy
clara.silvestre@ipcb.cnr.it

WP4: Characterization of nanocomposite properties around percolation threshold

Dr. Patrizia Lamberti
Uni Salerno, Italy
plamberti@unisa.it

WP5: Robust nanocomposite design and optimization of material's formulation

Dr. Patrizia Lamberti
Uni Salerno, Italy
plamberti@unisa.it

WP6: Modeling, simulation and optimization of nanocomposite cellular structures

Prof. Philippe Lambin
UNamur, Belgium
philippe.lambin@unamur.be

WP7: Prove of design concept by experimental validation of 3D printed cellular structures.

Dr. Evgeni Ivanov
NANOTECHLAB, Bulgaria
ivanov_evgeni@yahoo.com

WP8: Dissemination, exploitation of results & communication.

Prof. Rumiana Kotsilkova
IMEch-BAS, Bulgaria
kotsilkova@yahoo.com

WP9: Ethics requirements

Prof. Rumiana Kotsilkova
IMEch-BAS, Bulgaria
kotsilkova@yahoo.com

PROJECT CONTACTS:

graphene3d.project@gmail.com

<http://graphene3d.imbm.bas.bg>