

MultiComp

Slovenj Gradec, Final meeting, September 2020



Book of Abstracts

Faculty of Polymer Technology

24th – 25th September, 2020

COST Action CA15107

MULTI-FUNCTIONAL NANO-CARBON COMPOSITE MATERIALS NETWORK (MULTICOMP)

Final Multicomp Meeting 2020

24th – 25th September, 2020

Slovenj Gradec, Slovenia

Organized by

Faculty of Polymer Technology

Zaključno Multicomp srečanje 2020

Final Multicomp Meeting 2020

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COST Action CA15107 - Multi-Functional Nano-Carbon Composite Materials Network (MultiComp)

Uredniki /Edited by:

Maja Mešl, Miroslav Huskić, Irena Pulko, Polona Umek

Foreword

MULTICOMP COST action was designed to bring together theorists, experimentalists and industrialists in the field of nanocarbon materials technology. In four years we achieved a lot and now it is time to come together for the last time, show, see and summarise results.

The final meeting will be held at the Faculty of Polymer Technology in Slovenj Gradec, Slovenia. Due to the unfortunate situation with the COVID 19, it will be different from all the other ones that we had before. The meeting is partially organised as an online meeting, and partially as a normal COST meeting. The security measurements have to be followed by participants who come to Slovenj Gradec. **Masks are now mandatory in closed public places, where social distance should also be obeyed.**

The program of this meeting is shorter as usually. However, it is not less interesting. There will be 8 invited speakers, 19 flash presentations, and 7 posters. Some presentations will be given on-site, some online, using MS Teams. This is somewhat complicated but we believe it should not ruin scientific debate and experience exchange. Actually, it gives us even more opportunities to ask questions. Although the online audience should shut down their microphones, there is a “chat” they can use to ask questions during, or after the presentation. Therefore, even a 6-minutes presenter, can get, and later answer 10 questions or more. This is impossible during the normal COST meeting. However, the possibility of networking and exchange experiences will be hindered since most of the participants will be online.

We warmly welcome you all to the meeting, whether online or in Slovenj Gradec. We hope you will enjoy the programme and those who come to Slovenj Gradec, take your time and visit a small and beautiful city and its surroundings.

Local Organising committee

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Polona Umek

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Funded by:



Scientific programme

Thursday, September 24th

8:00 – 9:00	Registration	
9:00 – 9:15	Opening	Presentation Page
	Session 1 - chair Miroslav Huskić	
9:15 – 9:45	Invited lecture: Sharali Malik Nanotubes from Atlantis : Catalytic growth of Carbon Nanotubes	SG
9:45 – 10:15	Invited lecture: Silvia Marchesan Hybrid functional matter shaped by nanocarbon templates	SG
	FLASH Presentations (5 x 6 min talks)	
	Andraž Rešetič Thermomechanical functionalization of conventional silicone rubber – study and development of polymer dispersed liquid crystal elastomers	SG
10:15 – 10:45	Jacek Wychowaniec Unique cellular network formation guided by heterostructures based on reduced graphene oxide - Ti3C2Tx MXene hydrogels	online
	Joanna Rymarczyk Carbon nanocomposite materials with gold nanoparticles - synthesis, characterization, applications	online
	Liutauras Marcinauskas Influence of the dopant type on the structure of amorphous carbon films	SG
	Maria Rybarczyk Coal Fly Ashes as a platform towards functional materials	online
10:45 – 11:15	Coffee break and Poster session	
	Session 2 - chair Sharali Malik	
11:15 – 11:45	Invited lecture: Aravind Vijayaraghavan High-grip and hard-wearing graphene reinforced polyurethane coatings	SG
	FLASH Presentations (6x 6 min talks)	
11:45 – 12:25	Alen Oseli Nano-mesh formation in single-walled carbon nanotube / polyethylene nanocomposites and its effect on their physical properties	SG
	Saide Umerova Rheology of thermomechanically active shape-programmable elastomer microparticles suspension in a viscous medium	SG
	Ana Barra Graphene-based sponges for water decontamination	online
	Tamas Szabó	online

	Platelet size-effects in the colloidal stability of aqueous graphene oxide dispersions	
	Valentina Gargiulo Enhancing TiO ₂ photocatalytic activity: a survey on the effects of self-doping and of GRM-TiO ₂ interfacing	online
	Marjetka Conradi Stainless Steel Wettability And Friction In Different Environments Manipulated By Adsorption Of TiO ₂ Nanoparticle Coatings	online
12:25 – 14:00	Lunch brake	
	Session 3 - chair Silvia Marchesan	
14:00 – 14:30	Invited lecture: Paola Ayala Working towards sensing at room temperature with carbon nanotubes	SG
	FLASH Presentations (3 x 6 min talks)	
	Yasir Beeran Pottathara Dielectric Films from Cellulose nanofibrils and Graphene Oxide	SG
14:30 – 14:50	Zélia Alves Antioxidant and electrically conductive starch-based films with multiwalled carbon nanotubes: the effect of surfactant solution	online
	Roberto Di Capua Integration of conductive layers within the Eumelanin pigment: advanced spectroscopic and structural studies on EU/GL and EU/GO hybrid materials	online
14:50 – 16:00	Visit to FTPO labs	
19:00 – 22:00	Conference dinner	

Friday, September 25th

8:30 – 9:00	Registration	
	Session 4 - chair Paola Ayala	
9:00 – 9:30	Invited lecture: Mitjan Kalin Lubrication of diamond-like carbon (DLC) coatings: challenges and opportunities	SG
9:30 – 10:00	Invited lecture: Milo Shaffer Incorporating nanotubes into next generation fibre reinforcements	online
	FLASH Presentations (5 x 6 min talks)	
10:00 – 10:30	Tjaša Kolar Thermo-physiological and mechanical properties of textile, screen-printed with SWCNT-based printing pastes	SG
	Raul Arenal In-situ TEM Studies on Carbon Nanomaterials	online
	Michela Alfè Carbon Dots (CND) from carbon black: scalable top-down production and deposition in ultrathin film	online
	Christopher Ewels Bottom-up design and realisation of stable fullerene spin systems	online
	Maria Kandyla Functional surfaces of laser-microstructured silicon coated with polymer blends with reversible wettability upon heating	online
10:30 – 11:00	Coffie break and Poster session	
	Session 5 - chair Mitjan Kalin	
11:00 - 11:30	Invited lecture: Petra Pötschke Melt-mixed thermoplastic polymer-CNT composites as thermoelectric materials	online
11:30 – 12:00	Invited lecture: Jan Peters Diversity and inclusion: beyond numbers. Communication and Coaching in STEM Research	online
12:00 – 12:50	MC Meeting	online to SO and MC members
12:50 – 14:00	Lunch brake	
14:00 – 15:00	MC Meeting concluded	online to SO and MC members
15:00 – 18:00	WGs Meetings and WGs Leaders/Representatives Reporting	SG

Posters	
P1	Tamara Rozman Kinetic of crystallization of HDPE/SWCNT determined by Fast Scanning Chip Calorimetry
P2	Jaroslav Otta Thin Metal Layers as DRLs for High-Resolution CW-LIFT of Phthalocyanine-Fullerene Heterojunctions
P3	Aleksandras Iljinas Formation of titanium doped diamond-like carbon films by magnetron sputtering technique
P4	Subramanian Lakshmanan Temperature dependent electrical conductive properties of films prepared from differently dispersed single-walled carbon nanotubes and cellulose nanofibrils
P5	Polona Umek The role of cerium in $H_2Ti_3O_7$ nanoribbons in transformation to TiO_2 -B nanoribbons
P6	Ivan Radović Wake effect in interactions of ions with graphene-sapphire-graphene structure
P7	Ivan Brnardić Influence of Mg on Al alloy / MWCNT nanocomposites

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Wake effect in interactions of ions with graphene-sapphire-graphene structure

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In our recent publication¹ we have studied the wake potential induced by an external charged particle that moves parallel to various sy_1 - Al_2O_3 - sy_2 composites, where sy_i (with $i=1,2$) may be vacuum, pristine graphene, or doped graphene. Several important parameters were fixed at their respective typical values: the distance of the charged particle from the closest surface, the thickness of the sapphire (aluminum oxide, Al_2O_3) layer, and the doping density (i.e., Fermi energy) of graphene.

In this work we present a detailed study of the effects due to variations of all those parameters in the case of the wake potential produced by charged particle moving parallel to the graphene- Al_2O_3 -graphene composite system, by using the dynamic polarization function of graphene within the random phase approximation for its π electrons described as Dirac's fermions and by using a local dielectric function for the sapphire layer².

For the velocity of the charged particle below the threshold for excitations of the Dirac plasmon in graphene, given by its Fermi velocity v_F , strong effects are observed due to variation of the particle distance, while for the velocity of the charged particle above v_F strong effects are observed due to varying the thickness of the Al_2O_3 layer, as well as due to graphene doping.

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