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1126 59 Ave East, V5X 1Y9,  
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*In Association with*



PROCEEDINGS OF

**2<sup>ND</sup> ADVANCED**


**MATERIALS SCIENCE  
WORLD CONGRESS**

**2021**

**JUNE 14-15  
2021**

**Peers Alley Media**

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**ADV. MATERIALS SCIENCE 2021**



**A CONFLUENCE OF  
ERUDITE AND  
KNOWLEDGE-SEEKER**

**PROGRAM-AT-A-GLANCE**

**ADV. MATERIALS SCIENCE  
2021**

# DAY 2

TUESDAY, JUNE 15, 2021

# Scientific Program

BST – British Summer Time

## Keynote Session

07:45-08:00 **Opening Ceremony**

08:00-08:25 **Title: RE-based magnetic materials for e-mobility**  
**Spomenka Kobe**, Jožef Stefan Institute, Slovenia

08:25-08:50 **Title: Electrochemical corrosion resistance of polyetheretherketone-based coatings electrophoretically deposited on the Ti-6Al-4V alloy**  
**Alicja Lukaszczyk**, AGH University of Science and Technology, Poland

08:50-09:15 **Title: Influence of coupling two additive-manufacturing technologies on the microstructure of nickel alloys**  
**Matjaz Godec**, Institute of Metals and Technology, Slovenia

**Sessions:** Composite Materials | Polymer Science and Technology | Materials Science and Engineering | Materials Synthesis and Processing | Metals and Alloys | Metallurgical and Materials Engineering | Carbon and 2D Materials | Surface Science and Engineering | Nanomaterials and Nanotechnology | Metals and Alloys

09:15-09:35 **Title: Grain-boundary segregation of boron in high-strength steel: Characterization and modelling**  
**Philippe Maugis**, Aix Marseille University, France

09:35-09:55 **Title: Repair of components using additive manufacturing technologies**  
**Wilfried Pacquentin**, Université Paris-Saclay, France

09:55-10:15 **Title: A greener approach to the solution combustion synthesis of mixed oxides: Role of the chemical precursors**  
**Francesca Deganello**, Italian National Research Council, Italy

10:15-10:35 **Title: On the interaction of carbon nanotubes with photosynthetic assembles**  
**Maya Dimova Lambreva**, National Research Council(CNR), Italy

10:35-10:55 **Title: Ni-based catalysts for CO<sub>2</sub> conversion into CH<sub>4</sub>: Advances in catalysts design and promotion effects**  
**Leonarda Francesca Liotta**, National Research Council(CNR), Italy

10:55-11:15

**Title: Direct laser patterning of photoluminescent semiconductor quantum dots in polymeric films**

**Francesco Antolini**, ENEA Frascati Research Center, Italy

**Refreshment Break 11:15-11:30**

11:30-11:50

**Title: Microneedles fabrication technology for sensing and therapeutic applications**

**Principia Dardano**, Institute of Applied Science and Intelligent Systems, Italy

11:50-12:10

**Title: High performance Lithium Silicide electrode enable by molecular layer deposition**

**Zahilia Cabán Huertas**, Aalto University, Finland

12:10-12:30

**Title: An efficient four-variable I-L nonlocal dynamic model of unsymmetrical plane sandwich structure with laminated facings – Acoustic application**

**Stanisław Karczmarzyk**, Warsaw University of Technology, Poland

12:30-12:50

**Title: Microstructure dependent corrosion of Mg-Li alloys**

**Anna Dobkowska**, Warsaw University of Technology, Poland

12:50-13:10

**Title: Monitoring the effect of amino acid on the corrosion process of metal based on comprehensive micro- and nanospectroscopy investigations**

**Dominika Swiech**, AGH University of Science and Technology, Poland

**Lunch Break 13:10-13:40**

13:40-13:55

**Title: W-Zr-B coatings deposited by RF Magnetron – PLD hybrid method**

**Rafał Psiuk**, Polish Academy of Sciences, Poland

13:55-14:10

**Title: Photoluminescence of carbon nanoparticles synthesized by laser ablation in water and aqueous solutions of amine-based reagents**

**Agata Kaczmarek**, Polish Academy of Sciences, Poland

14:10-14:25

**Title: Analysing the impact of hydrophobic coatings on the reduction in soil accumulation on transparent surfaces intended for PV application**

**Małgorzata Rudnicka**, Gdańsk University of Technology, Poland

14:25-14:40

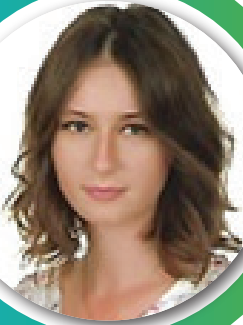
**Title: The effect of plasma treatment of polyethylene powder on the mechanical properties of composites prepared by rotational molding**

**Zoya Ghanem**, Czech Technical University, Czech Republic

14:40-14:55

**Title: Ensuring electrical conductivity of polymer-based component**

**Jakub Antoň**, Czech Technical University, Czech Republic



## Photoluminescence of carbon nanoparticles synthesized by laser ablation in water and aqueous solutions of amine-based reagents

**A.Kaczmarek, J.Hoffman, P.Denis and T.Mościcki**  
*Polish Academy of Sciences, Poland*

The comparison between two synthesis routes for obtaining carbon nanoparticles (CNPs) in water and in aqueous solutions of amine-based reagents is presented. The influence of synthesis approach and parameters on structural and luminescent properties of CNPs is discussed.

Each of the synthesis routes was a two-step process. In the first approach, the graphite target submerged in water was ablated using moderate fluence of a laser beam. Next, a certain amount of aqueous reagent solution was added to the suspension of carbon particles. Such a mixture was then exposed to a much stronger laser beam in order to reduce the size of particles. In contrast to the first approach, during another synthesis route the graphite target was immersed in aqueous reagent solution and exposed to laser irradiation. The obtained suspension of carbon nanoparticles

was further irradiated without the presence of graphite target.

Luminescence and absorbance studies revealed interesting properties of obtained colloids. Suspension of particles produced in pure water after first step is yellowish and has some absorbance in whole spectrum rising as the wavelength decreases. After second step it is colourless and fully transparent in visible light and has high absorbance in UV with distinct maximum about 285 nm. The addition of the reagent at the second step of the synthesis leads to location of absorbance maximum at about 285 nm. However, using amine-based solution from the beginning causes high absorbance in the whole spectrum without any distinctive maximum. It may indicate the simultaneous creation of different carbon structures and fluorescent molecules during laser ablation process.

### Biography

Agata Kaczmarek is a PhD student and a young researcher in the Institute of Fundamental Technological Research PAS (Poland). She works in the field of nanotechnology and materials science. Her main area of interest is nanoparticles synthesis by means of Pulsed Laser Ablation in Liquids (PLAL). She graduated in Nanotechnology at Gdansk University of Science (Poland). After graduation; she gained experience in additive manufacturing while working in XTPL S.A. In this company, she was holding a position of R&D engineer in applications laboratory and was responsible for ultra-precise deposition of materials, mainly inks with nanoparticles.