

# CEEC-PCMS1

# BOOK OF ABSTRACTS

Editors:

Matko Erceg

Andrei Rotaru

Ladislav Vrsalovic

CEEC-PCMS1

1<sup>st</sup> Central and Eastern European Conference  
on Physical Chemistry and Materials Science

26-30 July 2022  
Split, Croatia

**SITECH**

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## General Information

The joint event “1<sup>st</sup> Central and Eastern European Conference on Physical Chemistry and Materials Science (CEEC-PCMS1)” has gathered **183 registered participants** from **26 countries**, presenting a total number of **184 scientific works**. Of those, 6 are Plenary Lectures (**PL**), 8 are Invited Lectures (**IL**), 8 are Keynote Lectures (**KL**), 4 Parallel Sessions of Oral Presentations – 36 contributions (**OP**) & 3 Sessions of Poster Presentation – 126 contributions (**PS**). Each session of oral presentations is comprised of 9 works, while each of the three poster presentations included 42 works.

### Plenary Lectures

- *Aliaksandr S. Bandarenka* (Technical University of Munich, Germany)
- *Sigrid Bernstorff* (Elettra-Sincrotrone Trieste S.C.p.A., Italy)
- *Werner E.G. Muller* (Johannes Gutenberg University Mainz, Germany)
- *Luis A. Perez-Maqueda* (CSIC Institute of Materials Science of Sevilla/University of Sevilla, Spain)
- *Konstantinos N. Raftopoulos* (Cracow University of Technology, Poland)
- *Jaroslav Sestak* (The Czech Technical University in Prague, Czech Republic)

### Invited Lectures

- *Ignazio Blanco* (University of Catania, Italy)
- *Vera L.S. Freitas* (University of Porto, Portugal)
- *Maria Ines Goncalves Leles* (Federal University of Goias, Brazil)
- *Matej Hus* (National Institute of Chemistry of Slovenia, Slovenia)
- *Diego Manfredi* (Polytechnic University of Turin, Italy)
- *Alfred Menyhard* (Budapest University of Technology and Economics, Hungary)
- *Clive L. Oliver* (University of Cape Town, South Africa)
- *Paul Vasos* ("Horia Hulubei" National Institute for Physics & Nuclear Engineering IFIN-HH, Extreme Light Infrastructure-Nuclear Physics ELI-NP, Romania)

### Keynote Lectures

- *Dalia Bednarska* (Lodz University of Technology, Poland)
- *George R. Ivanov* (University of Architecture, Civil Engineering and Geodesy, Bulgaria)
- *Madalina Mateescu* (West University of Timisoara, Romania)
- *Filippo Parisi* (University of Trieste, Italy)
- *Miroslav M. Pavlovic* (University of Belgrade, Institute of Chemistry, Technology and Metallurgy, Serbia)
- *Adel Racz* (Centre for Energy Research, Hungary)
- *Ionel Roventa* (University of Craiova, Romania)
- *Peter Simon* (Slovak University of Technology, Slovakia)

## Advanced hybrid composite coatings based on calcium phosphate on titanium for potential biomedical applications

Marijana R. PANTOVIĆ PAVLOVIĆ<sup>1,2</sup>, Nenad L. IGNJATOVIĆ<sup>3</sup>,  
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Novi Pazar, Serbia

This paper deals with the issue of defining a new method of anodizing/anaphoretic deposition for the application of calcium phosphate and hybrid coatings based on calcium phosphate ceramics on titanium and anodized titanium coatings with improved properties. Hybrid coatings consisted of chitosan oligolactate (ChOL) and ChOL with Se as immunomodulatory oligoelement. The paper contributes to solving the problem of multi-stage pre-treatment and post-treatment of titanium and oxidized titanium surface to obtain a coating on the substrate, adhesion of the coating, antimicrobial and cytotoxic properties that occur in biomaterials, as well as reduced immune inflammatory response of the organism. It primarily deals with the creation and optimization of a new *in situ* anodizing/anaphoretic deposition process for obtaining multifunctional composite biomaterials. The *in situ* method results in improved adhesion bioactive coating, increased bioactivity and biocompatibility with increased antimicrobial properties and absence of cytotoxicity. The studied biomaterials have improved properties such as: corrosion resistance, absence of toxicity to the human body and adequate strength, which enables their potential use in medicine and dentistry. The aim of the research was to define new *in situ* anodizing/anaphoretic deposition process and adequate modification of process parameters for application of composite calcium phosphate coatings on titanium and its alloys, wherein innovation is reflected in combining calcium phosphate coating synthesis and surface modification by partially incorporating a ceramic coating into the crystalline structure of the substrate. The characterization of the coatings obtained in this manner was performed by various physico-chemical, biochemical and biological methods. These characterization techniques included: AFM, SEM, FE-SEM, roughness testing, XRD, FTIR, bioactivity, biocompatibility, cytotoxicity, antimicrobial activity and *in vivo* testing.

[1] M.R. Pantović Pavlović, M.M. Pavlović, S. Eraković, J.S. Stevanović, V. Panić, N. Ignjatović, *Mat. Lett.*, 261 (2020) 127121.

[2] M. Pantovic-Pavlovic, M. Pavlovic, S. Erakovic, T. Barudzija, J. Stevanovic, N. Ignjatovic, V. Panic, *J. Serb. Chem. Soc.*, 84 (2019) 1305–1318.

M. Pantović Pavlović, M.M. Pavlović, J. Kovačina, B. Stanojević, J. Stevanović, V. Panić, N. Ignjatović, *J. Serb. Chem. Soc.* 86(6) (2021) 555-559.

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