

Sanja G. Eraković Pantović, Senior Research Associate, ICTM

On the previous projects, Sanja Eraković Pantović research engagements include electrophoretic deposition method and characterization of new composite materials for biomedical applications. Especially, the novelty of her PhD work on composite hydroxyapatite/lignin and silver/hydroxyapatite/lignin coatings on titanium with natural polymer organosolv Alcell lignin that was for the first time used as a suitable biopolymer. The research was focused on finding an optimal concentration of lignin suitable for antimicrobial and cytotoxic properties, as well as corrosion stability in simulated body fluid. This PhD with a multidisciplinary approach enabled her the insight in the material science, electrochemical and physico-chemical characterization using a wide variety of experimental methods. Scientific cooperation from 2008 with *prof. Tatjana Stevanović Janežić, Department of Science of Bois et de la Forêt, Université Laval, Québec, Canada* is of particular importance in this part of the project.

In 2012 a new research topic was based on the biocomposite system Ag/hydroxyapatite/lignin involves the application of thin films on titanium and titanium oxide nanotubes using pulsed plasma deposition (PLD) and Matrix Assisted Pulsed Laser Evaporation (MAPLE) techniques. The research was focused on antimicrobial coatings obtained by laser deposition on titanium. It was found that the biocompatible hydroxyapatite/lignin coating doped with silver showed a bactericidal effect, especially according to *Candida famata*. Research was conducted within the framework of the international REGPOT-FP7 project at *NILPRP-The Laser Surface Plasma Interactions Laboratory, National Institute for Laser, Plasma and Radiation Physics in Bucharest, Romania*.

During 2013 started research collaboration with *Prof. Kyong Yop Rhee, Department of Mechanical Engineering, Kyung Hee University, Seoul, South Korea*. The focus was the use of graphene, especially for the purpose of obtaining and characterizing electrophoretic coatings of doped hydroxyapatite, as well as biocompatible Ag/hydroxyapatite/graphene coating on titanium. The influence of graphene was very important in the morphology, structure and thermal behavior of Ag/hydroxyapatite/graphene coatings and is characterized in detail by the various characterization methods. The antimicrobial activity and excellent cytotoxic results were very encouraging because silver doped coatings have shown an excellent bactericidal property, which confirms the ability to prevent the formation of biofilm, a key feature for all antibacterial implants.

In 2015, research of composite coatings has been extended to include a natural polymer chitosan. Electrophoretic deposition has been successfully applied to obtain non-toxic bioactive composite coatings based on HAP, chitosan and graphene on Ti and their interaction were analyzed by various techniques. Both hydroxyapatite/chitosan and hydroxyapatite/chitosan/graphene composite coatings have been classified as non-cytotoxic when tested on healthy peripheral blood cells.

In 2016 she stated research started on synthesis and analysis of perovskite nanomaterials based on rare earth elements and transitional metal elements (such as La,Sr,Co,Mn, etc), electrocatalysts, active titanium anodes and electrochemical characterization of materials.

The latest research of electrophoretic composite coatings for potential application in biomedicine continues in 2018 by investigating new *in situ* process of anaphoretic deposition/anodization of composite calcium phosphate coatings on titanium and titanium alloys.

All these years she spent working on research in different scientific environments, and gained the knowledge and certain level of experimental skills that make her a suitable candidate to accomplish the project objectives. She has quite strong background in the material science, electrophoretic deposition, various methods of synthesis - ultrasonic spray pyrolysis and microwave assisted method, physicochemical and electrochemical characterization of nanopowders and electrocatalysis. She gained valuable experience as a visiting researcher during internships, and had a chance to collaborate with numerous researchers from Serbia, France, Slovenia, Romania and Canada, with very different backgrounds from chemists and physicist, to medical doctors. She had a successful communication about experiments in order to obtain the desired results. Until now Sanja Eraković Pantović had 21 published papers with outstanding peer reviews, 2 book chapters, 1 patent and 22 international conferences.

Relevant references:

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2. **Sanja Eraković**, Ana Janković, Djordje Veljović, Eriks Palcevskis, Miodrag Mitrić, Tatjana Stevanović, Djordje Janačković, Vesna Mišković-Stanković, "Corrosion Stability and Bioactivity in Simulated Body Fluid of Silver/ Hydroxyapatite and Silver/Hydroxyapatite/Lignin Coatings on Titanium Obtained by Electrophoretic Deposition", *Journal of Physical Chemistry B* **117**,6 (2013) 1633-1643. (Chemistry, Physical, 32/134, IF (2011) = 4,061), ISSN 1520-6106.
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<http://www.sciencedirect.com/science/article/pii/S0925838814027261>

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- **a short Curriculum vitae**

Sanja Eraković was born on 6.12.1981 in Belgrade, Serbia. She graduated BSc studies in 2006 at the Faculty of Technology and Metallurgy in Inorganic Chemical Technology (Analytical Chemistry and Quality Control), University of Belgrade. Sanja Eraković started doctoral studies in school year 2006/2007 at Faculty of Technology and Metallurgy, University of Belgrade, Belgrade, Serbia. She defended her PhD thesis entitled „Electrophoretic Deposition and Characterization of Hydroxyapatite/Lignin and Silver/Hydroxyapatite/Lignin Coatings on Titanium“ in 2013. During her working on doctoral dissertation she had visiting study *Department of Science of Bois et de la Forêt, Université Laval, Québec, Canada* for 3 months in 2006, as a result of longlasting scientific cooperation with prof. Tatjana Stevanović Janežić, also one of the mentor of her PhD thesis. After that she also had two visiting studies in 2012 at *NILPRP-The Laser-Surface-Plasma Interactions Laboratory, National Institute for Laser, Plasma and Radiation Physics, Bucharest, Romania* for two months in group of prof. Ion Mihailescu, as a part of REGPOT-FP7 „Reinforcing of Nanotechnology and Functional Materials Centre“ (No: 245916). Dr Sanja Eraković has published two chapters, 21 scientific papers and 44 conference presentations at the national and international conferences. She is a member of Serbian Chemical Society (SHD), International Society of Electrochemistry (ISE) and Serbian Association for Cancer Research (SDIR). H-index: 11. Citation number (SCOPUS): 591. Citation without self citations (including book and book chapters): 542.

The projects:

2008 – 2010. Electrochemical properties of oxide and polymer coatings on modified metallic surfaces, Ministry of Science and Technological Development, Republic of Serbia, ON142061.

2011 – 2016. Synthesis, development of technology and application of nanostructured multifunctional materials with defined properties, Ministry of Education and Science, Republic of Serbia, III45019.

2016– 2020. A new approach to designing materials for energy conversion and storage, Ministry of Education, Science and Technological Development of the Republic of Serbia, OI 172060.

2010 – 2012. Electrochemical non-metallic coatings on modified metal surfaces, Bilateral project between the Ministry of Science and Technological Development, Republic of Serbia, and the Slovenian Research Agency, Republic of Slovenia.

2011 – 2015. COST Action MP1005: From nano to macro biomaterials (design, processing, characterization, and modeling) and applications to stem cells regenerative orthopedic and dental medicine (NAMABIO).