

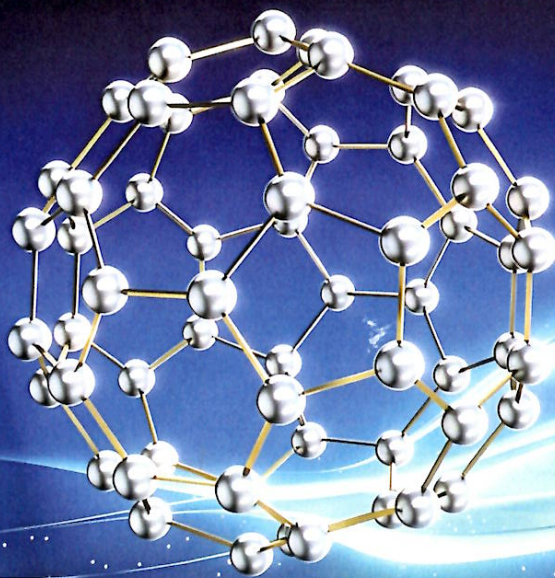


**The 9th International Congress on
Advanced Materials Sciences and Engineering**



The 4th World Chemistry Forum

Time: July 22-24, 2026 Place: Zagreb, Croatia



Abstract Book

Hosting Organizations



Day 1: July 22, 2026 (Wednesday), Afternoon

WCF-01: Chemical Synthesis and Catalysis

Time: 13:30-15:55, July 22, 2026 (Wednesday) ; Place: Room Jelenovac , Ground Floor

Chair	Dr. Sharafat Ali, Associate Professor, Linnaeus University, Sweden
13:30-13:55	Title: Artificial Cellulase Catalysts for Biofuel and Polymer Applications Dr. Ananda Amarasekara, Professor, Prairie View A&M University, USA
13:55-14:20	Title: Bimodal Nanostructured Contrast Probes Prepared by Green Chemistry Dr. Karolina Siskova, Head of Nanostructures for Biomedical and Environmental Applications, Dept. of Experimental Physics, Faculty of Science, Palacký University Olomouc, Czech Republic
14:20-14:45	Title: Opportunities for the Chemical Sector in the Transition from Linear to Circular Economy and Bioeconomy Dr. Marina Tišma, Professor, Josip Juraj Strossmayer University of Osijek, Croatia
14:45-15:10	Title: Design of Advanced Glass and Oxynitride Materials for Optical, Mechanical, and Sustainable Applications Dr. Sharafat Ali, Associate Professor, Linnaeus University, Sweden
15:10-15:30	Coffee Break
15:30-15:55	Title: DES-Templated ZnO Nanoplates as Sustainable Photoanodes for DSSCs: Irradiance-Dependent Behavior Dr. Lorenzo Gontrani, Associate Professor, University of Rome Tor Vergata, Italy

Title: Bimodal Nanostructured Contrast Probes Prepared by Green Chemistry

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Abstract

Background/Problem: Functional engineered nanocomposites can be prepared by many different chemical approaches. Considering sustainability of chemistry and responsible research, only the procedures that follow green chemistry principles belong to the highly recommended and preferred ones nowadays.

Objective/Purpose: This study aimed to demonstrate possibilities and limitations of green chemical syntheses of engineered bimetallic nanocomposites that are applicable as contrast agents.

Methods/Approach: We exploited aqueous solutions of biomolecules and inorganic salts to generate functional engineered nanocomposites that consist of two modalities, luminescent noble metal nanostructures and magnetic-field-responsive components, both embedded in bio-matrices. Thorough characterization and investigation of structure-property relationships led to further optimization of the whole synthetic procedure. After biocompatibility evaluation, the applicability of the as-prepared nanocomposites was assessed by magnetic resonance relaxivity measurements and by imaging techniques (fluorescence, FI; magnetic resonance, MRI) performed in vitro and in vivo.

Results/Findings: Properties of newly developed nanostructured contrast probes can be finely tuned by a careful setup of nanocomposite synthetic conditions obeying green chemistry principles. The nanocomposites revealed no cytotoxicity and were FI/MRI-active in vitro as well as in vivo.

Conclusion/Significance: The newly developed bimetallic nanocomposites can be prepared by green chemistry and serve as nontoxic bimodal contrast probes.

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Keywords: green chemistry, bimetallic nanocomposites, contrast agents, fluorescence, magnetic resonance imaging, dual imaging, bimodal imaging.

Biography

RNDr. Karolina Siskova, Ph.D. is an Associate Professor and, simultaneously, the Head of Nanostructures for biomedical and environmental applications research group (<https://www.prf.upol.cz/kef/nanobiomed/>) at Department of Experimental Physics, Faculty of Science, Palacky University in Olomouc. Karolina's research interest includes optically and magnetically active metal/metal-oxide nanostructures and their combinations that can serve as multifunctional nanocomposites. She is also interested in light-matter interaction and investigates mechanisms of nanocomposite formation. She was awarded by double PhD degree in 2006; one from Charles University in Prague, Czech Republic (physical chemistry), the other from Université Pierre et Marie Curie in Paris, France (interface of physics, chemistry and computing science with biology). During her postdoc, spent at University of California in Santa Barbara, USA (2008-2009), she was financed by Fulbright Foundation. In Autumn 2009, she started to teach as an Assistant Professor at Dept. of Physical Chemistry, Faculty of Science, Palacky University in Olomouc, Czech Republic, and became Associate Professor in 2014. She received several awards (e.g. by Spectroscopic Society of J.J. Marci; as ACS reviewer, Faculty of Science Dean's award for teaching). Her h-index is 22 according to Web of Science (accessed in March 2026).