

Nanomedicine – the highlight of the NANOCON'22 conference

The XIV. international conference NANOCON took place in Brno on October 19th – 21st, 2022. In total **232 participants from 19 countries listened 67 lectures and could see 128 posters**. Their common theme was nanomaterials and the latest advances in their research and applications. In the Czech Republic, it is the largest event of its kind, and one of the largest in the Central European region.

Nanomedicine – the use of nanoscale materials for the diagnosis and treatment of diseases – was the highlight topic of the NANOCON'22. Nanoparticles are already commonly used in diagnostics and medical imaging as contrast agents. Several chemotherapy drugs based on nanoparticles have already been approved. Unexpected covid-19 pandemic confirmed the huge potential of nanomedicine: effective masks were sewn from nanofibers in a large series, several nanomaterials have been successfully used in mRNA vaccines by Pfizer-BioNTech and Moderna. Rapid tests for detection the presence of the dangerous coronavirus use gold nanoparticles to create a coloured strip indicating a positive result.

The topic of nanomedicine resonated in all thematic sections of the NANOCON program, in a third of all posters, as well as in both plenary lectures. **Professor Arben Merkoçi** from the Catalan Institute of Nanoscience and Nanotechnology in Barcelona excited the audience in his opening lecture about the possibilities of smart and cheap nano biosensors for diagnostics, environmental or safety monitoring developed by his team. They are based on the integration of biological molecules (e.g., DNA) and other (bio)receptors with micro- and nanostructures and integrated into simple sensory platforms. **Professor Jean Francois Berret** from the University of Paris presented in his plenary talk, among other things, some particles used as diagnostic and therapeutic agents for the treatment of serious diseases, including cancer.

However, the **thematic scope of the conference** lectures was traditionally much broader. In Brno researchers presented their R&D in the preparation, characterization of the properties of nanomaterials and their applications not only in medicine, but also in industry, construction engineering or for the environmental purposes. Professor **Alexander Kromka** from the Institute of Physics CAS presented the research results in the field of nanostructured diamond surfaces suitable for biomedical engineering. **Andrea Salis** from the Cagliari University in Sardinia indicated the application possibilities of mesoporous silicon oxides and metal organic structures as adsorbents and enzyme carriers in the environment. Monitoring and toxicity of nanomaterials were also the subject of expert discussion.

Petra Vopařilová from the Mendel University in Brno won **the prize for the best poster**. The young scientist presented in her poster the method of detecting infectious pathogens using a portable microfluidic system. The diagnostic test is characterized by simplicity and the patient can test himself in the comfort of his home in communication with a smartphone. The work was created in cooperation with BUT experts Brno/CEITEC.

The Best Lecture for the Young Scientist (up to 33 years of age) was awarded to Tomáš Netolický from the University of Pardubice for his talk relating to the promising material for optics and photonics applications, which is based on nanocrystalline Yb₃Ga₅O₁₂ doped by Er³⁺ or Ho³⁺ ions. Dorota Sklenářová from the Masaryk University received the honourable mention for her lecture describing the developed effective immunomagnetic test available to detect prostate cancer at an early stage. The test uses up conversion nanoparticles to detect prostate-specific antigen (PSA), which is one of the most important biomarkers of prostate cancer.

The next, 15th NANOCON conference will take place on **18th – 20st October 2023**. It will accentuate the topic **Nanomaterials and nanotechnologies for sustainable energy and environment**. More information can be found at www.nanocon.eu

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