



**Belarusian State University
of Informatics and Radioelectronics**

R&D Department

Announcement

BSUIR to participate in the International Exhibition "ZDRAVOOKHRANENIE-2024" (within the frames of the International Scientific and Practical Forum "Russian Healthcare Week 2024")

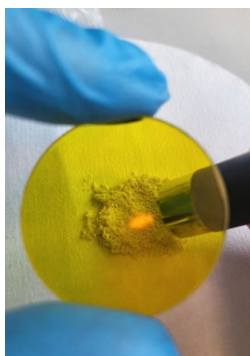
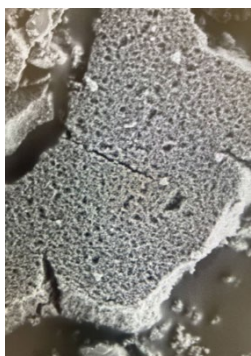
December 2 – 6, 2024

CEC "EXPOCENTER"
Krasnopresnenskaya embankment, 14,
Moscow, Russia

The forum traces its history back to the Healthcare exhibition, which has been held since 1974 and is one of the oldest medical forums in Europe, as well as one of the country's main federal congress and exhibition events in the field of healthcare.

The forum will traditionally include the international exhibition "Healthcare-2024" (ZDRAVOOKHRANENIE-2024), in which the Belarusian State University of Informatics and Radioelectronics plans to participate. The university's stand will be located in the collective exhibition of the Ministry of Education of the Republic of Belarus (stand number: 23F50). The university will present innovative developments in the field of nanotechnology and plasmonics, which can be applied in medicine and dentistry.

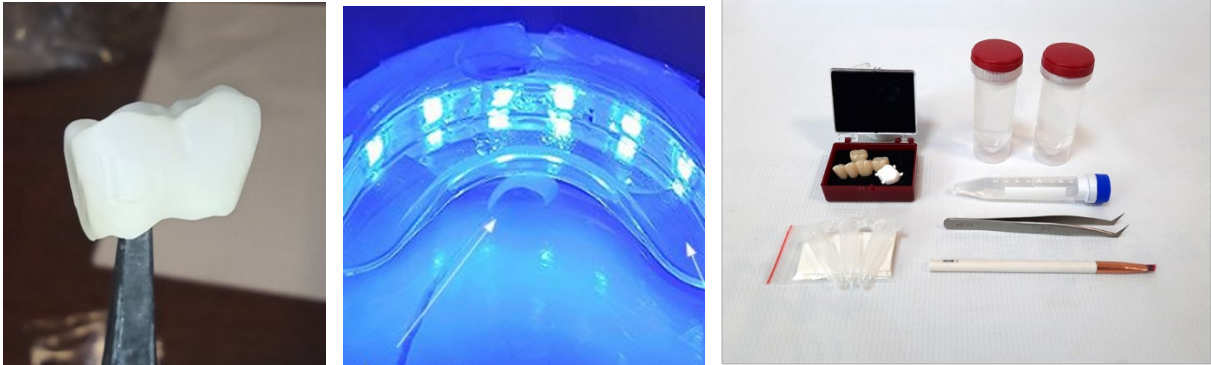
Biodegradable nanoparticles for the visualization and analysis of biological objects using photoluminescence and Raman spectroscopy.



The exhibit consists of powders made from biodegradable materials nanostructured particles containing silicon and silver that exhibit photoluminescence, dissolve in biological fluids at a controlled rate depending on pH, and enhance the Raman signal, allowing for simultaneous cell imaging, molecular analysis, and drug delivery.

The innovation of the development lies in the protocols for the formation of nanoparticles, their use for cell analysis and the introduction of drugs into them, which is characterized by world-class novelty and opens up the possibility of application in nanotheranostics.

Set for forming plasmonic coating on the surface of dental implants for photostimulated delamination of biofilms.



The set includes containers with solutions for coating formation, a brush, tweezers, filter paper, and a light-emitting device.

The developed coating consists of silver particles ranging in size from 250 to 450 nm with a packing density of 4 to 8 μm^{-2} and, when exposed to optical radiation with a wavelength of 445 nm and a power density of 7–10 mW/cm^2 , ensures the peeling off of biofilms from the surface of dental implants made of zirconium and titanium oxides due to light-induced charge transfer between silver particles and molecules of the adjacent biofilm layer. The advantage of this development over its analogues is that this process is not accompanied by an undesirable local increase in temperature.

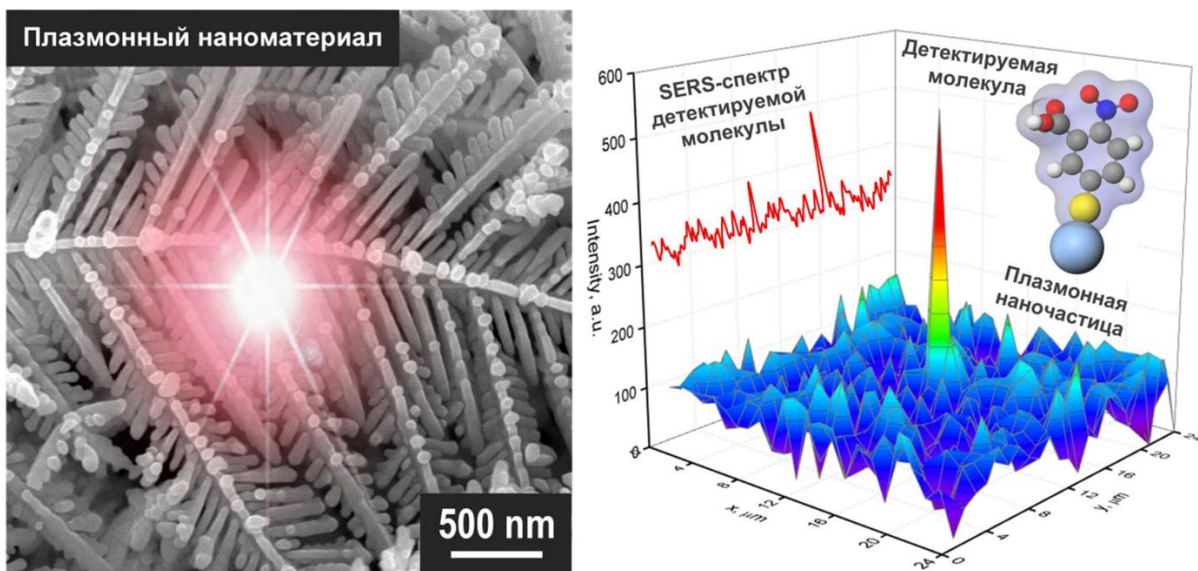
Self-cleaning porous filters with plasmonic and photocatalytic properties for face masks.



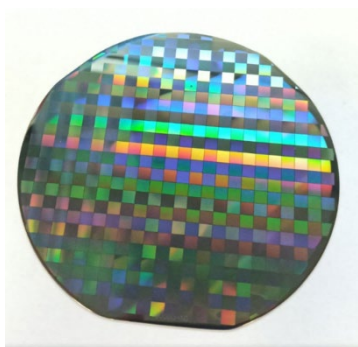
The developed filters are designed for multiple use, provide filtration of particles larger than 100 nm and sterilization of bacteria when exposed to solar and artificial radiation, which is impossible when using standard medical masks.

The cost of a reusable mask with a developed filter is four times higher than the cost of a standard disposable medical mask, but the stability of the sterilizing and filtering characteristics for 7 days increases the economic efficiency of its use for the consumer.

Photonic sensors operating on the effect of surface-enhanced Raman scattering of light.



A line of photonic sensors has been developed that, depending on the morphology of the sensitive area, allow for the detection and study of the structure of molecules, including disease biomarkers, and the high-precision analysis of biological fluids and sanitary-epidemiological swabs using Raman spectroscopy.



The advantages lie in the technological features of the formation of sensitive micro- and nanostructured areas that enable the production of sensors that are maximally adapted to customer requirements, including flexible ones; activated immediately before use; for visualization of single molecules,

analysis of high-molecular compounds, detection of anomalies in biological fluids, etc.

[About the developer](#)