



**Belarusian State University
of Informatics and Radioelectronics**

R&D Department

Announcement International Medical Forum "Healthcare in Belarus 2024" (Belarus Medika 2024)

April 23–26, 2024
Sports complex "Football Arena"
(Pobediteley Ave., 20/2, Minsk, Republic of Belarus)

At the International Medical Forum "Healthcare in Belarus 2024" the Belarusian State University of Informatics and Radioelectronics will present:

ULTRASOUND TECHNOLOGIES AND EQUIPMENT FOR MEDICINE

Portable cavitometer



It is designed to measure and control cavitation activity in high-power ultrasonic fields and hydrodynamic cavitators. The device can be used to optimize ultrasonic technological processes, determine the presence and intensity of cavitation in hydraulic systems, and measure cavitation thresholds.

Application in medicine:

- to increase the permeability of cell membranes (sonoporation) without significantly affecting the vital activity of a cell;
- to suppress cell growth and reproduction;
- to destroy cells without the possibility of restoration of functions.

Features and Advantages:

- ensures separation of the contributions of stationary and non-stationary cavitation;
- equipped with a built-in memory card and USB connector;
- includes software for processing measurement results.

Ultrasound High Frequency Dispenser



It is designed to generate ultrasonic vibrations in liquids. The device can be used for obtaining suspensions or emulsions from various substances, washing small parts from mechanical contaminants, extraction, dispersion, sonic chemistry, as well as for processing samples from fibrous, crystalline, powdery and other substances during electron microscopic studies.

Application in medicine:

- for cell destruction;
- for accelerating the production of Misfolding prions in medical research;
- for simplification of the blood test for Stomafree hemolysate – processing time is reduced from 30 minutes to 5 seconds;
- for rapid destruction of bacteria.

Features and Advantages:

- operating modes: pulsed, continuous;
- adjustment of the amplitude of oscillations of the emitter in the range from 5 to 100%;
- replaceable emitter waveguides.

[About the developer](#)

PLASMON NANOMATERIALS FOR BIOSENSING AND ANTIBACTERIAL COATINGS OF FILTERS AND IMPLANTS

Nanomaterials for visualization and analysis of biological objects using photoluminescence and SERS spectroscopy



The developed nanomaterials are substrates made of biodegradable nanostructured silicon and silver, which exhibit photoluminescence, dissolve at a controlled rate depending on the pH level and contribute to the appearance of the SERS effect, which makes it possible to simultaneously visualize cells, study the structure of target molecules in them, and also introduce into them medicines.

Innovation lies in the development of modes for the formation of photoluminescent nanomaterials from biogenic silicon based

on horsetail, bamboo or rice, which is characterized by world-class novelty, opens up the possibility of using substrates in nanotheranostics and increases the economic efficiency of their production technology.

Set for forming an athermal coating for sterilizing the surface of medical devices



The set includes two containers with solutions for forming the coating, a brush, tweezers, and filter paper.

The developed coating consists of silver particles ranging in size from 250 to 450 nm with a packing density from 4 to 8 μm^2 and, when exposed to optical radiation with a wavelength of 445 nm and a power density of 7.1 mW/cm^2 , ensures peeling of biofilms from the

surface of medical products due to light-induced charge transfer between silver particles and the molecules of the adjacent biofilm layer, which is not accompanied by an undesirable local increase in temperature characteristic of currently used coatings of noble metal particles ranging in size from 10 to 150 nm.

Porous nylon filters modified with plasmonic and photocatalytically active nanoparticles for self-cleaning face masks



The developed filters are designed for repeated 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, however, the stability of sterilizing and filtering characteristics for 7 days increases the economic efficiency of its use for the consumer.

About the developer

PLASMA GENERATION SYSTEM FOR PROCESSING BIO-OBJECTS

Experimental plasma generation system for processing bio-objects



An experimental system for generating dielectric barrier discharge plasma using "cold" plasma was developed to study the process of the influence of atmospheric plasma on biological objects and bioorganic substances, in particular, on seeds and root systems of higher plants. It is also possible to use the device in cosmetology and medicine.

Advantages:

- has no analogues in Belarus;
- the device and processing technology using cold atmospheric plasma allow for non-destructive changes in the surface properties of materials of various natures.

About the developer

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