





## FSBI TISNCM

Synthesis of diamond single crystals weighing up to 7 carats that do not have natural analogs.

Development of hard alloys based on TiC-ZrC; ultrahard fullerites;  $UO_2$  ceramics,  $\beta-Si_3N_4$ , new  $Bi_2Te_3$ -based nanostructured thermoelectric materials.



## X-ray Optics and Diamond Anvils

Research under ultrahigh pressures up to 2.5 - 3 Mbar. Absence of luminescence.

X-ray optics unparalleled anywhere in the world as confirmed by independent research in the Argonne National Laboratory.



## Diamond Single Crystal Microsurgical Scalpels

Hardness exceeds 105 GPa.

Grinding radius is less than 4 nanometers.

Thanks to their superiority in all parameters over steel scalpels diamond single crystal scalpels reduce the surgery risks to a minimum and provide healing at a far quicker rate.

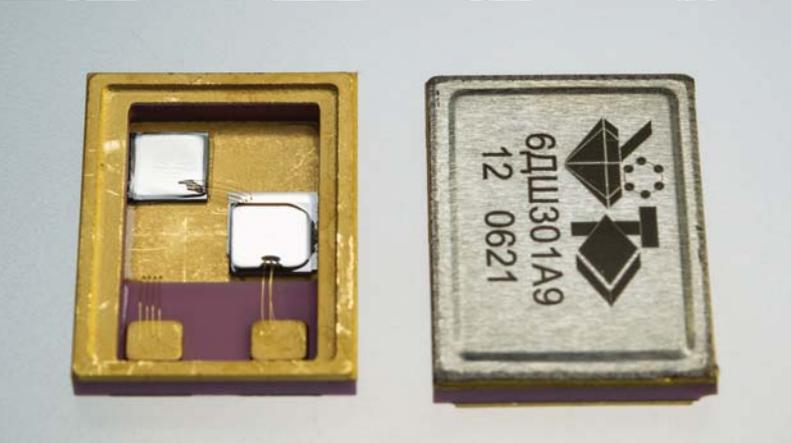


## Power Supply and Sensors based on Diamond Single Crystals

1040 single structures on a single crystal. Integral forward current higher than 1A (5mA/mm).

Ultraviolet and temperature sensors, and sensors of ionizing radiation.

The highest measurement accuracy, wide range and high speed.

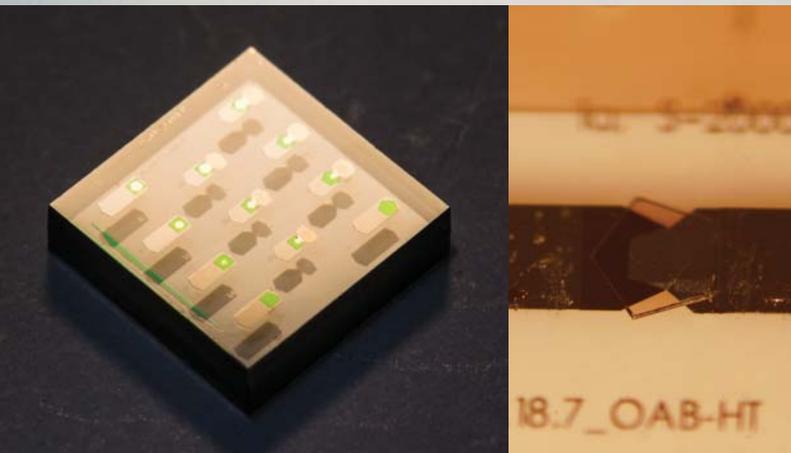


## Extreme Acoustoelectronics

High and ultra high pressure sensors.

Remote temperature control under radiation effects.

Conversion of the nuclear radiation energy to electric energy.



## Instrument Making

Unparalleled "NanoScan" scanning nanohardness testers.

Devices and apparatus for identification and sorting of diamonds, created jointly with "ALROSA" and superior over all the world analogues.



## Production of Installations

Development and creation of high-pressure equipment and control systems for technological processes of synthesis.

A smoothly running for several years method and installations of HPHT.

High-end equipment for CVD synthesis of diamond layers.



## Products for Drilling Equipment

Two-layer diamond-hard alloy plates.

Successfully passed a field test at "Gazprom Neft". Covering 25 - 30% of RF needs in PDC for drill bits on the first stage of deployment production and 80 - 90% on the second stage.



## Carbide Tools and Waterjet Cutting Nozzles

Carbide (WC - Co) tools with coating of TiC, TiCN,  $Al_2O_3$ ,  $TiB_2$ , etc. High-precision processing of materials.

Single-crystal diamond nozzles - wear resistance up to 10 000 hours at 6 000 atmospheres.



## Diamond Micromechanics

Manufacture of micromechanics from diamond single crystals.

Diamond properties allow obtaining levels of accuracy and durability unattainable for mechanics made of any other metal or alloy.



