FSBI TISNCM

Technological Institute for Superhard and Novel Carbon Materials

TISNCM was founded in 1998 on the basis of the 'Superhard Materials' Scientific and Technical Centre (SHM STC) which had been established in 1995. The Ministry of Education and Science of the Russian Federation performs as a founder of FSBI TISNCM.

Areas of research:

– basic and applied research aimed at developing and improving superhard and carbon materials, structural and functional nanomaterials;

– experimental design, including development of high-tech equipment, manufacturing pilot samples of the equipment, materials and products.

Current research spheres:

– development of high-pressure and high-temperature synthesis methods for high purity, doped/semiconductor diamond monocrystals, their characteristics studies;

– studies of superhard and novel carbon nanostructured materials properties, diamonds and CVD diamond films, polymerized fullerites, high-efficiency thermoelectrics;

– development of synthesis methods for long and few-layer carbon nanotubes;

– development of scanning probe microscopy methods for measuring physical, mechanical, and electrical proper ties of surfaces and their nanomodification.

In 2007 – 2010 a major innovation project of national importance was successfully implemented: 'Conducting research and development activities, technology development and organization of industrial manufacture of products from single-crystal superhard materials for instrument and tool industry'.

One of the most important scientific and technical achievements is the result of the joint work carried out by the physicists from Argonne National Laboratory, the U.S. and TISNCM scientists in 2009 – 2011. The main results of this work are highly perfect crystals of the IIa-type synthetic diamonds grown in TISNCM. The world`s first obtained record value of the reflection coefficient 98% for energy radiation of 23.7 keV agrees well with the theoretical calculations of the American scientists. Thus, there are all the necessary preconditions for practical realization of an X-ray free electron laser creation, where highly perfect diamond crystals will play the role of mirrors.

In 2009 – 2011 technology for nanostructured thermoelectric materials with high thermoelectric efficiency was developed and an international patent (jointly with Siemens) was obtained.

Currently, the Institute employs 7 Doctors of Science and 29 Candidates of Science. The average age of the staff is 38.

Монокристаллы синтетических алмазов и изделия из них, созданные в ФГБНУ ТИСНУМ

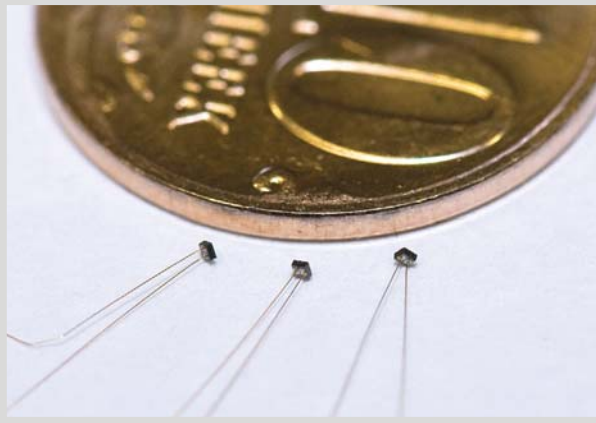
Single crystal synthetic diamonds and production from them made in FSBI TISNCM

Электрические измерения на микроконтактах с помощью зондовой станции

Point contacts electrical measurements using probe station

Сопла для гидроабразивной резки из монокристаллов алмаза

Water-jet cutting nozzles made of diamond single crystals



Чувствительные элементы датчиков температуры

Sensor elements of temperature gauges