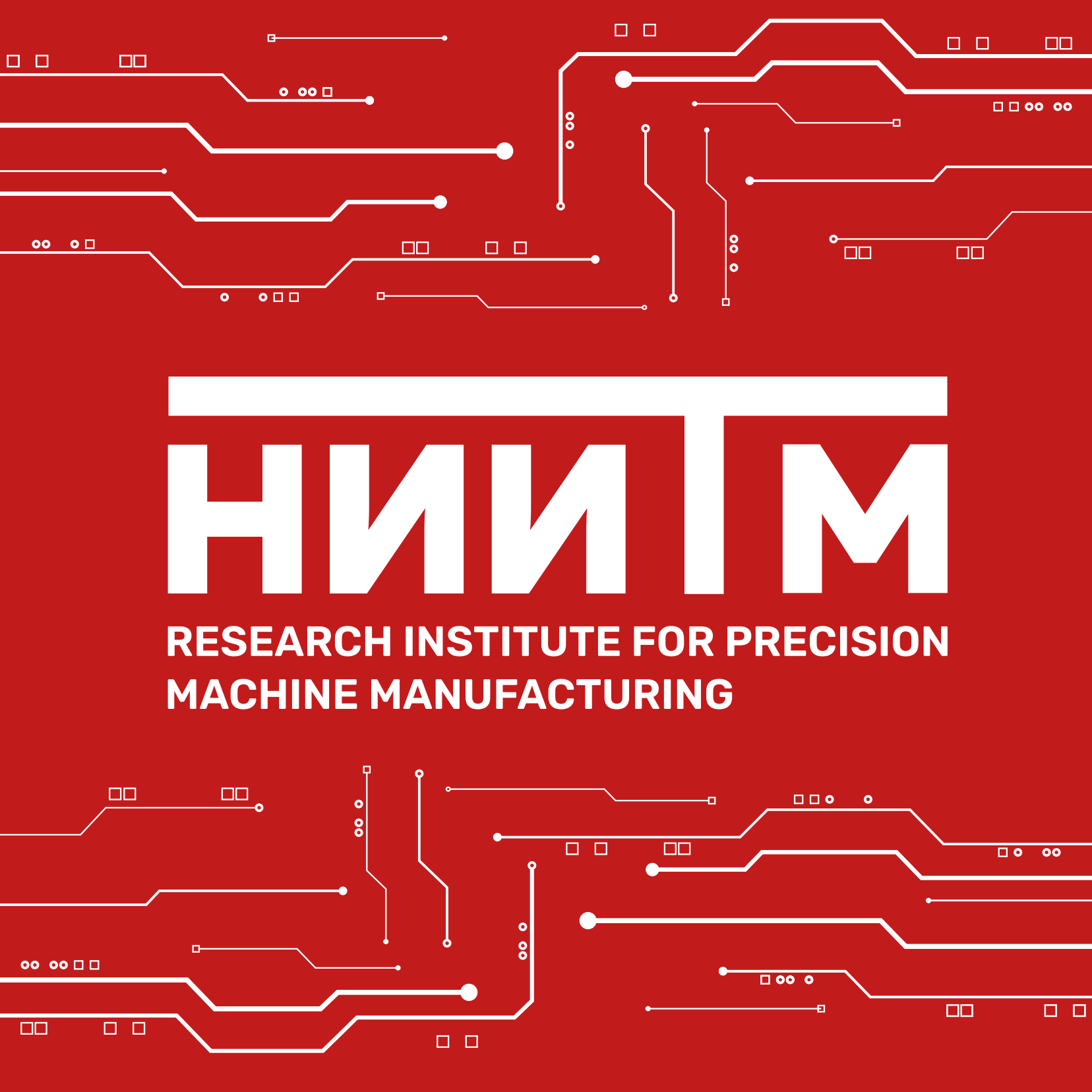




HIITM

**RESEARCH INSTITUTE FOR PRECISION
MACHINE MANUFACTURING**



ABOUT THE COMPANY

Research Institute for Precision Machine Manufacturing (NIITM JSC) is a leading domestic developer and manufacturer of a wide range of industrial and R&D semiconductor manufacturing equipment for the microelectronics industry. The company is an active participant in Comprehensive Projects and State Programs of the Ministry of Industry and Trade of the Russian Federation.

1962

YEAR OF
FOUNDATION

> 3000

UNITS OF EQUIPMENT

Our Mission:

«Development of domestic
innovative equipment for electronic
components' production and technologies»

> 60

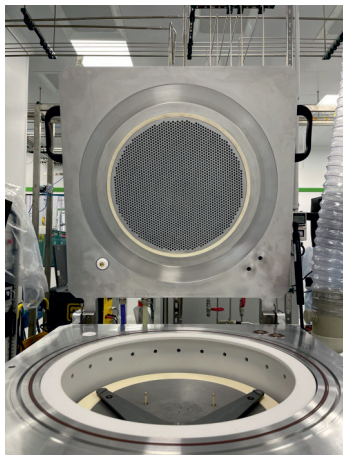
CUSTOMERS

3200

SQUARE METERS
OF MANUFACTURING
FACILITIES

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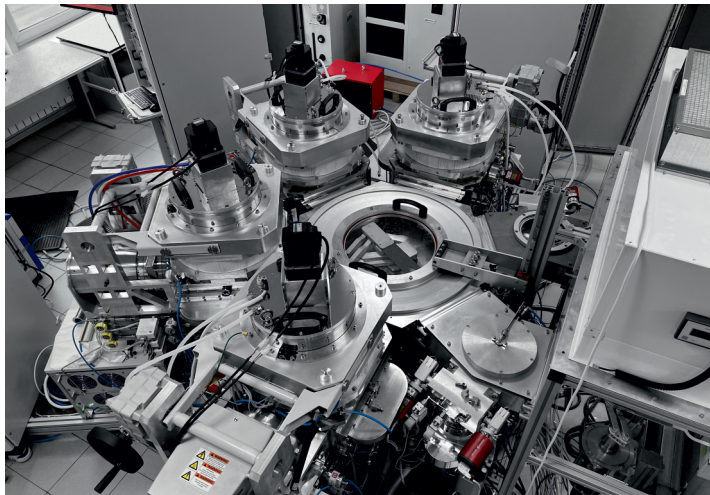


CLUSTER SYSTEMS

Manufacturing-oriented cluster systems Cluster TM are developed for processing 6-inch, 8-inch and 12-inch wafers.

The cluster system configuration includes 1 to 4 process modules integrated by a robotic vacuum transfer system. This transfer system is designed for automated wafer transfer between process modules, featuring wafer loading/unloading from cassettes, SMIF or FOUP load ports. The modular architecture allows flexible system configuration depending on production requirements and capacity, thereby reducing the equipment footprint.

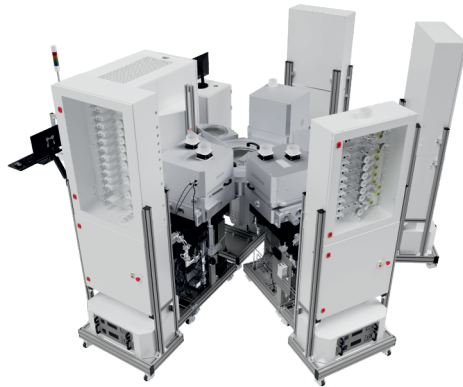
One of the company's latest developments are high-throughput plasma etching and deposition cluster systems for 12-inch wafer processing. The development of these systems was completed in 2025 as part of a joint R&D project conducted with Molecular Electronics Research Institute (MERI).





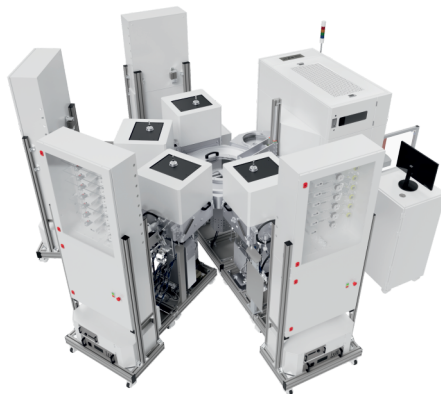
Physical Vapor Deposition PVD Cluster

- ⊞ Vacuum magnetron sputtering
- ⊞ Sputtered materials: Al, Ti, TiN, Ta, Cu, Au and others



Plasma-Chemical Etching RIE Cluster

- ⊞ Reactive Ion Etching (RIE) of metal layers
- ⊞ Reactive Ion Etching (RIE) of silicon and polysilicon layers
- ⊞ Reactive Ion Etching (RIE) of dielectric layers
- ⊞ Plasma-chemical etching of photoresist and polymer layers



Chemical Vapor Deposition CVD Cluster

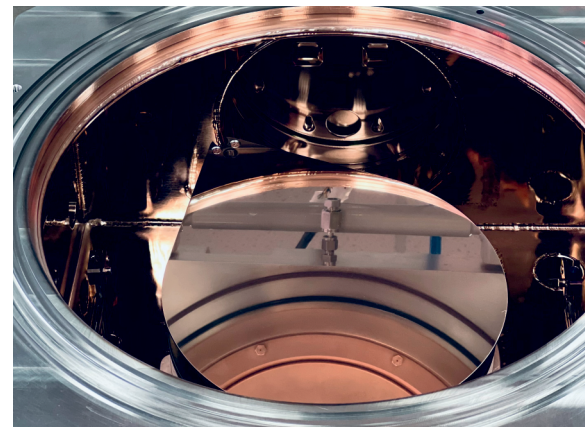
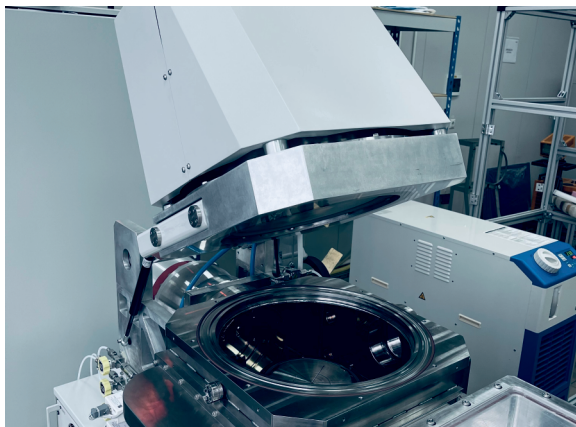
- ⊞ Chemical Vapor Deposition of Si_xN_y from SiH_4 / NH_3
- ⊞ Chemical Vapor Deposition of SiO_x from SiH_4 / NO
- ⊞ Chemical Vapor Deposition of SiO_x from TEOS / O_2
- ⊞ Thermal Deposition of SiO_x from TEOS / O_3

PHYSICAL VAPOR DEPOSITION



The development of physical vapor deposition (PVD) systems — ranging from benchtop to industrial-scale equipment for various film deposition — is one of the primary areas of the company's expertise. The semiconductor manufacturing equipment is configured for both batch and single-wafer processing of 3-inch to 8-inch wafers, as well as 60×48 mm substrates.

The equipment is engineered for the deposition of single-layer and multi-layer metallic, dielectric, and resistive thin films by magnetron sputtering, electron-beam (e-beam) evaporation or thermal evaporation methods.

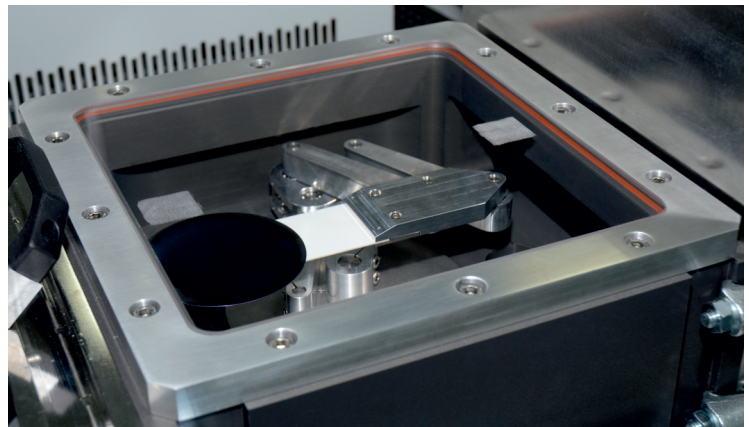
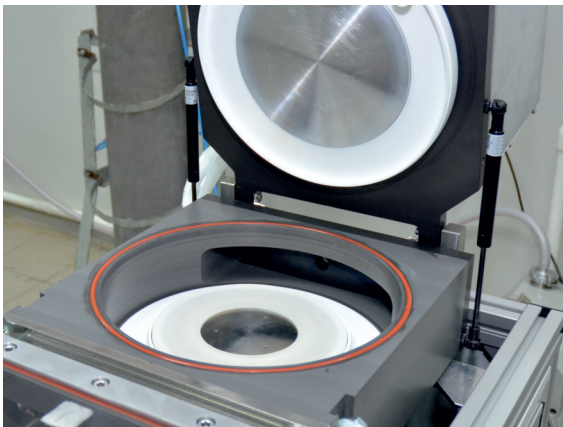


PLASMA-CHEMICAL ETCHING



The company designs and manufactures equipment for various plasma-chemical etching processes.

These solutions are engineered for the etching of metallic, dielectric, and semiconductor layers, deep silicon etching, processing of III-V compounds, etching of polymer layers, and photoresist ashing. The semiconductor manufacturing equipment supports wafer processing up to 12 inches.

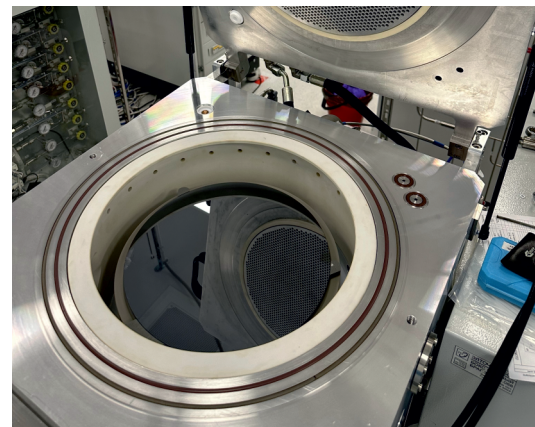


PLASMA-ENHANCED CHEMICAL VAPOR DEPOSITION



The company's core product portfolio includes equipment of various capacities designed for thin-film radio frequency plasma-enhanced chemical vapor deposition (PECVD) processes. The systems are capable of processing wafers up to 12 inches.

The equipment lineup is engineered to support a wide range of chemical vapor deposition processes, including the deposition of dielectric layers using CCP or ICP plasma sources, plasma-enhanced atomic layer deposition (PEALD), and sub-atmospheric chemical vapor deposition (SACVD).

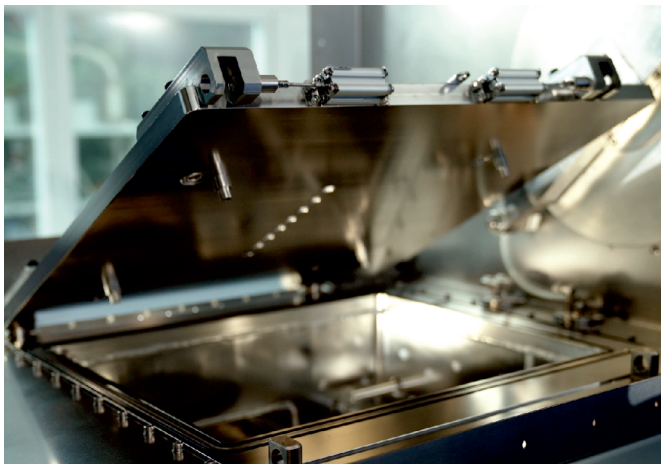


EPITAXIAL STRUCTURE GROWTH



NIITM has been engaged in the design and manufacturing of technological equipment for single-crystal structure growth for over 50 years. The plant is engineered for epitaxial layer growth on silicon wafers ranging from 3 inches to 8 inches.

Wafer processing can be performed in both batch (3-inch or 4-inch) and single-wafer (6-inch or 8-inch) modes. Automation of the process cycle ensures high quality of the manufactured products.

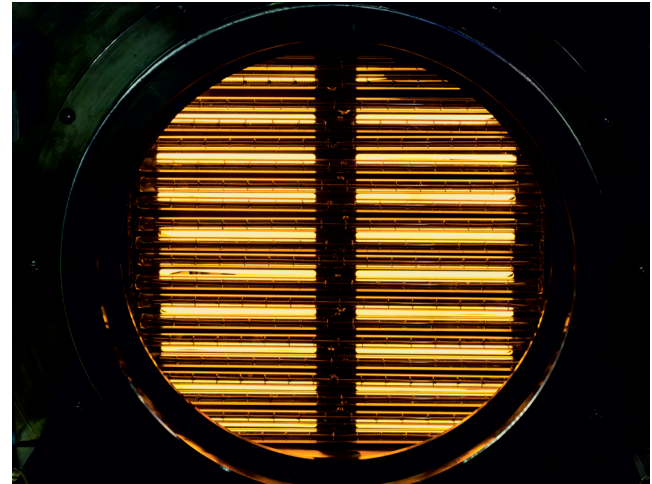
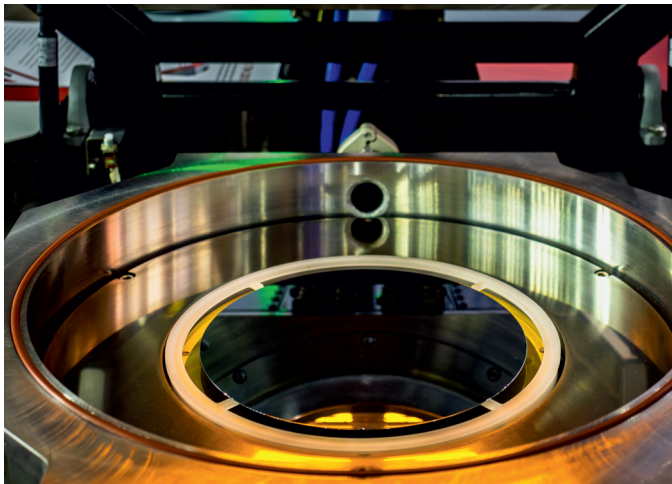


GAS-ASSISTED THERMAL PROCESSING (300–1300°C)



Equipment for thermal processing cycles such as rapid thermal annealing, oxidation, deposition, and diffusion represents one of NIITM's core areas of development and manufacturing.

This equipment is designed for processing wafers up to 8 inches. Wafer loading/unloading can be performed from a cassette or manually via load-lock systems using a quartz boat or a cuvette, as well as manually.



ADVANCED DEVELOPMENTS ION IMPLANTATION

In 2023 NIITM started the development of ion implantation systems: medium-current and high-energy implanters for silicon-based technologies with 90–180 nm design rules for 4-inch, 6-inch and 8-inch wafers. The systems are equipped with a robotic loading/unloading system for 8-inch wafers from SMIF as well as 4-inch and 6-inch wafers from Ultracassette cassettes. The technical specifications satisfy all requirements of leading domestic manufacturers of electronic component base.

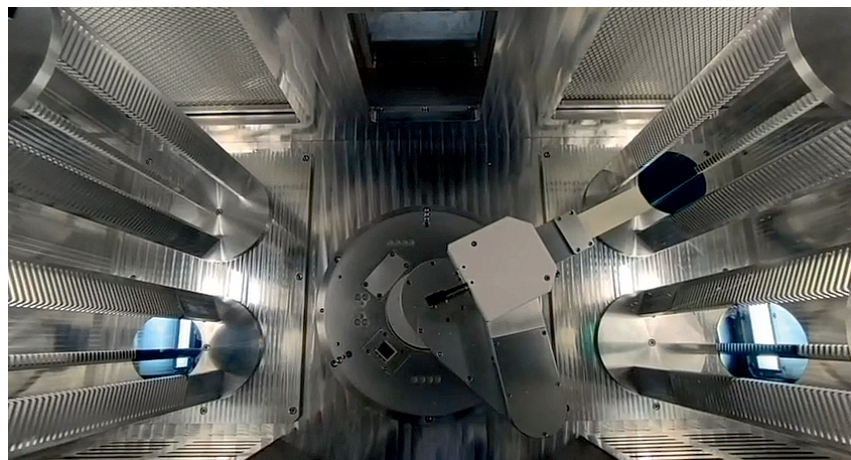




ACTIVATOR

A batch high-temperature annealing system (up to 2000°C) for 4-inch and 6-inch semiconductor wafers. It is designed for the annealing of silicon carbide (SiC) wafers, as well as structures with GaN and AlN. Processes are conducted at atmospheric or reduced pressure with the capability of supplying the following gases: Ar, N₂, H₂, He (optionally SiH₄, C₃H₈, C₂H₄).

It is the first vertical furnace in the Russian Federation featuring automated loading. Up to 50 wafers can be processed simultaneously. It includes an integrated storage capacity for 200 wafers with a clean air purge system.





ISOPHAZ – V

Equipment for Chemical Vapor Deposition (CVD) of tungsten layers designed for the formation of tungsten contacts and interconnects on **8-inch** wafers with 90–180 nm design rules, featuring a robotic wafer loading/unloading system utilizing a SMIF load port. Tungsten thin films are used for contacts and interconnects during the creation of integrated circuit (IC) metallization layers.

ISOPHAZ – D

A system engineered for the deposition of SiO_2 , SiON , and SiONGe dielectric layers on up to **8-inch** wafers, featuring a robotic loading/unloading system utilizing a SMIF load port. These dielectric layers function as electrical insulation for integrated circuits (ICs).



MAIN ROUTES OF TECHNOLOGICAL EQUIPMENT PRODUCTION



12-inch

Equipment line for **Si**
topological standards up to 28 nm;
CMOS-microcircuits.

8-inch

Equipment line for **Si/GaN** 90/130/180 nm;
Optoelectronic devices;
MEMS-structures;
Monolithic Microwave Integrated Circuit and
HEMPT-transistors based on **GaN**.



3-inch/4-inch

CMOS technologies;
3D TSV (interposers);
Power and microwave electronics
on **GaAs/SiC/SiGe/GaN** up to 200 nm;
Integrated photonics on **Si**.



OUR ADVANTAGES

- ❑ Development of a wide range equipment
- ❑ Full-cycle design and production of semiconductor manufacturing equipment
- ❑ Execution of Research and Development (R&D) activities
- ❑ Customized technical solutions tailored to each customer's needs





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