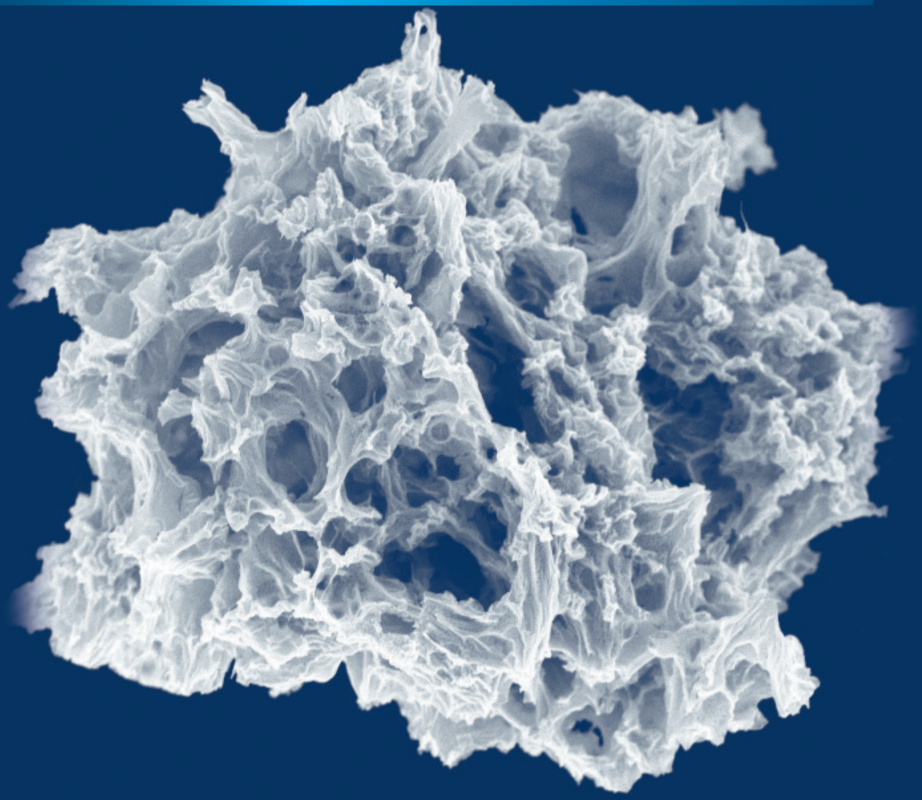
Ural Federal University

Ural Center for Shared Use

“MODERN NANOTECHNOLOGY“



Microscopy

Equipment complex of scanning probe microscopy:

Equipment complex of confocal microscopy:

Equipment complex of electron microscopy:

www.nanocenter.urfu.ru
tel.: +7 (343) 389 95 68
e-mail: nanocenter@urfu.ru

Analyzers

Spectrometry

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tel.: +7 (343) 389 95 68
e-mail: nanocenter@urfu.ru

Magnetometry

Equipment complex for magnetometry:

Equipment complex for magnetic measurements:

Other equipment

Equipment complex of X-ray diffraction:

Technological equipment

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Ural Center for Shared Use "MODERN NANOTECHNOLOGY" (UCSU MN)

Ural Center for Shared Use «Modern Nanotechnology» of the Ural Federal University:

- specializes in scientific research, services and experimental development
- has a unique complex of expensive analytical and technological equipment
- has qualified staff
- uses certified measurement methods

What do UCSU MN clients receive?

- solving important production problems
- targeted staff development
- accelerated development of innovative solutions
- authoritative conclusions about product parameters

What do the clients of the UCSU MN save on?

- on the purchase of expensive equipment
- on long and expensive operator training
- on maintenance of analytical equipment

Ural Federal University

Opening ceremony of the Center took place on December 12th, 2007.

UCSU was created in 2007-2008 on the basis of UCSU "Scanning Probe Microscopy" (opened in UrFU in 2002), equipment purchased under the Innovative Educational Program of UrFU.

In 2010, equipment supplies were carried out under 2008-2010 Federal Program of Nanoindustry Development in Russian Federation.

Address: Russia, Ekaterinburg, Kuybysheva str., 48
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Phone: +7 (343) 389 95 68
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Ural Federal University

Ural Center for Shared Use

«MODERN NANOTECHNOLOGY» Ural Federal University (UCSU MN, UrFU)

The main goals for UCSU are the following:

- Enhancement of the technical facilities of UrFU by providing the unique up-to-date scientific and technological equipment;
- Development of the cooperation in the area of nanotechnology with the institutes of the Ural Branch of Russian Academy of Sciences, scientific organizations and major industrial and business companies of the Ural Region;
- Improvement of the education level in natural sciences departments of UrFU, including nanotechnology area;
- Integration of the creative capabilities of UrFU scientific groups.

The current objectives

- Support of fundamental and applied research in the field of physical and chemical material science related to nanomaterials and nanostructures;
- Support of development of advanced material and device technologies based on nanotechnology;
- Creation and application of the new data banks and other IT products;
- Organization of the effective use of UCSU equipment to execute order of regional enterprises and companies, so as educational and scientific institutions;
- Exchange of experience, information, and educational programs with foreign partners;
- Providing the best conditions for scientific work of invited researchers from Russia and abroad.

PROBE NANOLABORATORIES
NTEGRA, NT-MDT SI, Moscow, Zelenograd, Russia

NTEGRA platform is the basis for development of the scanning probe microscopy capabilities and their combination with other up-to-date research techniques.

NTEGRA family includes the equipment for scanning probe microscopy investigations in ambient and special conditions:in vacuum, at high and low temperatures, in liquids, etc.

Basic modes for NTEGRA family:

Contact and non-contact atomic-force microscopy
Scanning tunneling microscopy and spectroscopy
Two scanning regimes: by sample and by probe
Surface potential microscopy
Scanning capacitance microscopy
Electrostatic force microscopy
Magnetic force microscopy
Force modulation microscopy
Force and current lithography

Sample sizes:	up to 100×100×15 mm^3
XY-resolution:	down to 10 nm
Z-resolution:	down to 0,04 nm

Location: rooms 101, 109

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EQUIPMENT COMPLEX OF SCANNING PROBE MICROSCOPYX

PROBE NANOLABORATORY NTEGRA-AURA, NT-MDT SI, Moscow, Zelenograd, Russia

2007

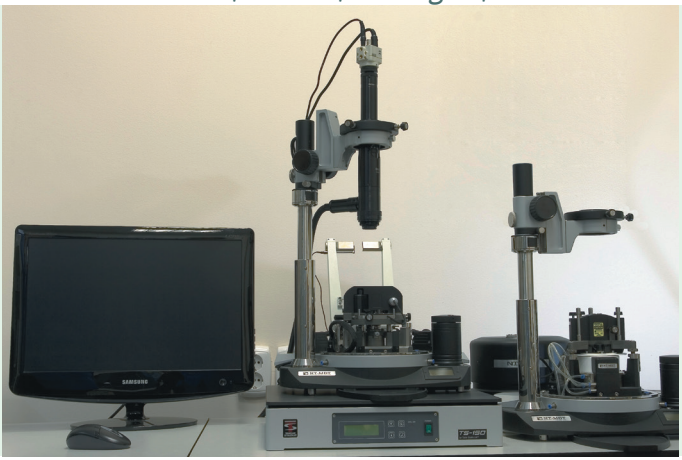
Measurements in vacuum and controlled atmosphere

Additional capabilities:
Measurements in gas media under controlled pressure
Piezo-response force microscopy
Contact scanning capacitance microscopy
Atomic-force acoustic microscopy
Measurements in liquid

Voltage application:	up to 200 V
Sample heating:	up to 300 °C

Location: room 109

PROBE NANOLABORATORY
NTEGRA-THERMA,
NT-MDT SI, Moscow, Zelenograd, Russia



2007

Measurements in wide temperature range

Additional capabilities:
Measurements with precise drift compensation
in temperature range: from -30 °C to 200 °C
High-stable measurements with atomic resolution
in atomic-force microscopy mode
Measurements in lateral and longitudinal magnetic field
Sample heating: up to 300 °C
Measurements in liquid

Location: room 109

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PROBE NANOLABORATORY
NTEGRA-PRIMA,
NT-MDT SI, Moscow, Zelenograd, Russia

2007

Basic model - a multifunctional instrument to solve
the routine problems related to scanning probe microscopy

Additional capabilities:
Voltage application: up to 50 V
Nanoindentation
Measurements by nanosclerometric module:
Young modulus: from 1 to 1000 GPa
hardness: from 1 to 150 GPa
Usage in educational process

Location: room 101

SCANNING PROBE MICROSCOPE
MFP 3D SA, Asylum Research, USA

2013

Highest sensitivity,
broad spectra of local electrical measurements

Sizes of samples:	up to 100x100x15 mm^3
XY resolution:	up to 10 nm
Z resolution:	up to 0.04 nm
Application of voltage:	up to 200 V
Local properties, which can be measured:	
micro-и nano-relief of the surface:	
range of heights:	up to 0.04 nm
Conductivity and spreading resistance:	
registered current:	above 1 nA
Work function of electrons	
Spatial distribution of surface potential	
Electromechanical properties	
Spatial distribution of magnetic properties	

Location: room 126

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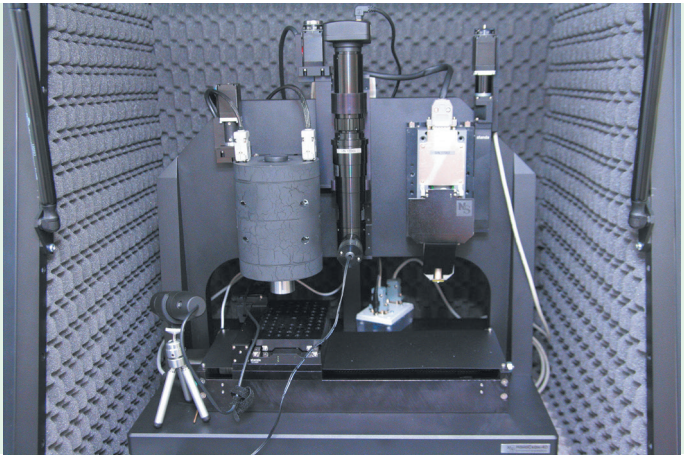
SCANNING NANO-HARDNESS TESTER NANOSCAN-4D,
Technology Institute for Superhard and New Carbon Materials, Russia

2014



Measuring of hardness and elastic module by nanoindentation
and surface topography on nanometer scale

Test forces:	0.1—1000 mN
Hardness:	0.001—80 GPa
Young modulus:	0.01—1000 GPa
Maximum specimen dimensions:	100x100x80 mm^3
Measurement of length:	
X and Y axes:	0.02—90 μm
Z-axis:	0.004—9 μm

Location: room 109

PROBE NANOLABORATORY
NTEGRA-Spectra, NT-MDT, Moscow, Zelenograd, Russia

2007

Integration of scanning probe microscopy
with confocal microscopy and Raman spectroscopy

Additional capabilities:
Spectroscopy and optical microscopy
effect of giant Raman scattering amplification
in-plane resolution: up to 50 nm
Scanning laser confocal microscopy
including bulk scanning
Confocal fluorescence microscopy and spectroscopy
including bulk scanning
Scanning near-field optical microscopy
Imaging of the same sample area
with atomic-force and optical methods
Operations with transparent and nontransparent samples

Location: room 109

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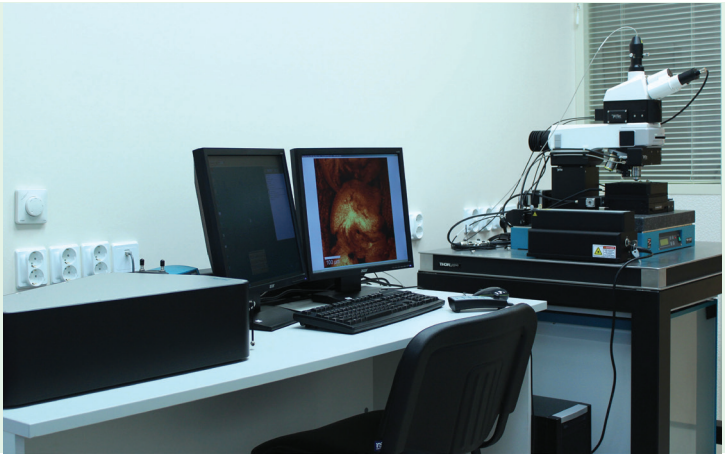
CONFOCAL RAMAN MICROSCOPE
Alpha 300 AR, WiTec, Germany

2012



Nondestructive chemical analysis
and surface relief mapping

Confocal microscopy in reflected light	
Fluorescent and Raman spectroscopy	
Large area mapping:	up to 25x25 mm^2
3D layer mapping	
Automated sample positioning:	by X, Y and Z axes
Excitation laser wavelengths:	488 and 633 nm
Optical resolution (for laser 488 nm):	
Vertical:	about 500 nm
Lateral:	about 400 nm
Spectral resolution:	0.72 cm^{-1}
Detector:	EMCCD camera

Location: room 122

WORKSTATION
AURIGA CrossBeam, Carl Zeiss, Germany

2010

Study of morphology, chemical and structural material properties with nanoscale resolution

Scanning electron microscope with focused ion beam, electron backscatter diffraction (EBSD), energy-dispersive X-ray spectroscopy (EDS), local charge compensation, and E-beam lithography

Scanning Electron Microscopy:	
Electron gun:	Schottky field emitter
Resolution:	1.0nm @ 15kV, 1.9nm @ 1kV
Magnification:	12x—1000000x
Acceleration voltage:	0.1—30kV
Focused Ion Beam:	
Ion gun:	Ga liquid metal ion source
Resolution:	<2.5nm @ 30kV
Magnification:	300x—500000x
Acceleration voltage:	1.0—30kV

Location: room 124

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SCANNING FIELD EMISSION ELECTRON MICROSCOPE
MERLIN, Carl Zeiss, Germany

2016

Scanning electron microscope for a wide range of studies

- Observation in secondary electrons
- Observation in reflected electrons with selection by work function and electron escape angle
- Charge compensator with the possibility of *in situ* cleaning of the sample surface
- 4 manipulators for measuring the conductivity of samples in the microscope chamber
- EBIC detector for the study of the electrical properties of semiconductor materials
- Energy dispersive microanalysis

Beam current:	up to 300 nA
Accelerating voltage:	from 20 to 30 kV
Thermal stage for studying the dynamics of phase transitions:	from -180 to +400°C

Location: room 126

SCANNING ELECTRON MICROSCOPE
EVO LS 10, Carl Zeiss, Germany

2014

Scanning electron microscope for wide range of life science samples

Electron gun: thermionic emission (W, LaB6)
Resolution: 3 nm @ 30 kV, 20 nm @ 1kV
Accelerating voltage: 0.1—30 kV
Pressure Range: 10—3000 Pa
Detectors
- Everhart-Thornley Secondary Electron Detector
- Variable Pressure Secondary Electron Detector
- Extended Pressure Secondary Electron Detector
- Backscattered Electron Detector (4QBSD)
- Energy Dispersive Spectrometer (EDS)
- Scanning transmission electron microscopy detector

Environmental Electron Microscopy
Peltier cooling stage
Sample preparation system (Quorum Tech, UK)
- Ultramicrotome: section thickness 5 nm — 15 μm
- Rotary-pumped combined sputter coater and SEM carbon coater Q150RES
- Critical Point Dryer K850
- CryoSEM preparation system PP3010T

Location: room 113

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SCANNING ELECTRON MICROSCOPE
VEGA 3 SBH, Tescan, Czech Republic

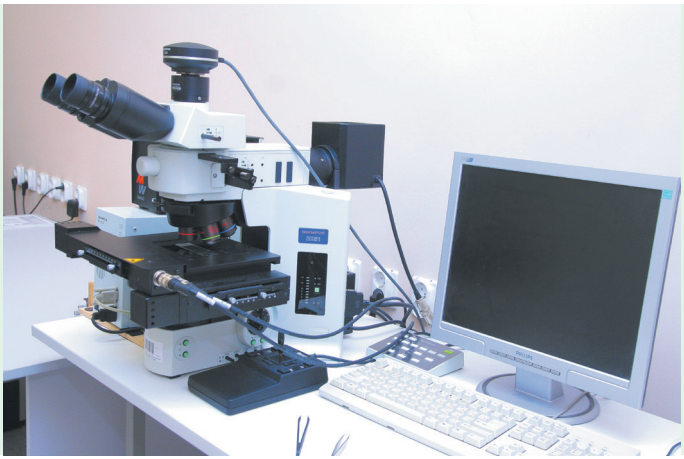
2020

Scanning electron microscope with an energy-dispersive attachment for elemental microanalysis and vacuuming of samples

Resolution:	3 nm at 30 kV 8 nm at 3 kV
Magnification:	4.5 to 1,000,000
Electron gun:	tungsten heated cathode with thermionic emission
Vacuum operating value in the chamber:	less than 9×10^{-3} Pa

Location: room 116

UNIVERSAL RESEARCH MICROSCOPE
BX61 Olympus, Japan



2011

Wide range of optical microscopy investigations
with automatic image analysis

Specifications:

Maximum magnification:	1000x
Reflected light	
Transmitted light	
Polarized light	
Dark field	
Phase contrast	

Fully motorized
Software for image registration and image analysis

Location: room 124

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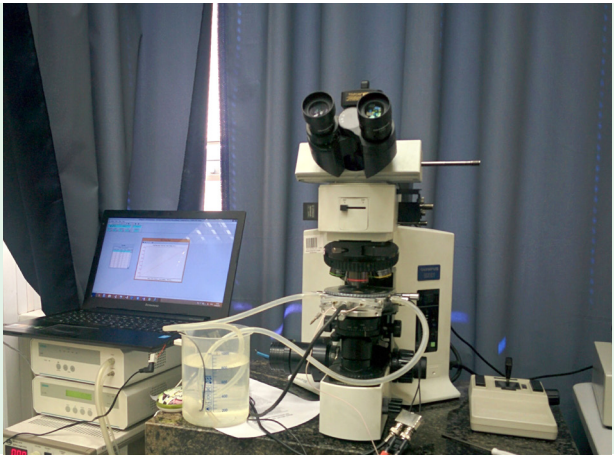
UNIVERSAL RESEARCH MICROSCOPE
BX51 Olympus, Japan

2004



Wide range of optical microscopy investigations
with automatic image analysis

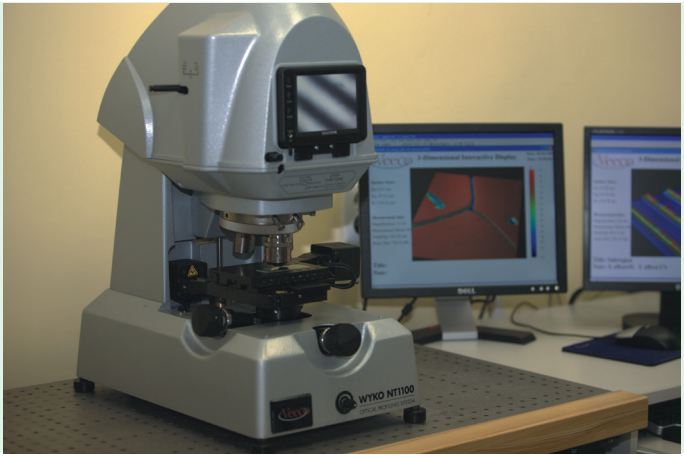
Specifications:

Maximum magnification:	1000x
Reflected light	
Transmitted light	
Polarized light	
Dark field	
Phase contrast	

Fully motorized
Software for image registration and image analysis

Location: room 229

OPTICAL PROFILER
Wyko NT1100, Veeco Instruments, USA



2007

3D surface metrology: noncontact fast measurements of surface topography from nanometer scale roughness through millimeter scale steps

Measurement techniques:	
vertical scanning interferometry	
Z-range:	3 nm — 1 mm
phase-shifting interferometry	
Z-range:	0.1 nm — 160 nm
Magnifications:	2.5x—100x
Lateral spatial sampling:	80 nm — 8 μm
Field of view:	50 μm — 5 mm
Auto stitching:	up to 100 mm

Location: room 229

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NON-CONTACT OPTICAL VIDEO MEASURING MICROSCOPE
Kestrel-200/Peregrine, Vision Engineering, UK

2010

Wide range of fast and accurate non-contact
2-axis measurements

Dynascope™ Optical head and Video processor QC300 with automatic edge detection.
Pattern Approval Certificate of Measuring Instruments “Non-contact measurements system”.

Specifications:

magnification:	x10, x20, x50
reflected and transmitted light	
measurement table:	150x100 mm^2
measurement accuracy:	7 μm

Location: room 229

THERMAL STAGES FOR OPTICAL MICROSCOPY
TS1500EV-7/6 and THMS600, Linkam Scientific, UK

2021

Investigations by optical and confocal Raman microscopies in a wide temperature range with controlled atmosphere and humidity

Temperature range:	-196°C to 1500°C
Heating/cooling rate:	0.1 to 200°C/min
Temperature stability:	0.1°C for the range -196°C to 600°C 1°C for the range 600°C to 1500°C
Humidity control range:	5% to 90%
Humidity stability:	±0.5%
Vacuum:	up to 10^{-3} mbar

Location: room 229

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THERMOGRAVIMETRIC ANALYZERS
STA 409 PC Luxx, Netzsch, Germany

2007

Simultaneous Thermo Analysis (TG-DSC or TG-DTA)
in wide temperature range

Sensitivity:	0.001 mg
Mass variation measurement ranges:	±20 mg, ±200 mg, ±2000 mg
Accuracy:	1 % of measurement range
Peak load:	18 g
Temperature range:	25—1500 °C
Rate of temperature change:	0.1—50 °C/min
Atmosphere:	neutral, oxidative, reducing

Location: room 417

SYNCHRONOUS DSC/DTA INSTRUMENT, THERMOGRAVIMETRIC ANALYZER PYRIS 1 TGA, Perkin-Elmer, USA

2008

Representative of a new generation of thermal analyzers, combining high sensitivity, accuracy and reproducibility

Temperature range	50…1500 °C
Balance sensitivity	0.1 μg
Weighing accuracy	not less than 0.02%

Location: room 406

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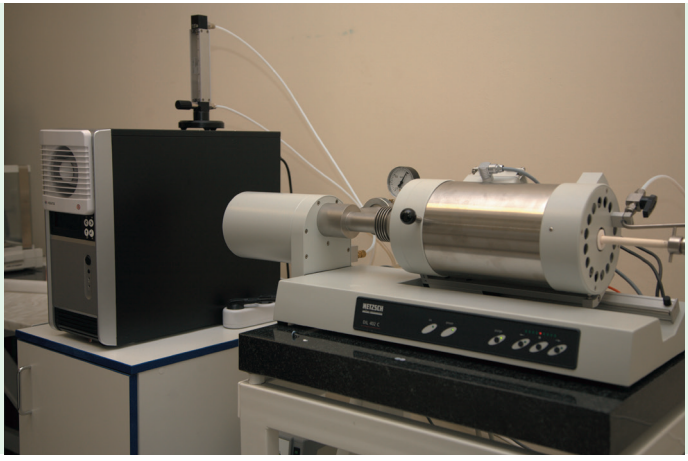
DILATOMETER
DIL 402C, Netzsch, Germany

2007



Measurement of linear thermal dilatation of solid and liquid powders, pastes and ceramic fibers

c-DTA software for calculation of endo-/exothermic effects simultaneously with measurement of sizes change
Connection with mass-spectrometer is available
Horizontal sample holder

Measurement ranges:	0.5/5 mm
Resolution:	0.125 nm per order, 1.25 nm per order
Contact pressure with sensor:	0.15—0.45 N
Adjustable range of sample length:	25 mm
Temperature range:	from RT to 1600 °C

Location: room 318

SPECIFIC SURFACE AREA ANALYZER
TriStar 3000, Micromeritics, USA

2008

High-quality surface area and porosimetry measurements on solid materials by using the technique of gas adsorption and desorption

Measured parameters:
- pores radius
- pores volume distribution
- specific surface area

Minimal surface area:	0.01 m^2/g
Minimal pore volume:	$4x10^{-6}$ cm^3/g
Simultaneous analysis:	up to 3 samples

Location: room 214

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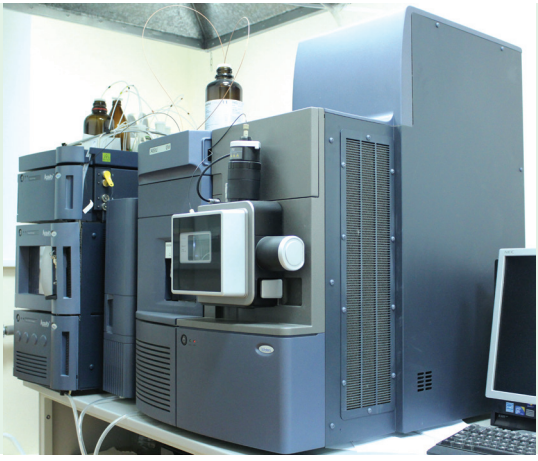
HYBRID QUADRUPOLE HIGH RESOLUTION MASS SPECTROMETER
XEVO QToF with ACQUITY UPLC system, Waters, USA

2013



Quadrupole (Q) and time-of-flight (Tof)
high resolution mass spectrometer

The basic components of the system are:
Waters ACQUITY UPLC system
Waters Xevo QTof mass spectrometer

Allows identifying, quantifying and confirming
the broadest range of compounds in the
most complex and challenging samples
Ionization source: Xevo electrospray (ESI)

Location: room 158a

GAS-ANALYSIS SYSTEM BASED ON QUADRUPOLE MASS SPECTROMETER STA 409 Luxx/QMS 403 C, Aëolos, Netzsch, Germany

2007

Qualitative and quantitative analysis of gaseous decomposition products of inorganic matters

Connection to the simultaneous thermal analyzer	
Mass range:	1-300 a.m.u.
Resolution:	> 0.5 a.m.u.
Registration threshold:	> $2x10^{-14}$ mbar
	> 1 ppm
Connection type:	capillary
Capillary maximal temperature:	300 °C
Ion source:	electron impact, energy 70 eV
Sensor:	Faraday and SEV
Vacuum system:	turbomolecular and diaphragm pumps

Location: room 414

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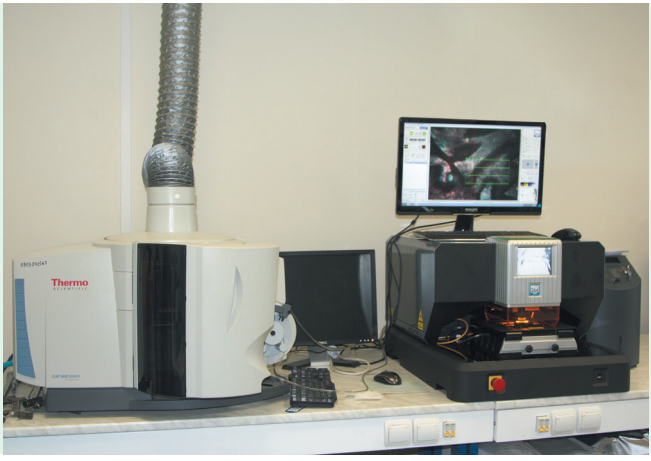
ATOMIC-EMISSION SPECTROMETER WITH INDUCTIVELY COUPLED PLASMA iCAP 6500 Duo, Thermo Scientific, USA and LASER ABLATION SYSTEM NWR 266, ESI, USA

2007, 2014



Quantitative and qualitative elemental analysis
with simultaneous detection of up to 40 elements

Spectral range:	from 166 to 867 nm
Spectral bandpass at 200 nm wavelength:	7 pm
A new-generation semiconductor solid state detector:	CID86

Wide range of concentrations measured

Possible analysis of:

- high saline solutions
- hydrofluoric acid containing samples
- organic solvents containing samples

Analysis of natural and waste water for heavy metals for environmental monitoring:

- ferrous and non-ferrous materials
- environmental objects (water, soil)

Laser wavelength: 266 nm

Location: room 309

ATOMIC ABSORPTION SPECTROMETER
SOLAAR M6, Thermo Scientific, USA

2007

Qualitative elemental analysis of different samples
for inorganic components

Flame and furnace analysis	
Definition limits for Al detection:	
flame analysis:	28 μg/l
furnace analysis:	0.052 μg/l
Amount of possible elements determination:	40
Spectral range:	from 180 to 900 nm
Spectral bandpass at 200 nm:	0.5 nm/mm

Location: room 309

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LIQUID CHROMATOGRAPH
LC-20, Shimadzu, Japan

2008

Compounds separation from liquid complicated mixtures
based on different passing speed through
the chromatographic column under the high pressure

Operational ranges:

pH:	1—13
temperature:	4—35 °C
flow-rate setting:	0.0001 to 10 ml/min
flow-rate precision:	0.3 %

Spectrophotometric UV-Vis detector:
with temperature-controlled flow cell
noise level: 0.5×10^{-6} AU

Possibility of the organic toxicants determination:
in natural objects
in waste waters

Location: room 312

GAS CHROMATOGRAPH WITH GAS-CARRIER DIGITAL CONTROLLER, Thermo Focus GC., Thermo Scientific, USA

2008

Separation of complex mixtures based on difference in volatility, solubility, or adsorbability

Identification and quantitative determination of components	
Molecular weight of split components:	up to 400
Temperature range:	from RT to 350°C
Temperature programming rates:	0.1—120 °C/min
Number of ramps:	7
Typical cooling time from 350 °C to 50 °C:	270 s
Typical heating time from 50 °C to 350 °C:	270 s
Data acquisition frequency:	300 Hz
Environmental analysis for organic contaminants	

Location: room 312

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LASER ANALYZER OF ELEMENTAL COMPOSITION
LEA–S500, SOL instruments, Belarus

2021

Qualitative and quantitative determination
of the elemental composition of materials and substances
in solid and powder forms by laser-spark emission spectrometry

Definable elements:	from hydrogen (H) to uranium (U)
Concentration measurement range:	0.01ppm to 100%
Spectral range:	175-800 nm
Spectral resolution:	0.014 nm
Sample size:	from 12×12×2 mm^3 to 75×75×40 mm^3
Emission spectra excitation system:	Solid state two-pulse Q-switched laser on YAG:Nd3+ (1064 nm)
Laser spot diameter on the sample surface:	0.05–0.2 mm

Location: room 153

FOURIER TRANSFORM INFRARED SPECTROMETER WITH EXPANDED SPECTRAL RANGE
Nicolet 6700, Thermo Scientific, USA

2007

Measurement of IR absorption spectra and diffuse reflection for identification of inorganic and organic materials, polymers and coordination compounds

Spectral range:	27000—50 cm^{-1}
Spectral resolution:	0.4 cm^{-1}
Wave number error amount:	0.01 cm^{-1}

Accessories:

- for attenuated total reflection (ATR)
- for diffuse reflection
- full-sized additional experimental module AEM
- dry-air generator

Identification in automatic mode using the spectra data library
Analysis of fluid, viscous, and solid samples without special preparation.

Location: room 307

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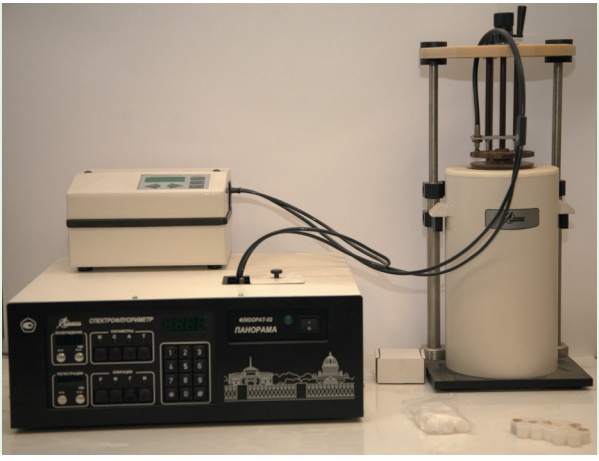
SPECTROFLUOROMETER
Fluorat-02-Panorama, Lumex, Russia

2007



Determination of time-resolved fluorescence,
and time dependence in the processes
of chromatographic separation

Spectral range:	from 220 to 840 nm
Spectral bandwidth of monochromators:	< 10 nm
Wave length measurement accuracy:	< 3 nm
Duration of single measurement:	< 10 s
Measurements possible:	
at ambient temperature	
at temperature of liquid nitrogen	

Location: room 307

UV-VIS-NIR DOUBLE BEAM SPECTROPHOTOMETER, Cary 5000, Agilent Technologies, USA

2013

Measurements of absorbance and reflectance at specific wavelengths or over a range for absolute or relative comparisons of solid and liquid samples

Wavelength range:	175—3300 nm
Limiting resolution:	UV-Vis < 0.048 nm
	NIR < 0.2
Spectral bandwidth:	
	UV-Vis 0.01 to 5.00 nm, 0.01 nm steps, motor driven
	NIR 0.04 to 20, 0.1 nm steps, motor driven
Wavelength accuracy:	UV-Vis ± 0.08 nm
	NIR ± 0.4
Wavelength reproducibility:	UV-Vis < 0.02 nm
	NIR < 0.08

Location: room 126

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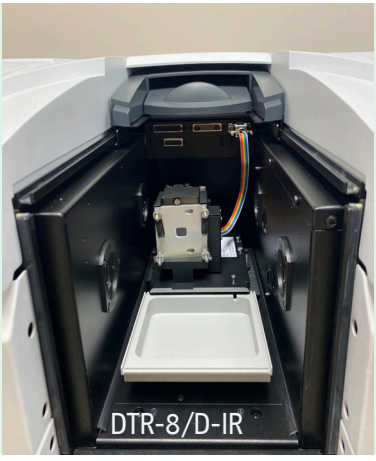
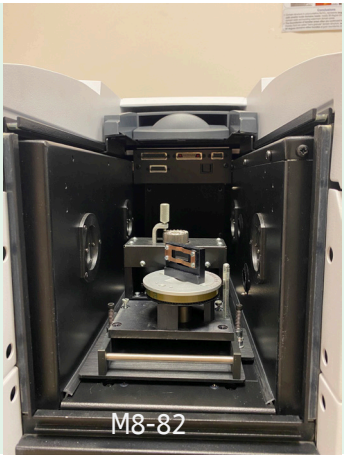
PHOTOELECTRIC ATTACHEMENTS
DTR-8/D-IR & M8-82, SOL Instruments, Belarus

2023





DTR-8/D-IR attachment with integrating sphere for measurement of transmittance and diffuse reflection coefficient with the possibility of excluding the normal component.
M8-82 attachment for measuring of absolute specular reflection coefficient at a variable angle.
Study of the optical characteristics of structures with microrelief, colloidal solutions of micro and nanoparticles of any concentration, powders, ceramics.

Combined and separate measurement of diffuse and specular reflection

Spectral range:	220—1100 nm
Integrating sphere diameter:	50,8 mm
Angle of incidence range:	8—82°
Angle setting step:	0,5°

Location: room 126

TOTAL REFLECTION X-RAY FLUORESCENCE (TXRF) SPECTROMETER
Nanohunter, Rigaku Corporation, Japan

2010

Investigations in the field of material science, microelectronics, products composition control, legal expertise

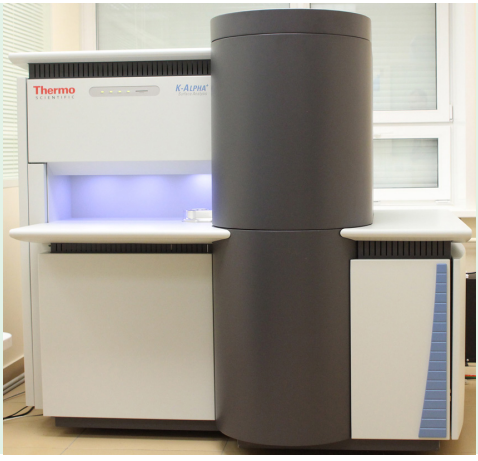
Main features:

Power of Mo and Cu X-ray tubes:	0.05 kW
Elemental range:	from Al to U
Sensitivity:	10^{-7} wt.%
Glancing angle range:	0—2°
Angular scanning resolution:	0.01°
Radiation penetration depth:	up to 500 nm
Measurements in air	
Maximum sample size:	100x100x5 mm

Location: room 284

www.nanocenter.urfu.ru
tel.: +7 (343) 389 95 68
e-mail: nanocenter@urfu.ru

MULTIFUNCTIONAL X-RAY PHOTOELECTRONIC SPECTROMETER
K-Alpha, Thermo Fisher Scientific, UK



2015

Non-destructive analysis of the elemental composition,
empirical formula, chemical and electronic state
of atoms present in the material

Ion cannon with charge neutralization function
128-channel analyzer for building
high quality spectral maps

Range of measured kinetic energies:	5–1500 eV
Analyzer transmission energy:	1-400 eV
X-ray spot size:	30-300 μm (step 5 μm)
Maximum power:	not less than 72 W

Location: room 113

SQUID-MAGNETOMETER
MPMS XL7, Quantum Design, USA

2008

Measurement of magnetic properties with high sensitivity
in wide temperature range

Magnetic field range:	±7.0 T
Intrinsic field uniformity over 4 cm:	0.01 %
Field stability:	10^{-6}/hour
Temperature range:	1.9—800 K
Differential sensitivity:	10^{-8} emu
Range of measurements:	± 300 emu
Sensitivity at AC susceptibility measurement:	10^{-8} emu

Location: room 278

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tel.: +7 (343) 389 95 68
e-mail: nanocenter@urfu.ru

VIBRATING SAMPLE MAGNETOMETER
7407 VSM, Lake Shore Cryotronics, USA

2013

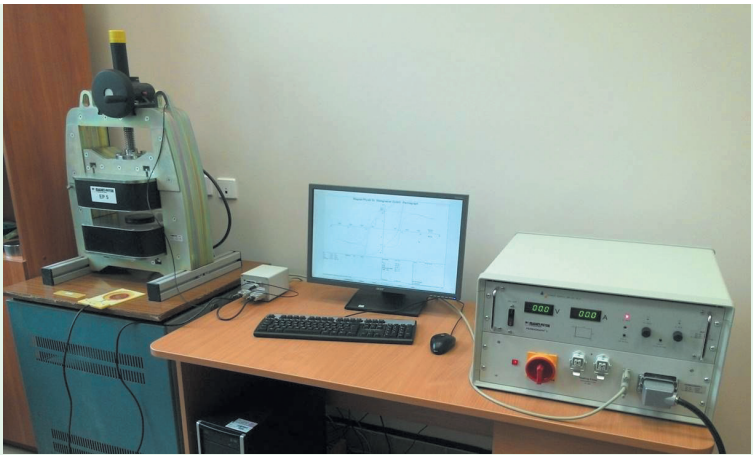
Measurements of magnetic moments of bulk and thin film samples

Sensitivity:	10^{-7} emu
Range of magnetic moments:	10^{-7}—1000 emu
Temperature range:	4.2—1300 K
Magnetic field:	up to 23 kOe
Optional sample rotation system	
Equipped with sample evacuation system and Helmholtz coils	
Equipped with option for measurements of electrical resistivity	
Electromagnet poles diameter:	51 mm

Location: room 285

COMPUTER CONTROLLED HYSTERESISGRAPH
Permagraph L, Magnet Physik, Germany

2012



Measurement of magnetic hysteresis characteristics
of magnetic materials

Magnetic field intensity:	up to 32 kOe
Sample heating:	up to 200 °C

A set of compensated measuring coils
of 10, 15, 26 and 40 mm diameters
A set of certified standard nickel samples
Hard ferrite magnet reference sample

Location: room 283

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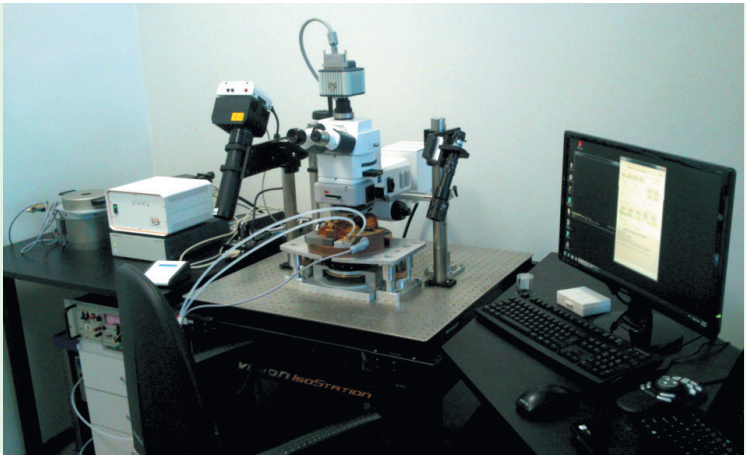
e-mail: nanocenter@urfu.ru

MAGNETO-OPTICAL KERR-MICROSCOPE
Evico magnetics, Germany



2015

Visualization of magnetic domains and automatic measurement of magnetooptical hysteresis loops

Polar, longitudinal and transverse Kerr effects can be used	
Based on the Carl Zeiss polarizing microscope	
Linear dimensions of the observation area:	0.1—5 mm
Optional overview polarizing microscope	
Linear dimensions of the observation area:	8—30 mm
Light source – 8 highly stable LEDs	
Wavelength:	450 nm
Digital camera with resolution:	1344 × 1024 pixels
Horizontal magnetic field:	0.1—1300 mT
Vertical magnetic field:	up to 900 mT
Substrates' diameter:	up to 76 mm

Location: room 373

AUTOMATED MEASURING SYSTEM FOR MAGNETIC PARAMETERS TESTING
MagEq MMS, AMT&C LLC, Russia

2015

Direct measurements of adiabatic temperature changes initiated
by changes of magnetic field and heat capacity
at different magnetic fields

Operating temperature range:	110—360 K
Magnetic field range:	0.018—1.755 T
Speed of magnetic field change:	0.25—4.7 T/s
Measurements uncertainty:	
adiabatic temperature changes:	0.1 K
heat capacity:	3 %

Automated and manual operating modes

Location: room 375

www.nanocenter.urfu.ru
tel.: +7 (343) 389 95 68
e-mail: nanocenter@urfu.ru

PHYSICAL PROPERTIES MEASUREMENT SYSTEM
PPMS Dyna Cool, Quantum Design Inc., USA

2016

System for precise measurements of the characteristics of various materials in a magnetic field (heat capacity, electrical conductivity, magnetic susceptibility in an alternating field)

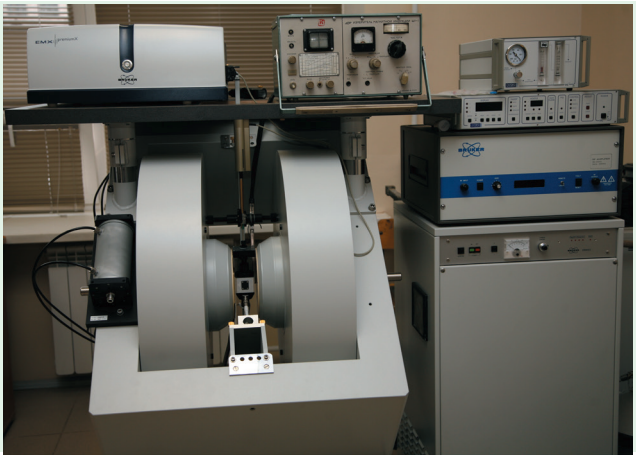
Cryogenic-free integrated helium liquefaction system
Continuous operation at temperatures below 4.2 K
Vacuum pump

Interval of working magnetic fields:	from -9 to +9 T
Operating temperature range:	1.9—400 K
Temperature sweep rate:	0.01—6 K/min
Field resolution value:	0.02 mT at < 1 T
	0.2 mT at < 9 T
Field stability:	1 ppm/hour

Location: room 375

ELECTRON SPIN RESONANCE SPECTROMETER
EMX Plus, Bruker, Germany

2007



Continuous wave detection Electron Spin Resonance (EPR) and Electron-Nuclear-Double Resonance (ENDOR) at frequencies up to 100 MHz

Magnet system:	
maximal magnetic field strength:	14.5 kG
air gap:	72 mm
High sensitivity probe head:	
optical window	
quality factor:	more than 15 000
absolute sensitivity:	1.6 x 10^9 spins/G
sample access:	10 mm
ENDOR system:	
frequency:	up to 100 MHz
Temperature control systems:	
helium system:	3.8—300 K
nitrogen system:	100—500 K

Location: room 103

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tel.: +7 (343) 389 95 68
e-mail: nanocenter@urfu.ru

EQUIPMENT COMPLEX
OF X-RAY DIFFRACTION

X-RAY POWDER DIFFRACTOMETER
XRD-7000S, Shimadzu, Japan

2014

X-ray diffraction analysis of polycrystalline materials

Cu-KA-radiation, long fine focus (LFF):	0.4×12 mm
Vertical θ -2θ goniometer radius:	200—275 mm
Minimum step size:	0.0001° (θ) 0.0002° (2θ)
Angle reproducibility:	+/–0.0002°
Scanning range:	-12—+164° (2θ)

Auto 5 position sample changer (ASC 1001)
In-plane rotation of the sample (1-60 rpm)
in combination with oscillation around
the goniometer sample axis (θ)

High-temperature attachment HTK 1200N (Anton Paar)
XRD diffraction in air and non-aggressive gas mixtures
at temperature range: 25—1200 °C

Location: room 102

X-RAY DIFFRACTOMETER
EQUINOX 3000, Inel, France

2010

Investigation of the kinetics of structural phase transitions
in solid state, X-ray phase and structural analysis

Curved position-sensitive detector	
Angular interval 2θ:	90°
Monochromatic radiation:	CuKA1
Holder:	30 samples
Vacuum X-ray studies at temperatures:	up to 1200 °C
Thin films investigation:	
Real time capture of diffraction patterns from crystal samples	

Location: room 320

www.nanocenter.urfu.ru
tel.: +7 (343) 389 95 68
e-mail: nanocenter@urfu.ru

TEST MACHINE
AG-50kNXD, Shimadzu, Japan

2008

Carrying out mechanical tests for stretching
and compression of various materials

Automatic-mode construction of deformation curves in standard coordinates and determination of the following mechanical characteristics of materials in the state of stretching or compression:

- proportionality limit
- fluidity limit
- strength limit
- strengthening coefficient
- sample lengthening before disintegration

Load range: 1 N — 50 kN

Accuracy corresponds to the first class

Location: room 102

PHYSICAL PROPERTIES MEASUREMENT SYSTEM
DMS-1000, Dryogenic, UK

2008

Cryogen-free investigation of various physical properties
in wide temperature range and high magnetic fields

Properties investigated:
- specific heat
- electrical resistivity
- Hall effect
- magnetic susceptibility

Temperature range: 0.1—300 K
Magnetic fields: up to 12 T

Location: room 100

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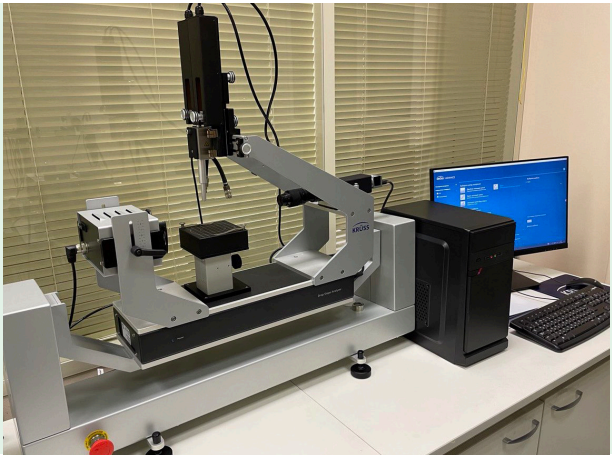
CONTACT ANGLE MEASURING DEVICE
DSA25S, KRUSS, Germany



2022

Contact angle measurement by sessile drop method

Measuring range:	1...180°
Resolution:	± 0.1°
Dosing step:	0.1 µl
Dosing rate:	10 ... 1400 µl/min
Surface temperature control and wetting liquid	-10 ... 450°C

Software-based calculation of the contact angle from the shape of a drop

Software-based calculation of the surface free energy from the contact angles

Location: room 124

TENSIOMETER
K100C, KRUSS, Germany

2022

Tensiometer with a module for measuring
the critical concentration of micelle formation

Available measurement types:
- surface and interfacial tension methods
- Du Nui rings and Wilhelmy plates
- critical micelle concentration (CMC)
- wettability of powders, films and fibers

Measurement range: 1 … 2000 mN/m

The CMC measurement module allows:
- determination and building a graph of the CMC points
- determination of the point of synergy of surfactant mixtures
- calculation of the surface of one molecule
- calculation of Gibbs free energy of absorption

Location: room 124

www.nanocenter.urfu.ru
tel.: +7 (343) 389 95 68
e-mail: nanocenter@urfu.ru

EQUIPMENT COMPLEX FOR RESEARCH OF FERROELECTRIC MATERIALS

MULTIFUNCTIONAL SYSTEM FOR COMPREHENSIVE EVALUATION OF PIEZO - AND FERROELECTRIC MATERIALS
aixPES, aixACCT, Germany

2012

Measurement and analysis of ferroelectric, piezoelectric, pyroelectric and dielectric properties in thin films and bulk materials

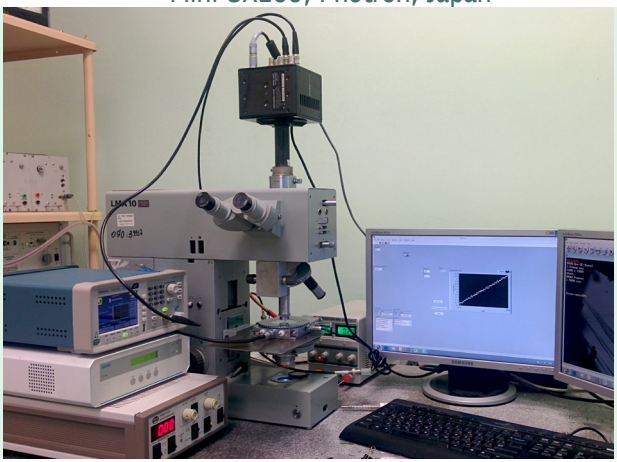
Investigation technique:
- Dynamic and static hysteresis loops of
  - polarization
  - strain
  - dielectric constant
  - piezoelectric coefficient
- Pyroelectric measurement
- Switching and leakage current measurement
- Investigation of fatigue and aging process

Precision low current preamplifier	
Sample holders for thin films and bulk samples	
operating temperature range:	20 — 200 °C
Internal and external voltage amplifier, max voltage up to:	10 kV
Precision displacement sensor	
(laser interferometer) resolution:	0.3 nm
Hysteresis loops measurement frequency:	10mHz — 10MHz

Location: room 215

OPTICAL MICROSCOPE
LMA10, Carl Zeiss, Germany
WITH HIGH SPEED VIDEO SYSTEM
Mini UX100, Photron, Japan

2013



Conducting studies of ferroelectric materials using
a combination of optical microscopy and electrical techniques
in a wide temperature range

Simultaneous recording of the switching current
and visualization of the domain structure
Arbitrary-shaped electric field pulses
Modified Merz scheme

Maximum electrical voltage:	10 kV
Temperature range:	-40 - 600 °C
Video shooting speed:	5000 fps at 1280×1000 px 20,000 fps at 1280×248 pixels 100,000 fps at 1280×32 pixels

Location: room 229

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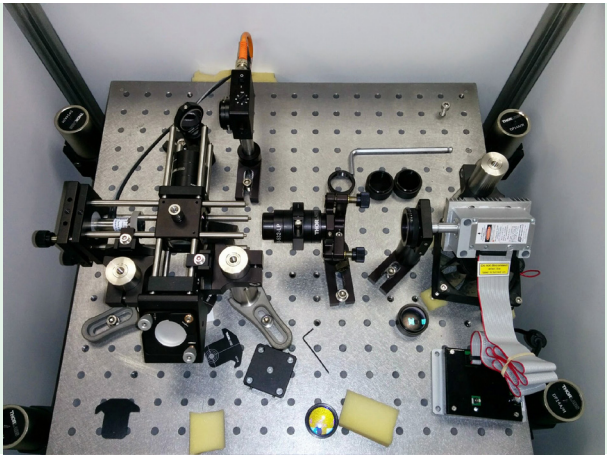
INTERFEROMETRIC MEASUREMENT SETUP
Thorlabs, USA



2014

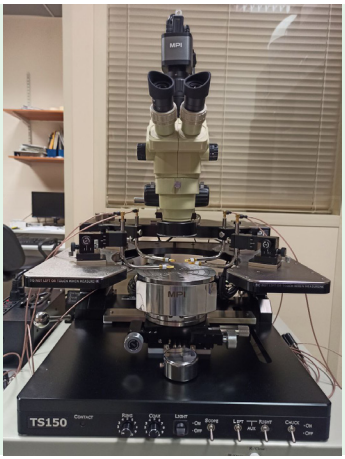
Measurement of electromechanical deformations
with high accuracy in wide temperature range

Michelson-Morley interferometer scheme
Selective amplification of the signal at the reference frequency
PID feedback

Minimum detectable displacements:	down to 10^{-4} Å
Measurement frequency:	10 Hz — 40 kHz
Temperature range:	0 — 200°C

Location: room 06

PROBE STATION
TS150, MPI Corporation, Taiwan



2023

Testing of semiconductor, optoelectronic, micro- and nano-electromechanical systems with precision probe positioning and process control with an optical microscope

Sample holder size:	150 mm
Number of probe manipulators:	4 pcs
Three-axis positioning accuracy:	1 μm
Vertical adjustment:	40 mm
Displacement repeatability:	1 μm

Location: room 06

www.nanocenter.urfu.ru
tel.: +7 (343) 389 95 68
e-mail: nanocenter@urfu.ru

EQUIPMENT COMPLEX FOR PHOTOLITHOGRAPHY

CLEAN ROOM ENVIRONMENT
class 100, CG "ROST, Russia

2007

Clean room for operations that require a minimum amount of pollution in the ambient air, including photolithographic processes

Room type:	turbulently ventilated clean room
Purity class:	class 100
Air exchange rate:	300 volumes per hour
Temperature maintenance accuracy:	1°C

Location: room 213

LABORATORY SPIN COATER
SM180-HP250HDMS, Sawatec Solutions, Liechtenstein

2008

Resist spin coating and thermal backing

Independent coater and hotplate/coolplate in one system
Spin coating of wafers with uniform resist films
After-development drying and high-temperature processing of resist films
Soft and hard backing of resist films (including vacuum or N_2 atmosphere)
Wafer annealing and HMDS primer deposition
Separate resist deposition and thermal processing

Wafers:	Si, GaAs, $LiNbO_3$ and others
Maximum wafer size:	150 mm (6″)
Maximum bit size:	100 mm

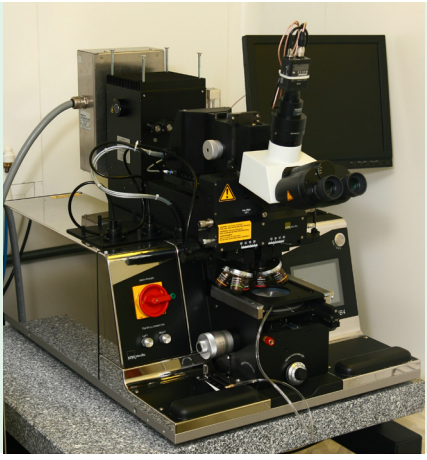
The equipment is installed in the clean room (class 100) intended for contact photolithography

Location: room 213

www.nanocenter.urfu.ru
tel.: +7 (343) 389 95 68
e-mail: nanocenter@urfu.ru

MANUAL CONTACT MASK ALIGNER
SUSS MJB4, Suss MicroTec, Germany

2008



Alignment of photomask with wafer
and resist exposition for contact lithography

Contact lithography modes:
- soft contact
- hard contact
- rough vacuum contact
- vacuum contact
- gap printing: 0—50 μm

Spatial resolution: up to 0.6 μm
Wafers: Si, GaAs, $LiNbO_3$ and others
Wafer size: 100 mm (4″)
Bit size: from 10 x 10 mm^2

The equipment is installed in the clean room (class 100) intended for contact photolithography

Location: room 213

WET PROCESS SYSTEM
OPTIwet ST30, SSE, Germany

2008

Automatic multi-step spin wafer cleaning,
resist development, and resist stripping

Solvent cleaning
RCA SC1 (NH_4OH: H_2O_2) and Piranha (H_2SO_4:H_2O_2)
cleaning with heating: up to 80 °C
Deionized ultrapure water rinsing with heating: up to 80 °C
Spin drying with gaseous nitrogen
Max. spin speed: up to 4000 rpm

The equipment is installed in the clean room (class 100)
intended for contact photolithography

Location: room 213

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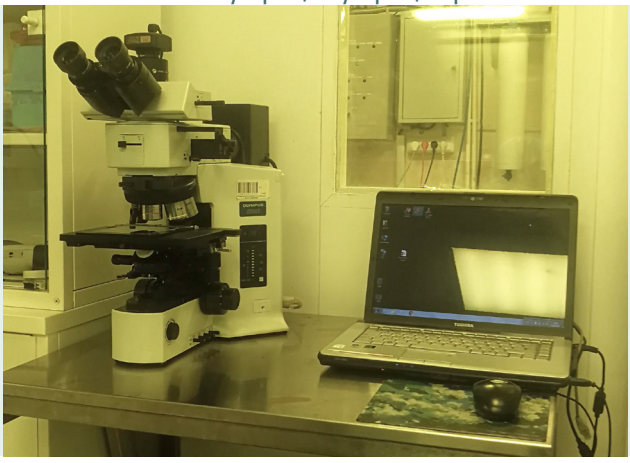
e-mail: nanocenter@urfu.ru

OPTICAL PHOTOLITHOGRAPHY QUALITY CONTROL SYSTEM BX51 Olympus, Olympus, Japan

2007



Optical microscopy in cleanroom environment
for testing the objects sensitive to contaminations

Imaging modes:
- Reflection
- Transmission
- Bright/Dark field
- Polarized light

Illumination: 100 W
Objectives: 1.25x, 5x, 10x, 20x, 50x, 100x
Digital camera with imaging software

The equipment is installed in the clean room (class 100) intended for contact photolithography

Location: room 213

WATER PURIFICATION SYSTEM
Elix 10, Millipore, France

2007

Production of ultrapure (type I) deionized water
with recirculation line

Resistivity (25°C):	above 18 MOhm·cm
TOC concentration:	below 30 μg/l
Removal of Si:	above 99.9 %
Peak productivity:	above 12 l/min
Average productivity:	above 200 l per 24 hours
Recirculation line pressure:	about 2 bar

Location: room 213

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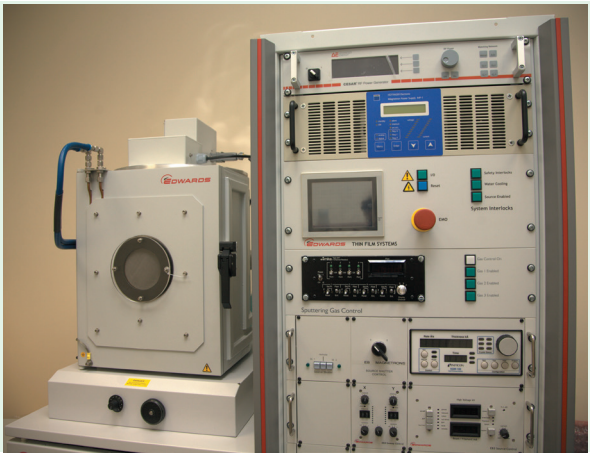
COMBINED VACUUM THIN FILMS DEPOSITION SYSTEM
Auto 500 Edwards, BOC Edwards, UK

2008



Deposition of metal and dielectric thin films by electron-beam evaporation and DC/RF magnetron sputtering

Wafer diameter: up to 100 mm
Materials:
elements: Al, Cu, W, Au, Pt, Cr, Nb, Ta, Ni, Mo, C
compounds: TiN, NiCr, Si_3N_4
oxides: TiO_2, Ta_2O_5, Al_2O_3, SiO_2, In_2O_3–SnO_2
Deposition of wide range of conductor, semiconductor, and dielectric materials applicable for magnetron sputtering
Plasma glow discharge wafer cleaning
Wafer heating: up to 300 °C

Location: room 222

MAGNETRON SPUTTERING SYSTEM
ATC ORION 8 UHV, AJA International, USA

2008

Sputtering of multilayer and composite metal, dielectric and magnetic films

Five independent magnetron sputtering sources
(2 DC and 3 RF power)
Turbomolecular pumping system
vacuum: not less than $5*10^{-7}$ Torr
Rotating substrate holder
heating: up to 800 °C
Substrate holder cooled by liquid nitrogen
Three independent gas feed lines
Computer control system

Location: room 275

www.nanocenter.urfu.ru
tel.: +7 (343) 389 95 68
e-mail: nanocenter@urfu.ru

REACTIVE ION ETCHING SYSTEM
Plasmalab 80 Plus RIE, Oxford Instruments, UK

2008

Plasma reactive ion etching of metals,
Si and Si compounds, and dielectrics

Metals:	W, Nb, Ta, Mo
Si compounds:	SiO_2, Si_3N_4
Wafer diameter:	up to 200 mm
Roughing pump productivity:	95 m^3/h
Turbo molecular pump with inert gas purge:	
5 reactive gas lines with independent automatic mass flow control	
reactive gas:	O_2, Ar, CF_4, CHF_3, SF_6

Location: room 222

VACUUM COATING SYSTEM
ELATO, IZOVAC, Belarus

2016

Coating by electron-beam evaporation
with preliminary ion-beam cleaning

Ultimate residual pressure:	< 2×10^{-4} Pa
Time to reach ultimate residual pressure:	< 12 hours
Time to reach a pressure of 8×10^{-4} Pa in a clean chamber since shutter opening:	< 40 minutes
Heating temperature:	up to 350 °C
Temperature maintenance accuracy:	±5 °C
Electron-beam evaporation power:	6 kW
Substrate material:	$LiNbO_3$, $LiTaO_3$
Substrate diameter	76, 100 mm
Substrate holder rotation speed:	5—40 rpm
Substrate heating:	300 ± 5 °C
Substrate heating/cooling rate:	up to 5°C/min

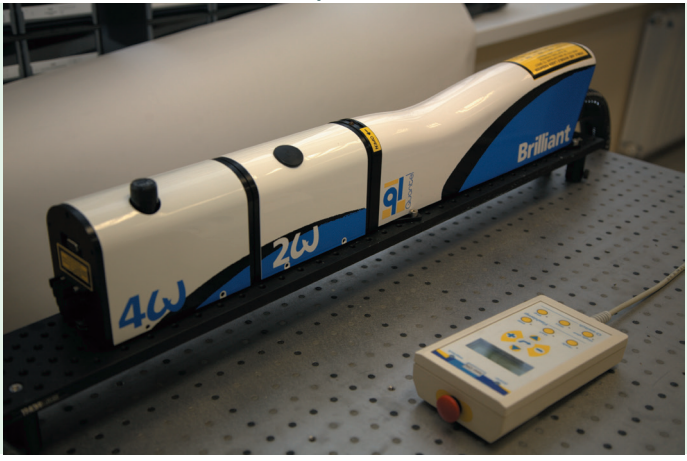
Location: room 229

www.nanocenter.urfu.ru
tel.: +7 (343) 389 95 68
e-mail: nanocenter@urfu.ru

EQUIPMENT COMPLEX FOR ANALYSIS OF LASER RADIATION PARAMETERS

Q-SWITCHED SOLID-STATE ND:YAG LASER WITH HARMONIC GENERATORS
Brilliant, Quantel, France

2007



Generation of high energy laser pulses in IR, visible, and UV spectral ranges (first, second, third, and fourth harmonics of 1064 nm)

Wavelengths:	1064, 532, 355, 266 nm
Pulse energy:	
1064 nm:	350 mJ
532 nm:	160 mJ
355 nm:	60 mJ
266 nm:	30 mJ
Pulse duration:	5—6 ns
Repetition rate:	10 Hz
Divergence:	less than 0.5 mrad
Beam diameter:	4—6 mm
Laser head sizes:	150×500×80 mm^3

Location: room 220

LASER SYSTEM FOR MATERIAL PROCESSING
VL-300/40, Universal Laser Systems, USA

2008

Laser marking, engraving, and cutting of wide range of materials

Pulsed CO_2 gas laser

Wavelength:	10.6 μm
Average radiation power:	40 W
Scanning system:	
Max. speed:	1.8 m/s
Max. operating area:	305×610 mm^2
Positional accuracy:	±25 μm

Additional lens set for 10.6 μm wavelength

Location: room 101

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e-mail: nanocenter@urfu.ru

EQUIPMENT COMPLEX FOR ANALYSIS OF LASER RADIATION PARAMETERS

EQUIPMENT SET FOR CHARACTERIZATION OF LASER BEAMS
LaserStar, BeamStar FX50, Ophir, Israel

2007

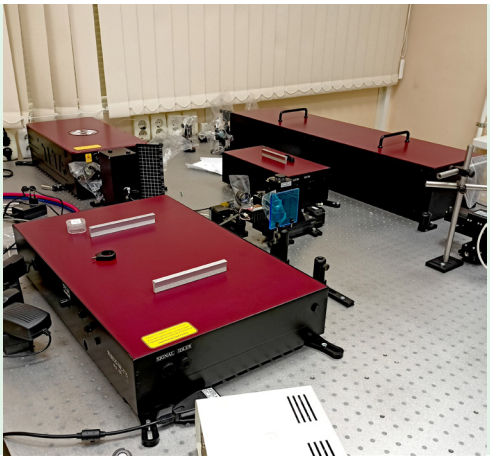
Measurement of various parameters of laser irradiation

Measurement of power and energy of cw and pulsed laser irradiation
Measurement of beam profiling
Determination of laser beam radius, divergence, and M^2 beam quality factor
Temporal pulse shape measurements

Power measurement range:	30 nW — 10 W
Spectral range:	350—1320 nm
Maximal beam size to measure:	up to 4x6 mm^2
Beam radius measurement accuracy:	over ±1 %

Location: room 220

ULTRASHORT LASER PULSES SETUP
Avesta-Project Ltd., Russia



2021

Ultrashort pulse laser setup for material processing,
two-photon polymerization and lithography

Femtosecond laser TETA-10:	
Wavelength:	1030 nm
Pulse energy:	up to 400 μJ
Pulse width:	270 fs to 10 ps
Pulse repetition rate:	up to 200 kHz
Average power:	10 W
Parametric generator PARUS-NE-515:	
Signal wave tuning range:	630 to 1020 nm
Idle wave tuning range:	1040 to 2800 nm
External generator of the second and third harmonics AtsG-A-1030:	
Wavelengths:	515 nm and 343 nm

Location: room 101

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e-mail: nanocenter@urfu.ru

EQUIPMENT COMPLEX FOR ANALYSIS OF LASER RADIATION PARAMETERS

ULTRASHORT LASER PULSES SETUP
Avesta-Project Ltd., Russia

2023

Femtosecond pulse laser setup
for processing of various materials with focused laser radiation

Wavelength:	1030 nm
Pulse energy:	> 20 μJ at frequency of 1 MHz
Pulse width:	270 fs
Pulse repetition rate:	from 200 kHz to 1 MHz
Average power:	20 W

Location: room 101

PRECISION LASER MARKING SYSTEM
MiniMarker 2 - M20, Laser Center LLC, Russia

2017

Precision marker based on a fiber laser with increased speed and quality characteristics

Laser wavelength	1064 nm
Pulse duration	110 ns
Pulse repetition rate:	20-100 kHz
Marked materials:	metals and alloys, painted and coated metal surfaces, ceramics, rubber, plastic, semiconductors, “tesa laser” foil, etc.
Positioning accuracy	± 150 μm
Software and hardware resolution	2.5 μm
Repeat positioning accuracy	5 μm
Beam travel speed	adjustable, up to 8.7 m/s

Location: room 101

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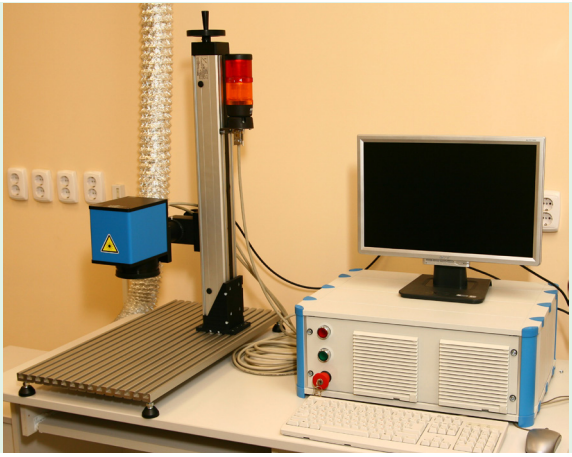
EQUIPMENT COMPLEX FOR SYNTHESIS OF COLLOID SOLUTIONS OF METAL NANOPARTICLES

LASER SYSTEM FOR MATERIAL PROCESSING
Fmark-20 RL, Laser Technology Center, St.-Petersburg, Russia



2008

High speed and accuracy laser marking, engraving and cutting of wide range of materials

Pulsed ytterbium fiber laser	
Wavelength:	1.05—1.07 μm
Frequency:	20—100 kHz
Max. power:	20 W
Max. pulse energy:	1 mJ
Service life:	30000 hours
Double-axis galvanometric scanning system:	
operating area:	50x50 mm^2
max. speed:	4.5 m/s
positional accuracy:	±2.4 μm

Location: room 101

PARTICLE SIZE, ZETA-POTENTIAL AND MOLECULAR WEIGHT ANALYZER
Zetasizer Nano ZS, Malvern Instruments, UK

2009

Measurement of size distribution, Zeta-potential
and molecular weight of nano-
and submicro-particles and molecules in colloid solutions

Parameters measured:	hydrodynamic size, zeta potential and molecular weight
Temperature control range:	0°C — 90°C +/- 0.1°C
Min. sample volume:	12 μL
Size range	0.6 nm — 8.9 μm
Molecular weight range	342—2x10^7 Da
Zeta potential:	
suitable size range:	3.8 nm — 100 μm
max. sample conductivity:	200 mS/cm
min. sample volume:	150 μL

Location: room 101

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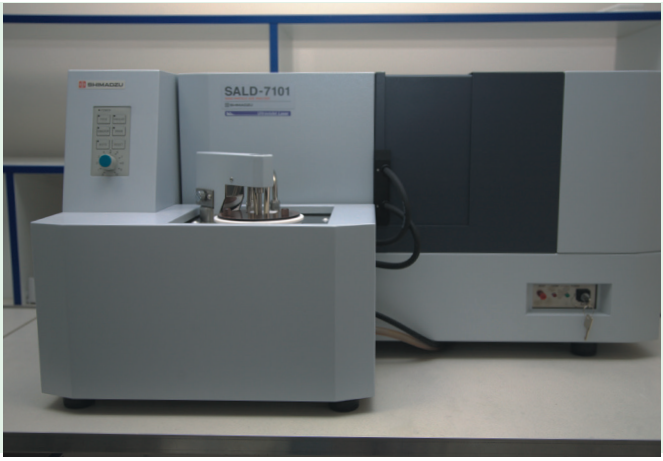
EQUIPMENT COMPLEX FOR SYNTHESIS OF COLLOID SOLUTIONS OF METAL NANOPARTICLES

LASER DIFFRACTION PARTICLE SIZE ANALYZER SALD-7101, Shimadzu, Japan



2007

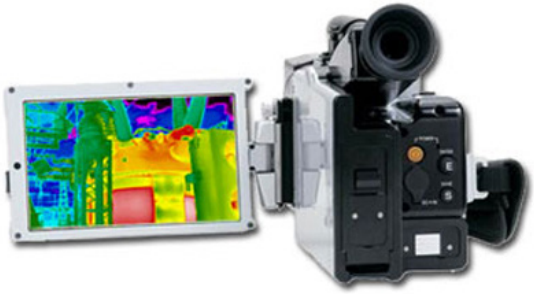
Measurement of particle size distribution in suspension by laser diffraction method

Measuring size range:	15 nm — 250 μm
Light source:	UV semiconductor laser
Light detector:	81 elements in total
Inner volume of dispersing bath:	280 cm^3
Disperser:	
frequency:	42 kHz
output power:	40 W
Bath cell:	
inner volume:	12 cm^3
material:	quartz glass

Location: room 412

INFRARED CAMERA
Avio H2640, NEC, Japan

2013



Carrying out thermographic measurements
over a wide temperature range

Temperature measurement range:	from -40°C to +2000°C
Imager accuracy:	± 2°C, ± 2% of reading
Spectral range of the thermal imager	8 ... 13 μm
Detector type:	uncooled microbolometer, VO_2
Thermal imager detector size:	640×480 pixels
Emissivity correction	1.00 ... 0.10 (step 0.01)

Location: room 101

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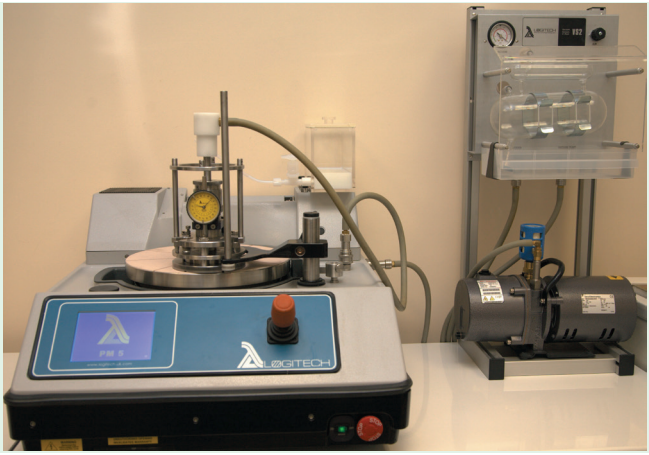
PRECISION LAPPING AND POLISHING MACHINE
PM5, Logitech, UK



2007

Precision lapping and polishing of crystalline wafers

Microprocessor control
Precision jig for wafer flatness and alignment control
Different lapping and polishing pads (cast iron, polyurethane)
Precision thickness measurement gauge
Optical autocollimator for precision
parallel specimen production

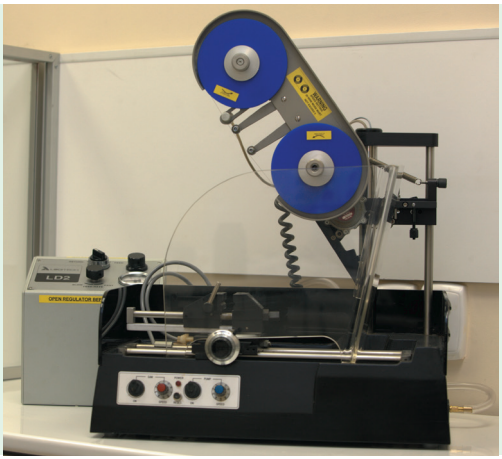
Wafer diameter:	up to 83 mm
Disk diameter:	300 mm
Al_2O_3 abrasives:	3 μm and 9 μm

SiO_2 suspension for mechano-chemical
fine polishing for sub-nm surface roughness

Location: room 231

DISK AND WIRE DICING SAW
Model 15, Logitech, UK

2007



Precision cutting of single crystals and wafers

Rapid change from disk to diamond wire saw
Controlled saw pressure
Automatic hydraulic sample feed
Micrometer translator and limb for sample positioning
Maximum cut depth: 50 mm

Location: room 231

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AUTOMATIC DICING SAW DISCO DAD3220
DISCO DAD 3220, Japan

2014

Blade dicing and grooving with extra-high precision

Single spindle
Max. revolution speed: 40 000 rpm^{-1}
X-axis
feed speed range: 0.1—500 mm/s
Y-axis
spindle offset step: 0.1 μm
positioning accuracy: 5 μm
Z-axis
repeating accuracy: 1 μm
Max. workpiece diameter: 150 mm
Max. blade size: 58 mm
Min. disc thickness d: 10 μm
Max. cutting depth (at d<100 μm): dx20
Automatic, semi-automatic or manual operation
Variety of discs available to cut broad range of materials
Capability of multistep cutting

Location: room 231

HIGH TEMPERATURE FURNACE
LHT 01/17 D/P480, Nabertherm, Germany

2019

Compact high-temperature furnace
with molybdenum disilicide heaters

Maximum temperature:	1650 °C
Chamber volume:	1 dm^3
Power:	2.2 kW
Thermocouple type:	S
Controller:	P480
Chamber dimensions (W x D x H):	110×120×120 mm^3
Oven dimensions (W x D x H):	385×425×525 mm^3
Heating time to max temperature:	10 min

Location: room 09

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CHAMBER FURNACE
LHT 08/18, Nabertherm, Germany

2019

Compact high-temperature furnace
with molybdenum disilicide heaters

Maximum temperature:	1800°C
Heating time to maximum temperature:	60 min
Chamber volume:	8 dm^3
Internal dimensions (WxDxH):	150×300×150 mm^3
External dimensions (WxDxH):	470×850×750 mm^3
Power consumption:	9.0 kW

Location: room 018

TUBE FURNACE
R 50/250/13/C450, Nabertherm GmbH, Germany

2021

Compact tube furnace
with integrated adjustment devices

Maximum temperature:	1300°C
Maximum heating rate:	5°C/min
Annealing in an inert gas environment:	N_2, Ar, O_2
Vacuum annealing	0.06 Torr

Location: room 018

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MUFFLE ELECTRIC FURNACE
TK.8-1150.M.1F, Termokeramika LLC, Russia

2013

Muffle furnace with annealing function
according to a given temperature profile

Maximum operating temperature of the furnace:	1150 °C
Dimensions of the working chamber of the furnace (WxDxH):	180×285×180 mm
Working environment:	air
Number of temperature control zones:	1
Temperature control:	automatic
Thermocouple type:	K
Heating element:	X23Ю5T (Alloy 875 analogue)
Chamber volume:	8 dm^3
Furnace installed power:	13 kW

Location: room 018

RAPID THERMAL ANNEALING SYSTEM
STE RTA100, SemiTEq, Russia

2022

Installation for rapid annealing of samples and thermal activation of contact layers in a controlled inert environment

Optical pyrometer for surface temperature control
Ability to program «multi-stage» annealing profile

Ultimate residual pressure in the chamber (reactor)	< 10 Torr
Maximum diameter of the processed plate	100 mm
Maximum heater power	18 kW
Maximum heating rate	30°C/sec
Maximum heating temperature	1000 °C
Annealing time	1–600 s
Heating uniformity at 800°C	±2%

Location: room 229

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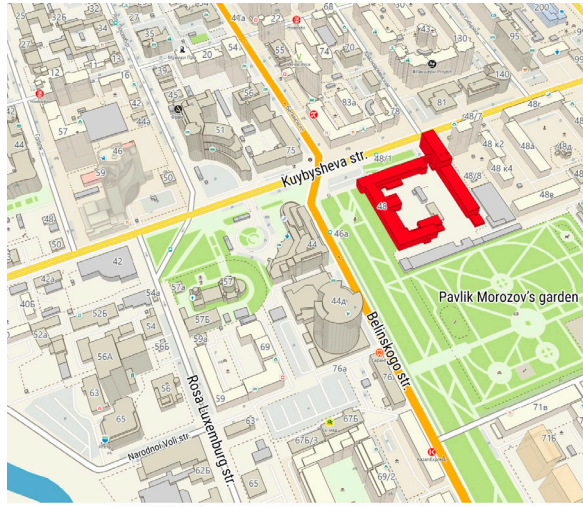

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(УЦКП СН УрФУ)

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