R&D 100 2011 Award Winner

THE NEW GENERATION OF SCIENTIFIC TRAINING LABORATORIES FOR NANOTECHNOLOGY EDUCATION

NT-MDT

NANOEDUCATOR II

NANOEDUCATOR II

NANOEDUCATOR II is a scientific measurement training complex based on a scanning probe microscope (SPM); suitable for both: scientific research as well as nanotechnology education

FEATURES:

- Improved quality of scanning results and high efficiency due to the use of a new digital controller
- Low noise closed-loop scanner 100x100x10 µm
- AFM / STM atomic lattice resolution
- Easy adjustments
- Robust design
- Remote control via the Internet

SCIENTIFIC MEASUREMENT TRAINING COMPLEX NANOEDUCATOR II CONSISTS OF:

1 Scanning Probe Microscope:
Atomic Force Microscopy (AFM),
Scanning Tunneling Microscopy (STM),
nanolithography

2 Digital controller

3 Electrochemical etch station
for probe production

4 Handbook, manual, demo
samples and accessories

NANOEDUCATOR II

NANOEDUCATOR II is a complete easy-to-use system that helps teachers to educate the next generation of researchers in nanoscience by means of thorough hands-on training in all important nanotechnology areas.
It is designed to capture the students' interest in science and train future nanotechnologists using both AFM and STM techniques.
Robust and foolproof, NANOEDUCATOR II is providing an interdisciplinary education with a broad understanding of different fields of nanoscience.

NANOEDUCATOR II provides:

- Individual approach to education process
- Remote control from the teacher's computer
- Interactive learning

THE TRAINING LABORATORIES

The classroom equipped with NANOEDUCATOR II can be used to demonstrate, image and measure basic nanoscience principles in next-generation curricula for chemistry, physics and biology as well as hands-on experience in investigation of the nanoobjects (nanoparticles) and nanostructures, lithography and nanomanipulations.

THE CLASSES OF FIRST-GENERATION NANOEDUCATOR:

Eindhoven University of Technology,
The Netherlands

Krasnoyarsk State Pedagogical University
by V.P. Astafiev, Russia

5 STEPS TO BRILLIANT RESULTS:

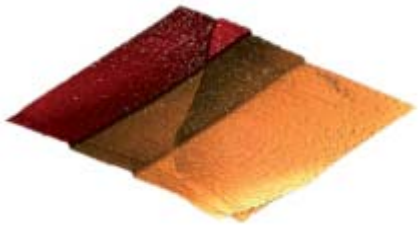
1 Make a tungsten wire probe or select the probe from the set provided

2 Insert the probe into the probe holder

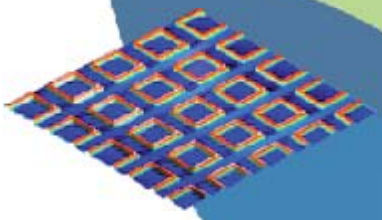
3 Insert the sample

4 Approach the sample with the probe

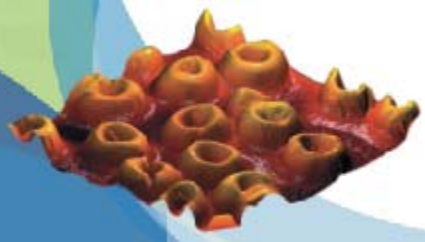
5 Scan



STM image of
graphite surface.
Image size:
800x800 nm



AFM image of
calibration grating.
Image size:
70x70 µm



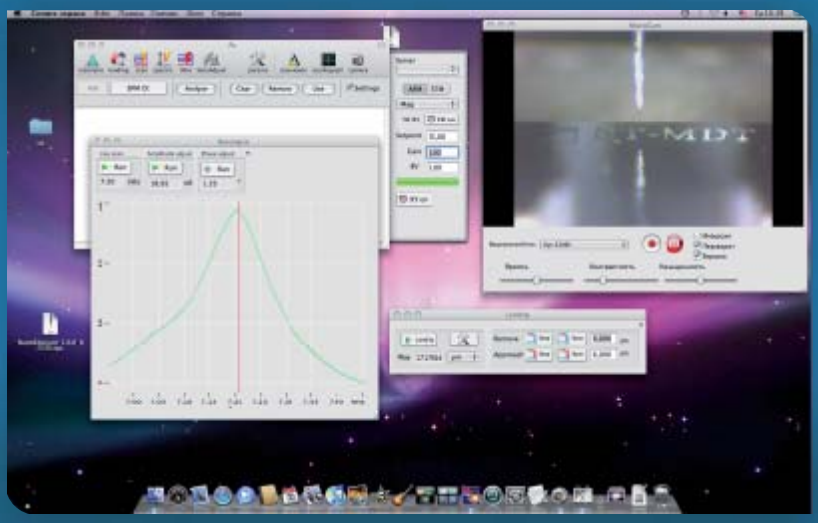
AFM image of
human erythrocytes.
Image size:
35x35 µm

SOFTWARE:

Easy-to-use software runs under the operating Windows XP®; and Mac® OS. It performs 2D and 3D image processing and nano-scaled manipulations. Also it has the ability to share data via iPhone™ and iPad™.

The managing program provides the following procedures:

- Measurement preparation
- Set and view of parameters of current configuration of the measurement head and controller
- Set and view of parameters of planned measurements
- Sample surface imaging
- Control of the relative position of the sample and tip
- Approach management
- Scanning and spectroscopy measurement management

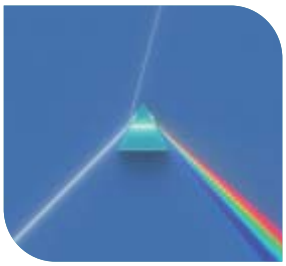


APPLICATIONS:

Biology
(cells, viruses, bacteria, DNA)

Material science
(metals, semiconductors, dielectrics, polymers, photovoltaic cells)

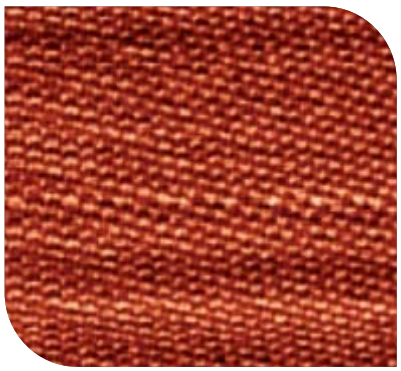
Data storage devices
(hard drives, CDs)



Micro- and nano-structures
(gratings, self-organizing systems)

ATOMIC LEVEL RESOLUTION

NANOEDUCATOR II has incorporated special electronics which enable the switch from conventional imaging to atomic level resolution by a simple mouse click.



STM image of atomic grating on graphite.
Image size:
3.5x3.5 nm

SPECIFICATIONS

Probe	Tungsten wire probes which can easily be made by students by the electrochemical etch station Piezo-tube AFM probe Piezo-tube STM probe Sharp tip for STM
Measuring head	Head for piezo-tube probes
Scanner	Piezo-tube closed-loop scanner
Scanning	By sample, range 100×100×10 µm
Sample positioned	Manual, range 5×5 mm
Sample weight	Up to 40 g
Sample size	Diameter up to 25 mm, Thickness up to 10 mm
Approach system	By sample, motorized, range 15 mm
Optical control	Embedded USB camera

SPM MODES

Atomic Force Microscopy (AFM):

- Topography imaging
- Phase imaging
- Force imaging
- Force spectroscopy
- AFM lithography

Scanning Tunneling Microscopy (STM):

- Constant Current
- Constant Height
- V(Z) spectroscopy
- I(V) spectroscopy

Digital controller

NANOEDUCATOR II
Dimensions: 170×150×150 mm

NANOEDUCATOR II

NT-MDT

NT-MDT is proudly represented in
Australia and New Zealand by
AXT Pty. Ltd.
1/3 Vuko Pl., Warriewood
NSW 2102 Australia
T. +61 (0)2 9450 1359 F. +61 (0)2 9450 1365
W. www.axt.com.au E. info@axt.com.au

www.ntmdt.com

BNE13E_2_11 06 20