LABORATORY OF ATOMIC FORCE MICROSCOPY

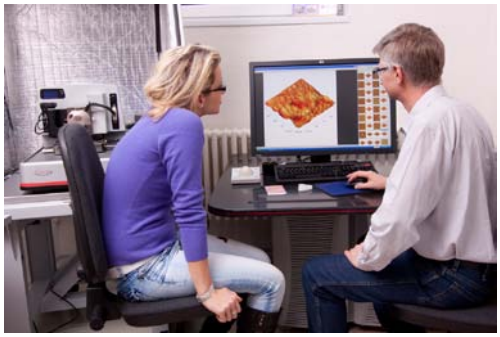
at the Structural Ceramics Department

Atomic force microscopy (AFM) or scanning force microscopy (SFM) is a very high-resolution type of scanning probe microscopy, with demonstrated resolution on the order of fractions of a nanometer. It allows to reconstruct very precise 3D representation of topography of observed surface, and to observe mechanical, electrical and magnetic properties of materials.

Equipment:
AFM Dimension ICON, by Veeco Instruments

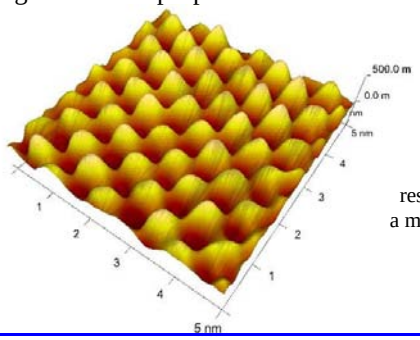
Technical specifications:

- Motorized XY-stage
- Samples max 120 mm radius
- Max scan size 100x100 µm
- Low noise, insulated hood
- Video: 508-4010x
- Tube scanner – movement in 3 directions



Modes of operation

- Contact mode (also in fluids)
- Tapping mode (amplitude, phase imaging)
- Lateral Force Microscopy (LFM)
- Friction Force
- Force Modulation
- Magnetic FM
- Electric FM, Surface Potential Detection
- Dynamic modulation
- Nanoindentation
- Piezoresponse
- Scanning Tunneling Microscopy
- Peak Force QNM – quantitative nanomechanical mapping of material properties



Atomic resolution on a mica sample

LABORATORY OF INSTRUMENTED INDENTATION

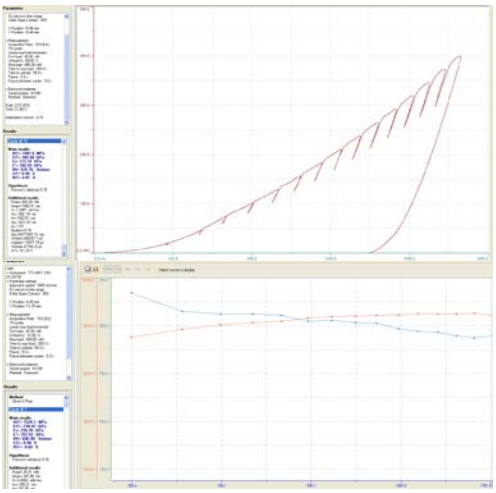
at the Structural Ceramics Department

Instrumented indentation / nanoindentation is a technique where in the course of the indentation process, a precise record of the depth of penetration and loading force is kept during loading and unloading. Then hardness, stiffness, elastic modulus and other mechanical properties as functions of depth can be calculated.

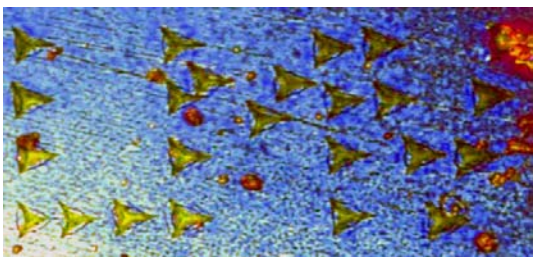
Equipment
Table Top Nanoindentation Hardness Tester – TTX NHT2, by CSM Instruments

Technical specifications

- Motorized programmable XY-stage (prec. ≤ 1µm)
- Various tip geometries
- Load resolution 40 nN
- Instrumented indentation testing from 0.1 to 500 mN
- Dynamical mechanical analysis
- Continuous Multicycle modes
- Sinus loading mode



Continuous Multicycle Loading – load-penetration curve and analysis of depth profiles of hardness and modulus of elasticity



Programmable matrix of indents