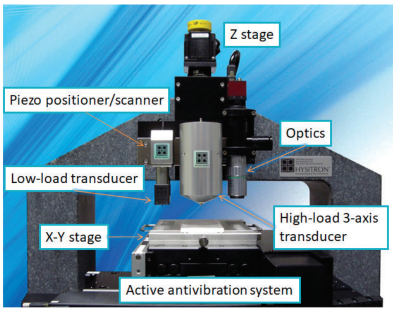
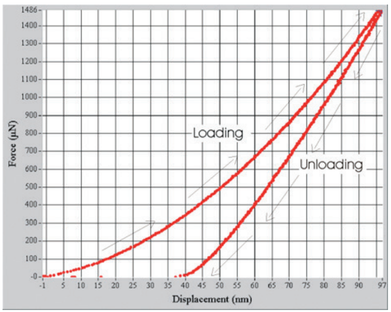
Nanoindentor

Hysitron TI 950

DESCRIPTION

To measure nanomechanical properties of surface layers of bulk materials and thin films, nanoindentation measurement techniques are used commonly. An indenter is pushed into the sample until bulk plastic deformation occurs, and then unloaded. During the indentation process, the device continuously monitors the load and the position of the indenter relative to the surface of the specimen. The area of the indent is then calculated from a knowledge of the area function of the tip of the diamond indenter.



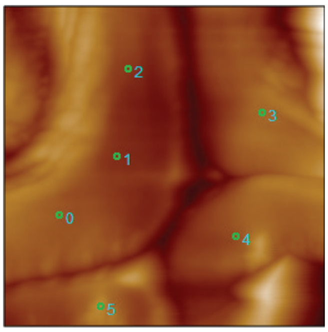


FEATURES

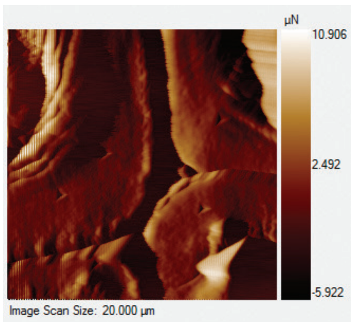
- **Quasistatic nanoindentation** – measurements of material mechanical properties such as hardness and elastic modulus
- **SPM imaging** – in-situ contact imaging of 3D profile of tested surface
- **Modulus Mapping** – large area mapping to provide quantitative information of material surface nanomechanical properties
- **Scratch testing** – evaluation of friction, wear resistance and coating adhesive strength
- **nanoDMA** – dedicated testing mode for dynamic mechanical behavior investigation of polymers and biomaterials
- **nanoECR** – in-situ electrical and mechanical measurements for material deformation and stress induced transformation behavior analyses
- **xSOL** – high temperature stage, can be added to provide feedback-controlled temperature accuracy during high temperature testing up to 800 °C
- **3D Omniprobe**

RESULTS

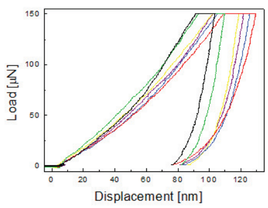
Nanoindentation tests of wood cell walls



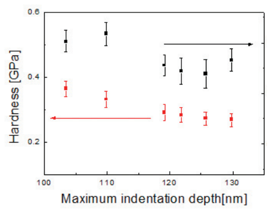
Automated positioning of indentation prints using SPM piezoscanner



Indentation prints in wood cell walls (spruce) imaged using the SPM piezoscanner



Load-displacement curves



Hardness and effective modulus results for different maximum indentation depths

SPECIFICATION

Standard Transducer Specifications
Normal Load
Resolution: <1 nN
Noise Floor: <30 nN
Imaging Contact Force: ≤70 nN
Normal Displacement
Resolution: <0.02 nm
Noise Floor: <0.2 nm
Drift: <0.05 nm/sec
Maximum Indentation Depth: 5µm
High Load Transducer Specifications
Maximum Normal Force: 2 N
Normal Force Noise Floor: <0.02mN
Load Resolution: <0.015mN
Displacement Noise Floor: <0.6nm
Displacement Resolution: <0.03nm
Maximum Normal Displacement: 80 µm
Maximum Lateral Force: 5 N
Maximum Scratch Length: 150 mm
Stage Specifications
X and Y stages
Travel: 250 mm × 150 mm
Encoder Resolution: 500 nm
Z stage
Travel: 50 mm
Resolution: 3 nm

MORE INFO

Guarantor: Saeed Mirzaei (saeed.mirzaei@ceitec.vutbr.cz)

Web: http://nano.ceitec.cz/hysitron-ti-950-nanoindentor/