



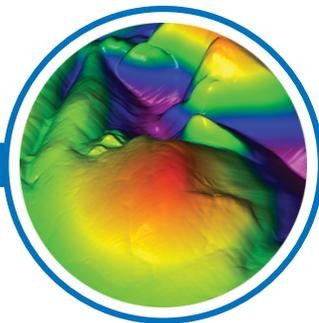
## Hysitron TI Premier

- Essential Toolkit for Nanometer-to-Micrometer Mechanical and Tribological Characterization

# Hysitron TI Premier

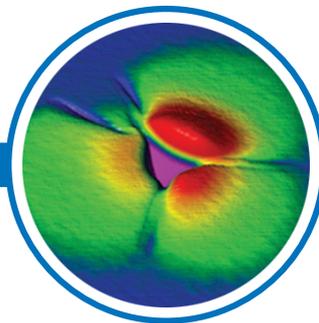
## Enabling Quantitative Nanomechanical Research

Bruker's Hysitron® TI Premier Nanomechanical Test Instrument was specifically designed to deliver industry-leading, quantitative nanomechanical characterization within a compact platform. Built upon proven Hysitron technology, the TI Premier provides an essential toolkit for your nanoscale mechanical and tribological testing. Routine measurements to advance research can be accomplished utilizing the versatile base configurations of TI Premier, while numerous technique upgrade options are available to meet the potential diversity of your future characterization needs.



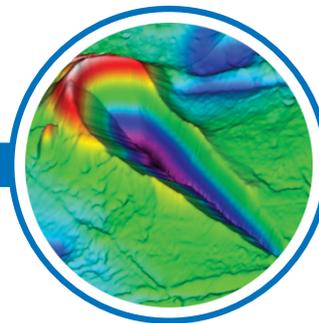
### **In-Situ SPM Imaging**

In-situ topography imaging, maximizing test placement accuracy and measurement reliability.



### **Nanoindentation**

Quantitative modulus, hardness, creep, fracture toughness, and stress relaxation characterization.



### **Nanoscratch**

Nanoscale measurement of scratch/mar resistance, thin film adhesion, and friction coefficients.



### **Nanowear**

Quantify wear volumes and wear rates under well-controlled tribological conditions.

## ● Accurate, Reliable, Quantitative

### Application-Specific Characterization Packages

Bruker's Hysitron TI Premier offers application-specific characterization packages tailored for quasi-static nanoindentation, dynamic characterization, high-temperature characterization, and testing over multiple length scales. These prepackaged configurations are optimized to deliver dedicated solutions to meet your research and process control requirements.

#### Quasi-Static Nanoindentation Package

Nanomechanical characterization optimized for thin films and inhomogeneous materials.

#### Dynamic Characterization Package

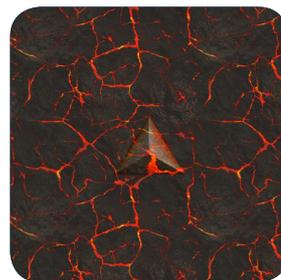
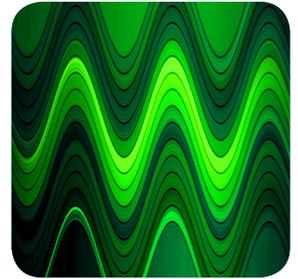
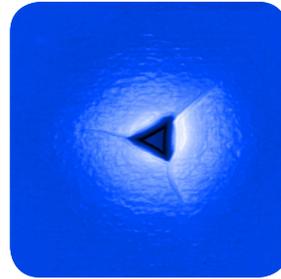
Quasi-static and dynamic mechanical property characterization over a broad range of materials, from ultrasoft to ultrahard.

#### High-Temperature Characterization Package

Investigate mechanical properties and time-dependent deformation behavior as a function of temperature.

#### Multiple Length Scales Package

Depth-sensing indentation over the nanometer and micrometer length scales.



### Quantitative Characterization Capabilities

Bruker has developed a broad suite of complementary characterization techniques to enable powerful nanoscale materials research.

#### Dynamic Mechanical Analysis

Storage modulus, loss modulus, and tan delta as a function of measurement depth, frequency, and time.

#### Tribology

Friction Coefficients, scratch resistance, thin film adhesion, and nanoscale wear.

#### Surface Characterization

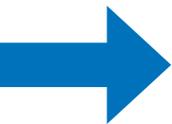
In-situ scanning probe microscopy, optical microscopy, and surface mechanical property mapping.

#### Electrical Characterization

In-situ electrical contact resistance, conductance, phase transformations, and material deformation behavior.

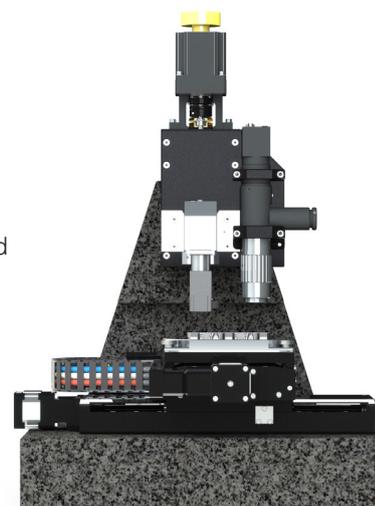
#### Environmental Control

Nanomechanical and nanotribological characterization at high temperatures and in customizable gaseous atmospheres.



## Hysitron TI Premier Features

- Application-specific testing technique packages to reliably meet your characterization needs
- Proprietary capacitive transducer technology for reliable mechanical and tribological property measurements at the nanoscale
- High-resolution in-situ SPM imaging that enables precise test positioning accuracy ( $\pm 10$  nm) and observation of post-test deformation behavior
- Custom-engineered enclosure with an integrated anti-vibration system to provide nanoscale characterization capabilities in non-ideal environments
- Sensitive force and displacement noise floors (75 nN, 0.2 nm) for unprecedented accuracy
- Intelligently designed software with enhanced automated testing routines and an intuitive user interface
- Easily adaptable system to meet specific research needs, from soft polymers to ceramic thin films



## Hysitron TI Premier Specifications

Nanoindentation	Normal Load Range: 75 nN to 10 mN (30 mN optional) Normal Displacement Range: 0.2 nm to 5 $\mu$ m
Nanowear	Normal Load Range: 100 nN to 1 mN Wear Box Size: 4 $\mu$ m - 60 $\mu$ m
In-Situ SPM Imaging	Imaging Force: <100 nN Maximum Scan Volume: >60 $\mu$ m x 60 $\mu$ m x 4 $\mu$ m
Motorized Staging	Travel: 50 mm x 150 mm Resolution: 50 nm

## Hysitron TI Premier Upgrade Options

Nanoscratch	Quantify scratch/mar resistance, thin film adhesion, and friction coefficients with normal and lateral force/displacement monitoring
xSol <sup>®</sup> Environmental Stage	400°C and 600°C stages for material investigation at non-ambient temperatures and under customizable atmospheres
nanoDMA <sup>®</sup> III	Dynamic mechanical analysis that enables a continuous measurement of elastic-plastic and viscoelastic properties as a function of contact depth, frequency, and time
nanoECR <sup>®</sup>	In-situ conductive nanoindentation to correlate nanomechanical properties, material deformation behavior, and electrical contact resistance
xProbe	Rigid-probe MEMS transducer that delivers ultra-low force and displacement noise floors typically associated with AFMs
MultiRange NanoProbe <sup>™</sup>	Expanded force and displacement testing range transducer for depth-sensing microindentation
Modulus Mapping <sup>™</sup>	Scanning dynamic nanoindentation mode for quantitative, high-resolution maps of modulus distribution across a surface
Electrochemical Cell	Quantitative, in-situ nanoscale mechanical and tribological characterization under oxidizing and reducing conditions
Sample Chucks	Diverse range of magnetic, mechanical, and vacuum chucks to mount almost any sample in any form
TriboAE <sup>™</sup>	In-situ, through-tip monitoring of acoustic signals generated from fracture and deformation events during the nanoindentation process

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