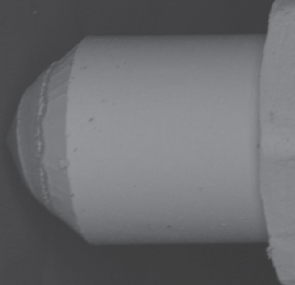


InSEM[®] HT

IN SITU HIGH TEMPERATURE NANOMECHANICAL TESTER



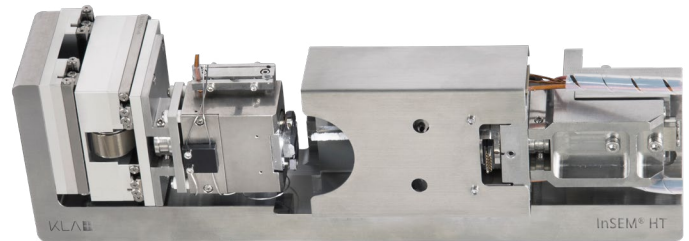
Features

- InForce 50 Actuator with tip heating for capacitance displacement measurement and electromagnetic force actuation with interchangeable tips
- Sample heating up to 800°C with 10mm sample-size and vacuum-compatible sample mounting system
- InQuest high speed controller electronics with 100kHz data acquisition rate and 20 μ s time constant
- XYZ motion system for sample targeting
- SEM video capture for synchronized SEM images with data
- Unique software-integrated tip-calibration system for fast, accurate tip calibration
- InView control and data review software with Windows-10 compatibility and method developer for user-designed experiments

Applications

- High-temperature testing
- Hardness and modulus measurements (Oliver-Pharr)
- Continuous stiffness measurement
- High speed material property maps
- Creep measurement
- Strain rate sensitivity

The InSEM[®] HT nanomechanical test system has been specifically designed for mechanical properties testing at high temperature under vacuum on small volumes of materials, without sacrificing accuracy or cost. The InSEM HT measures hardness, modulus and stiffness at high temperatures by independently heating both the tip and sample in a vacuum environment. It also has the ability to view real-time deformation, adding to the understanding of material performance at elevated temperatures.



Designed for High-Temperature Materials Research

The InSEM HT provides the material testing needed to understand material performance at high temperature by combining all the needed tools along with the essential extras to make testing accurate and easy. The resulting system can characterize materials faster than ever and deliver results with the lowest overall program cost.

Full Sample and Tip Heating in Vacuum

The InSEM HT is compatible with SEM, Focused Ion Beam (FIB) chambers or standalone vacuum chambers. The system provides independent control of the tip and sample temperatures to maintain minimum thermal drift between the indenter tip and testing sample.

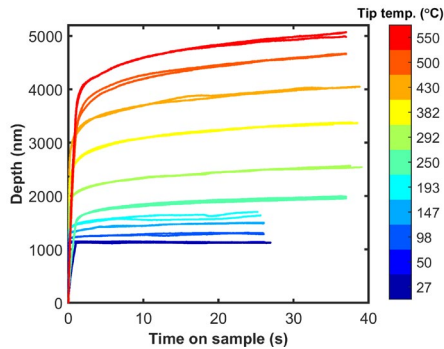
Motion System

The heating system is combined with a high precision XYZ motion system that provides positioning with sub 5nm resolution using linear optical encoders.

Continuous Stiffness Measurement (CSM) Option

- Measures stiffness and other material properties during the indentation cycle

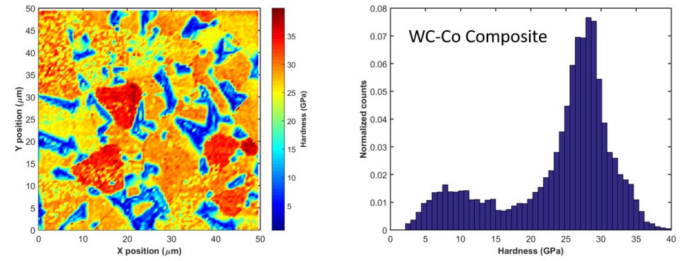
The CSM option involves oscillating the probe during indentation to measure properties (including creep at elevated temperature) as a function of depth, force, time or frequency."



Depth-Time curves measured at different temperatures for a fixed load. Significant creep was observed starting at ~200°C

NanoBlitz 3D Option

- Quickly and quantitatively maps surface mechanical properties
- Gives statistically significant results due to increased number of observations
- Measures rough surfaces and/or heterogeneous materials



Hardness mapping and statistical histogram of hardness on WC-CO composite materials using the NanoBlitz 3D option

Additional Options	
InForce 1000 actuator	The InForce 1000 actuator performs nanomechanical tests with forces up to 1000mN. It is compatible with the CSM, NanoBlitz, sample heating, scratch and wear, and ISO 14577 testing options. Tips are interchangeable with the entire line of InForce and Gemini actuators.
NanoBlitz 4D	NanoBlitz 4D generates 4D maps of measurements for both low-E/H and high-E (> 3GPa) materials with a Berkovich tip. It utilizes a constant strain rate method and provides visualization software and data handling capability.
AccuFilm™ Thin Film Method Pack	The AccuFilm Thin Film Method Pack is an InView test method based on the Hay-Crawford model for measuring substrate-independent material properties using CSM.
Scratch and Wear Test Method	The Scratch and Wear test applies a constant or ramped load to an indenter while moving across the sample surface. It can be used for characterizing thin films, brittle ceramics and polymers.
DataBurst Mode	DataBurst mode enables systems to record displacement data at rates > 1kHz for measuring high strain.
InView Experiment Scripting	InView offers a powerful and intuitive experiment-scripting platform for designing novel or complex experiments.
Indenter tips and calibration samples	Interchangeable tips for the InForce 50, InForce 1000, and Gemini actuators. Sharp indenters include Berkovich, cube corner, Vickers, and flat and sphere punches.

KLA SUPPORT

Maintaining system productivity is an integral part of KLA's yield optimization solution. Efforts in this area include system maintenance, global supply chain management, cost reduction and obsolescence mitigation, system relocation, performance and productivity enhancements, and certified tool resale.

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