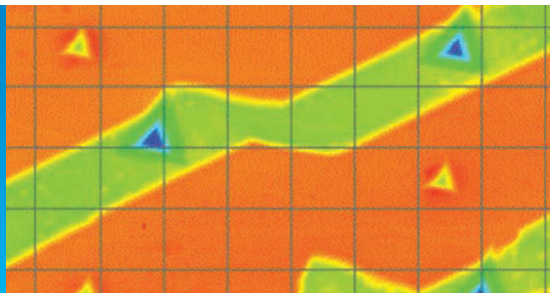
NanoVision Microscopy Module on the Nano Indenter® G200



Overview

The NanoVision microscopy module allows users to create quantitative high-resolution images. These images can be used to target indentation test sites with nanometer-scale precision or characterize individual phases of complex materials. NanoVision users can also examine residual impressions to quantify material response phenomena such as pile-up, deformed volume and fracture toughness. Standard NanoVision methods provide quick setup to obtain 3D results, while the option's interactive mode provides a flexible platform for customization of scan routines.

Features and Benefits

- Creates quantitative high-resolution images
- Allows users to target indentation test sites with nanometer-scale precision
- Allows users to examine residual impressions in order to quantify material response phenomena such as pile-up, deformed volume, and fracture toughness
- Features a closed-loop nanopositioning stage
- Provides user control over scan area, resolution, and speed
- Fully integrates NanoSuite software, providing:
  - Parallel control of nanopositioning stage and all other system hardware
  - 3D capabilities
  - Integrated indentation and imaging
- Includes ten NanoVision sample pucks

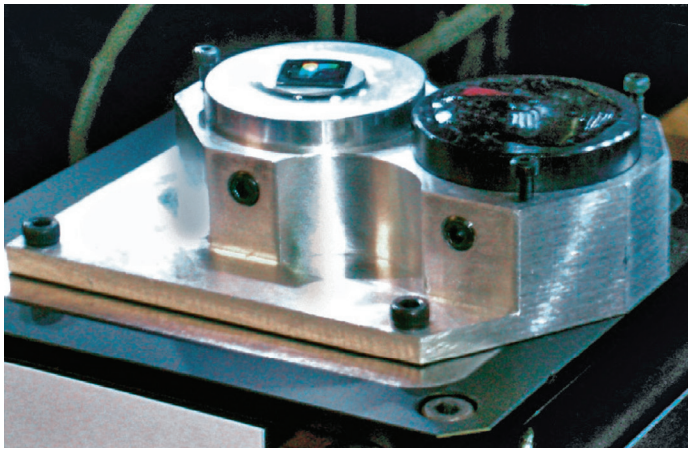


Figure 1. Nanopositioning scanning stage

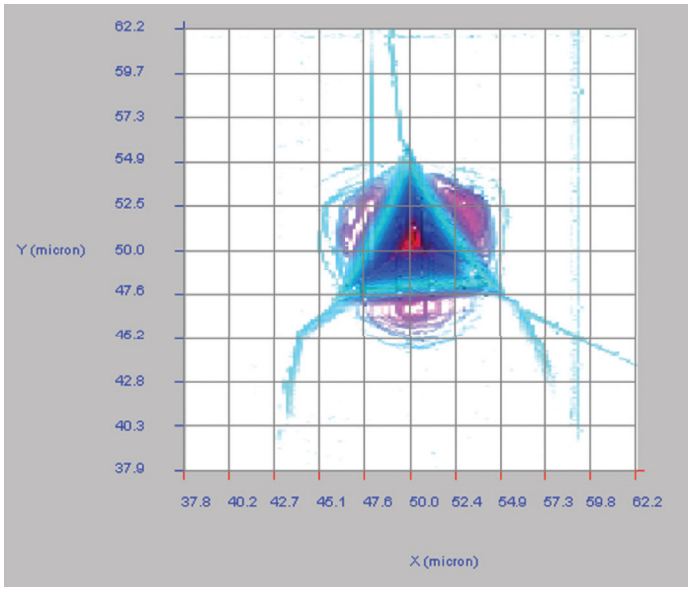


Figure 2. Rapid, easy setup of automated indent and scan routines for fracture toughness measurements

Principles of Operation

The NanoVision option for the Nano Indenter G200 system is used to probe the surface of a sample, generating a 3D map of the surface. The indenter tip is brought into contact with the surface and a small constant force is applied while rastering the sample back and forth. In order to maintain this constant force between the tip and the surface, the indenter head moves up and down with the surface profile. This up-and-down motion is measured and then used to generate a topographic image of the surface.

The topographic image can be used to position indentation test sites with nanometer-scale precision. Precise placement of indentations on a complex sample, such as a multilayer composite, allows users to target and characterize individual phases of the material.

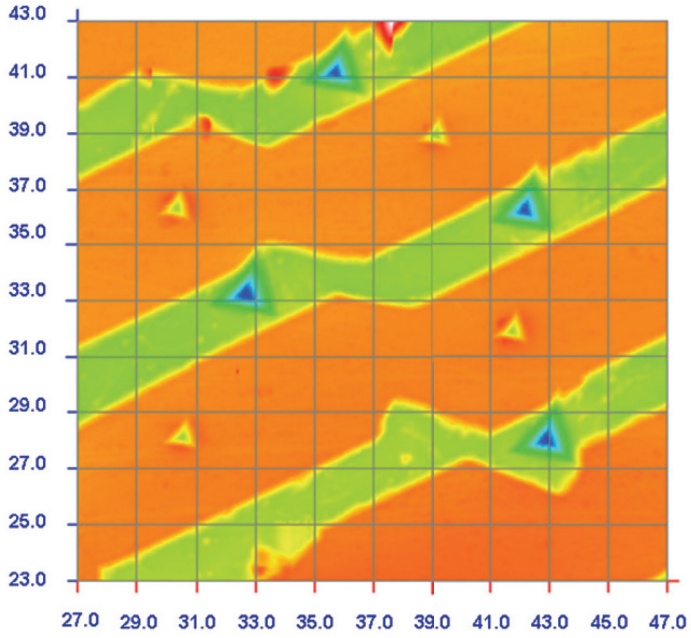


Figure 3. NanoVision-generated topographical image, used to select test sites. Above, the NanoVision image allowed the user to test individual phases of chrome and chrome-silicide

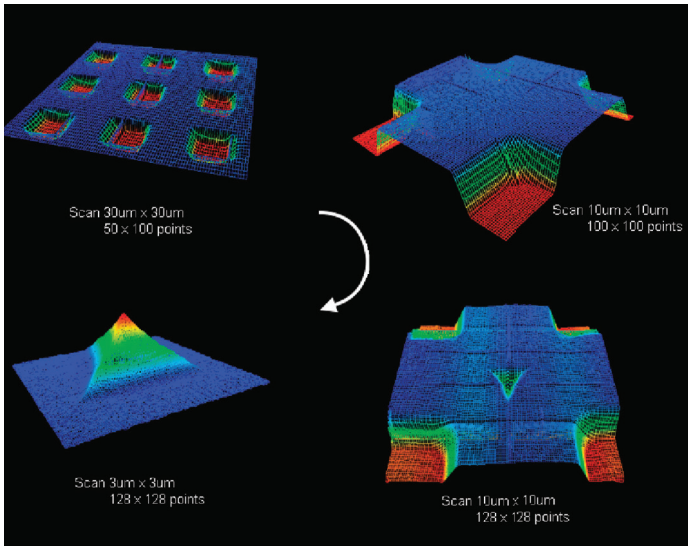


Figure 4. Using the NanoVision option to scan a grid with known step heights in order to demonstrate topographic accuracy.

NanoVision Option Specifications

- X-Y scan range: 100µm x 100µm
- Z scan range: Depends upon indentation head
- Positioning accuracy: < 20nm
- Resonant frequency: > 120Hz

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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