

500x Faster Nanoindentation



Hysitron XPM Accelerated Property Mapping

- Quantitative, Ultrahigh-Speed Nanoindentation

Bruker's Hysitron® XPM™ Accelerated Property Mapping Mode sets a new industry standard in terms of nanomechanical testing throughput paired with measurement resolution and accuracy. With the XPM mode on a Hysitron TI 980 TriboIndenter®, more data can be taken in a single afternoon than could be collected in an entire year using traditional nanoindentation methodologies. These exclusive performance capabilities are made possible by the coupling of three industry-leading Bruker technologies: a high-bandwidth electrostatically actuated transducer, fast control and data acquisition electronics, and top-down in-situ SPM imaging. These synchronized technologies can perform six measurements per second to achieve comprehensive, quantitative nanomechanical property maps and property distribution statistics in a record amount of time.

XPM Features

- Ultrahigh-speed quantitative mechanical property measurements (6 per second)
- Rapid, high-spatial-resolution mapping of hardness and modulus with distribution statistics
- Acquisition of large quantities of statistically significant data in a short period of time
- 500x faster characterization than traditional nanoindentation
- Robust, tip-area-function calibration within a minute
- Compatibility with Bruker's xSol® environmental control stage for rapid testing throughput under extreme environmental conditions

Measure More in Less Time

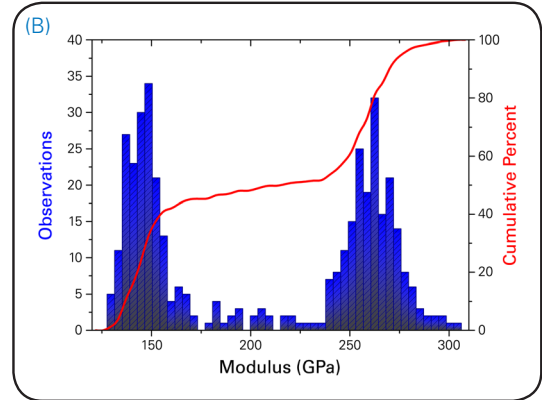
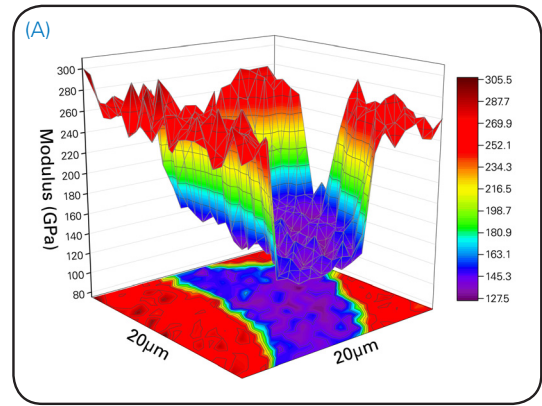
Nanomechanical testing was specifically developed to measure highly localized mechanical properties. Arrays of individual measurements can be spatially arranged and plotted to generate maps of mechanical property gradients across a surface. Conservatively, a traditional nanoindentation measurement takes ~90 seconds and a 20x20 array would take 10 hours to complete. Utilizing XPM ultrafast property mapping, this same data set can be compiled in a mere 1.1 minutes.

Test and Analyze with Ease

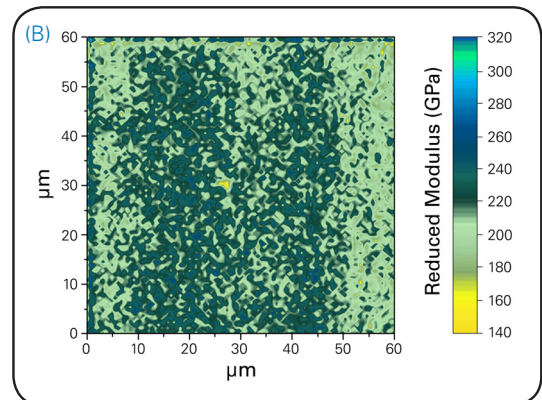
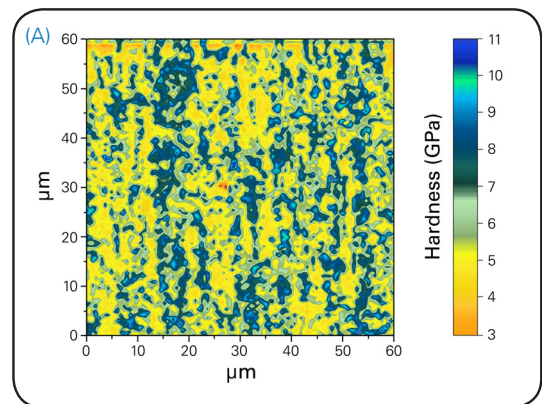
An intuitive XPM test function editor is built into Bruker's TriboScan™ control and data analysis software package. The operator simply defines the number of measurements to be performed, the spacing between measurements, and the indentation load function. XPM property maps can be accurately positioned on the sample using both optical and scanning probe microscopy techniques. After the XPM routine is complete, spatially resolved property maps and property distribution histograms are automatically generated.

Recalibrate Expectations

Unlike other nanomechanical test solutions, Bruker's XPM rapidly delivers a complete picture of how localized mechanical properties are spatially distributed in inhomogeneous materials, and also provides greater certainty in reporting property values on homogeneous materials. Even basic, yet time-consuming, system calibrations such as the tip-area-function are ~500x faster. With XPM, expect to spend more time understanding your materials and significantly less time gathering data.



(A) Ceramic matrix composite modulus map composed of 400 measurements in 67 seconds. (B) Ceramic matrix composite modulus distribution statistics.



(A) 10,000 point hardness map. (B) Modulus map on a DP 980 cold rolled steel alloy.

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