

● Dimension Icon AFM-Raman

Highest Performance AFM with Co-Localized μ -Raman Capability

Today's requirements on micro- and nanoscale characterization instrumentation go far beyond the capabilities of a single measurement method. The complimentary techniques of atomic force microscopy and Raman microscopy provide critical information on both the topography and the chemical composition of a sample. When these techniques are further enhanced with advanced AFM modes, such as Bruker exclusive PeakForce TUNA™ electrical characterization and PeakForce QNM® quantitative nanomechanical mapping, researchers are able to better understand the mechanisms that lead to specific material properties.

Bruker's Dimension Icon® AFM systems have proven to lead the industry in resolution, productivity and reliability, while maintaining the highest level of expandability. With the introduction of integrated Raman spectroscopy capability, the Icon again sets a new

standard in high-performance surface characterization. An advanced confocal μ -Raman system combined with Icon enables co-localized measurements with unsurpassed efficiency and ease, taking performance of material characterization to a new level.

Dimension Icon AFM-Raman Features

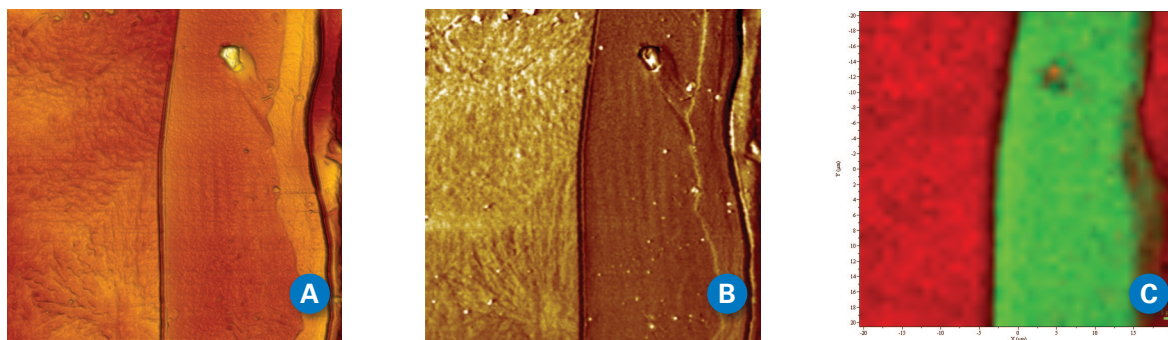
- Highest performance, most complete AFM capabilities combined with advanced confocal Raman microscopy
- Immediate correlated AFM and μ -Raman research quality results
- Most comprehensive data using the full range of extended AFM modes and spectroscopic methods
- Integrated material and composition mapping on a single platform guaranteeing optimum performance in sample characterization

Configuration Flexibility

The AFM-Raman system, consisting of the Dimension Icon AFM and a research-grade confocal Raman microscope (Horiba, LabRam), is on a single, rigid, anti-vibration platform. This configuration allows the system to maintain each individual instrument's full functionality, providing optimum combined performance. As an example, the configuration enables the full complement of Icon upgrades, AFM modes, and ease-of-use features, including Bruker-exclusive ScanAsyst®. You are able to tailor the most effective combination of modes for your application.

When it comes to combined measurements, Icon AFM-Raman again proves its superior productivity.

Within seconds the sample is transferred between the two techniques, using Icon's high-precision X-Y stage. AFM and spectroscopic measurements of the same sample area are carried out consecutively. Raman mapping and imaging results can easily be correlated with AFM images using MIRO®, Bruker's powerful microscopy overlay software. Stacks of data sets (topography, modulus and adhesion maps) can be overlaid with a chemical distribution map to provide comprehensive correlated information of the inspected surface area. With its full complement of techniques, advanced features and μ -Raman capabilities, the Dimension Icon is the perfect tool for sophisticated investigations of the mechanisms underlying the effect of chemical composition or crystalline structure on relevant material properties.



Series of images showing the topography (A), young's modulus (B) and Raman map (C) of the cross section of a layered polystyrene / polypropylene structure (image size $40\mu\text{m} \times 40\mu\text{m}$). PeakForce QNM provides quantitative information of the elasticity/stiffness of a sample. The change in contrast is due to the higher elastic constant of polystyrene (dark) vs. polypropylene (bright). In comparison, the Raman map clearly shows the regions of different chemical composition (polystyrene in green, polypropylene in red) demonstrating the excellent correlation of the methods.

Specifications

AFM

Dimension Icon	Identical to the standard Dimension Icon specs, with some variations depending upon specific configuration
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Raman

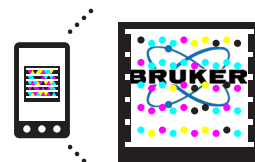
Spectrometer	Can be combined with major supplier instruments: Bruker Optic, Horiba, Renishaw, etc.
Co-localization AFM-Raman	< $3\mu\text{m}$ position accuracy, in post processing perfect data overlay using MIRO
Selections	- Multiple wavelength, - spot measurement, mapping and imaging capability - spectral range and resolution

Cover images Foreground: Dimension Icon in co-localized configuration with Horiba LabRAM HR Raman microscope. Left Background: Peak Force Tapping™ modulus image of a polystyrene/polypropylene structure. Right Background: Raman map of the same area (polystyrene in green, polypropylene in red). Variations in material properties correspond with different chemical compositions.

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