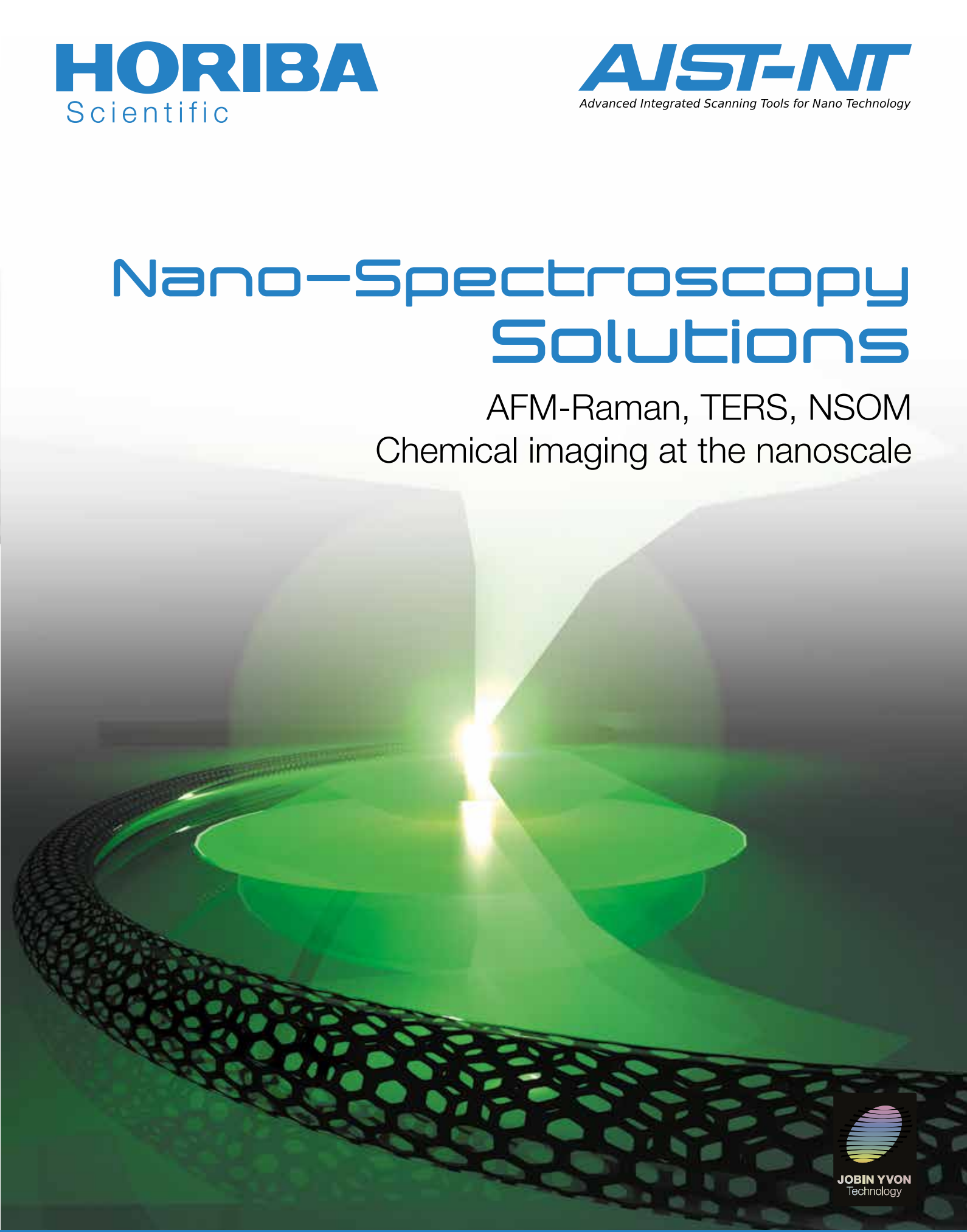
HORIBA Scientific

AIST-NT
Advanced Integrated Scanning Tools for Nano Technology

Nano-Spectroscopy Solutions

AFM-Raman, TERS, NSOM
Chemical imaging at the nanoscale



JOBIN YVON Technology

Raman–AFM and TERS

Made Easy!

Since its introduction in the early 80's, Scanning Probe Microscopy (SPM) has quickly made nanoscale imaging an affordable reality. The technique provides a continuously growing variety of surface analysis methods for the physical characterization of materials, yet label-free chemical sensitivity is still challenging.

On the other hand, optical spectroscopy has provided a unique way to determine the structure and chemical composition of molecules for decades and is a method of choice for the analysis of nano-materials despite its diffraction-limited spatial resolution.

The two techniques together make up an attractive and unique tool, yet integrating such different instrumention is challenging. Today, with over a decade of experience in this exciting field, we have refined the technique to its utmost with uncompromised performance to bring you a tool that is not only extremely powerful and versatile, but is also so easy to use, fast and reliable that generating outstanding data is virtually effortless.

Reliable Results

- Fully automated cantilever alignment insuring reproducible optimization of the AFM parameters from one tip to the next and from one user to another. (1) (5)
- Reliable repositioning of the probe on the sample within seconds. (1) (8)
- Drift compensated sample scanner with high resonance frequency brings reproducible images over long periods of time thanks to low vibration sensitivity. (5)
- Raman laser alignment by piezo-driven closed-loop objective scanner: shortest distance to the focus point for minimum drift. (6)
- Visual confirmation of the Raman laser alignment with independent video imaging, SPM detection and Raman mapping. (8)

Versatile

- Numerous SPM modes including AFM, STM, tuning fork, NSOM.
- Full range of Raman excitation lasers, including red and NIR, without interferences, thanks to a 1300 nm AFM feedback diode. (1)
- Up to 3 spectroscopic detectors and 20 SPM channels.
- High resolution sample scanner from nanometers to full scan range. (5)
- Top down and oblique Raman detection for optimum resolution and throughput in both co-localized and Tip-Enhanced measurement modes. (2)
- Full control through one workstation, or, SPM and spectrometer can be operated independently.

Powerful

- High numerical aperture objectives from both top and side for best co-localized spatial resolution and best TERS collection efficiency.
- High-throughput optics and spectrometer.
- High spectral resolution with the LabRAM HR spectrograph.
- Broad range of detection wavelengths, from deep UV to Infrared.
- Simultaneous SPM and spectroscopic measurements.
- Powerful processing software suite for both SPM and spectroscopic data, including Multivariate Analysis and spectral database lookup.

1300 nm AFM laser feedback

High efficiency top down and side coupling

Compact holder for easy probe exchange

Dual optical scheme, easy switching

High resonance scanner, auto tip-alignment and tuning

Closed-loop, short path-length Raman laser alignment for long-term stability

High performance without active vibration isolation

Visual confirmation of Raman laser alignment in all modes

Simple and Fast

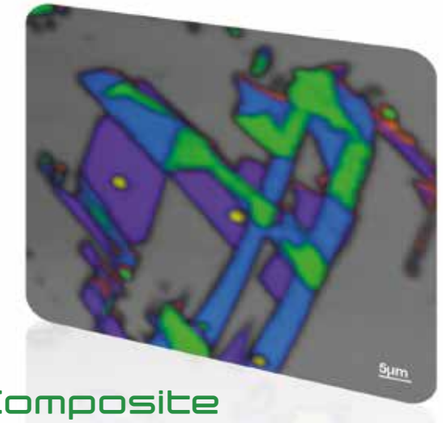
- One-click cantilever alignment, frequency tuning and optimization, requiring no manual adjustments.
- Easy cantilever exchange without affecting the sample.
- Fast and intuitive Raman laser to AFM tip alignment.
- Ultra-fast simultaneous SPM and Raman measurements.

The Ultimate Tool

For Physical and Chemical Characterization

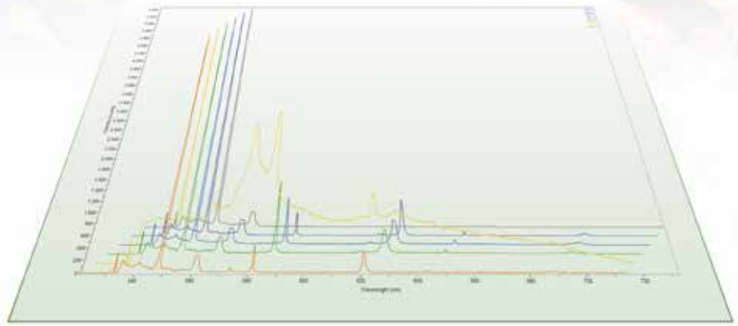
Raman-AFM

Full range of SPM modes and simultaneous spectroscopy



Composite Raman image

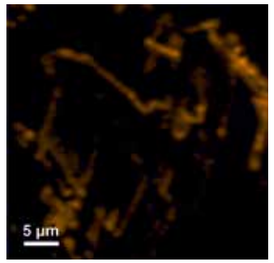
AFM Topography



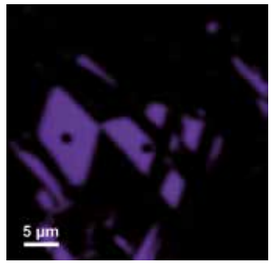
Graphene CLS Spectra

Raman Silicon

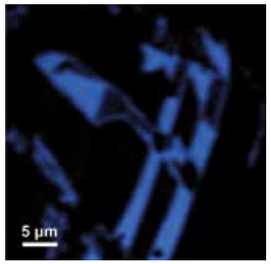
Raman Graphene with Defects



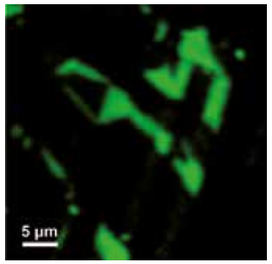
Raman Single Layer Graphene



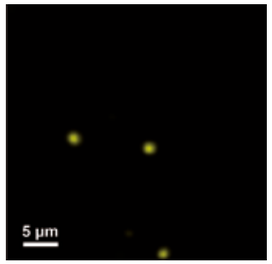
Raman 2-layer Graphene



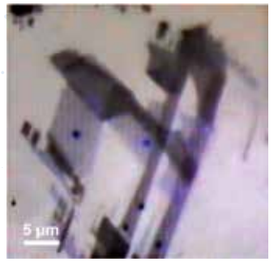
Raman 3-layer Graphene



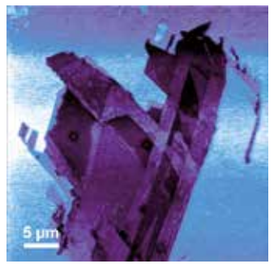
Raman Amorphous Carbon



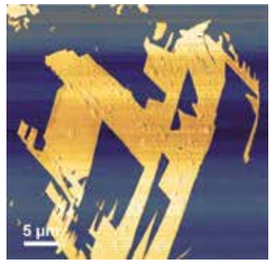
AFM Optical Image 100 %



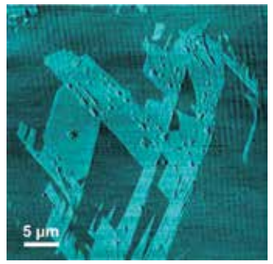
AFM Contact Potential Difference



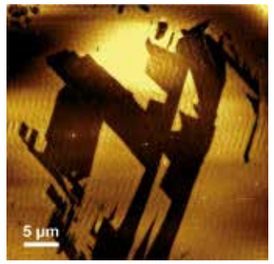
AFM Capacitance



AFM Phase



AFM Friction



Data courtesy of Prof. Hiroshi Uji of K.U. Leuven

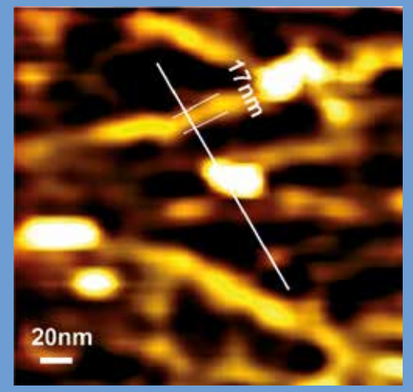
Main Applications

- Biological structures
- Graphene
- Carbon nanotubes
- Nanowires
- Polymers
- SERS substrates
- Semiconductors

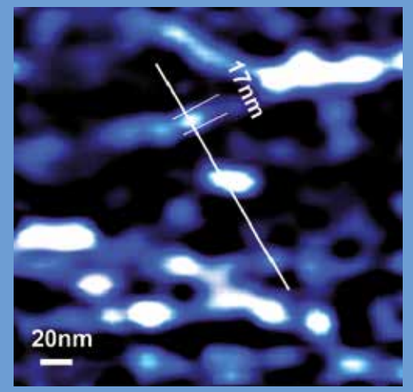
TERS

Label-free chemical characterization with nanoscale resolution

SWCNT STM Image



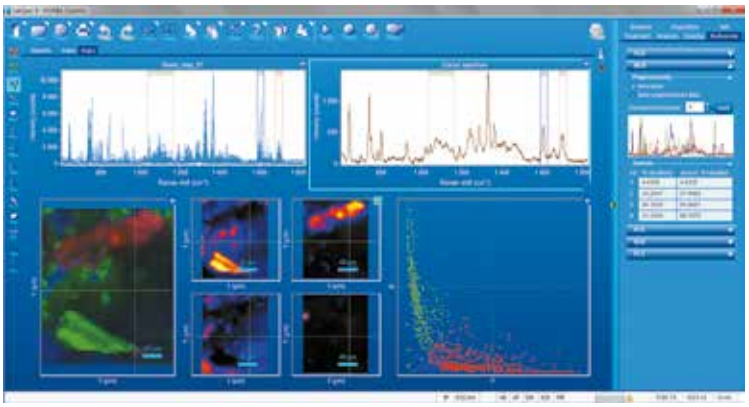
SWCNT TERS Image G Band



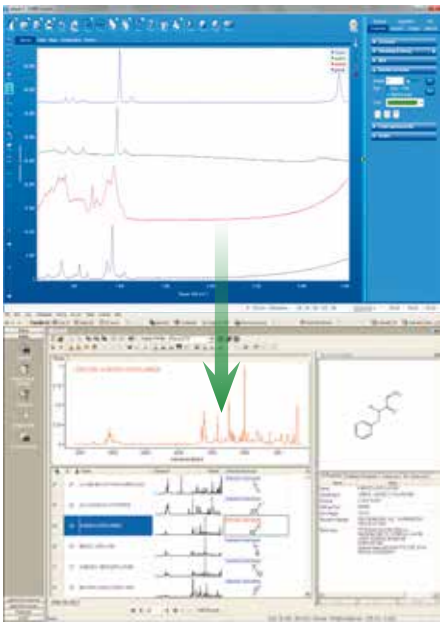
Integrated Software

Seamless system control and data acquisition, and the most advanced data analysis and processing suite

Integrated Multivariate Analysis module. High level analysis at a touch of a button. PCA | MCR | HCA | DCA.



Powerful data acquisition and system control interface with scripting and methods definition capabilities.



KnowItAll® HORIBA Edition. Fast chemical identification with HORIBA spectral database (>1750 spectra).

λ = (325 nm - 1064 nm) P ≤ 500 mW
VISIBLE AND OR INVISIBLE LASER RADIATION
AVOID EXPOSURE TO BEAM
CLASS 3B LASER PRODUCT

* Laser safety classifications depend on individual systems and options

CE

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