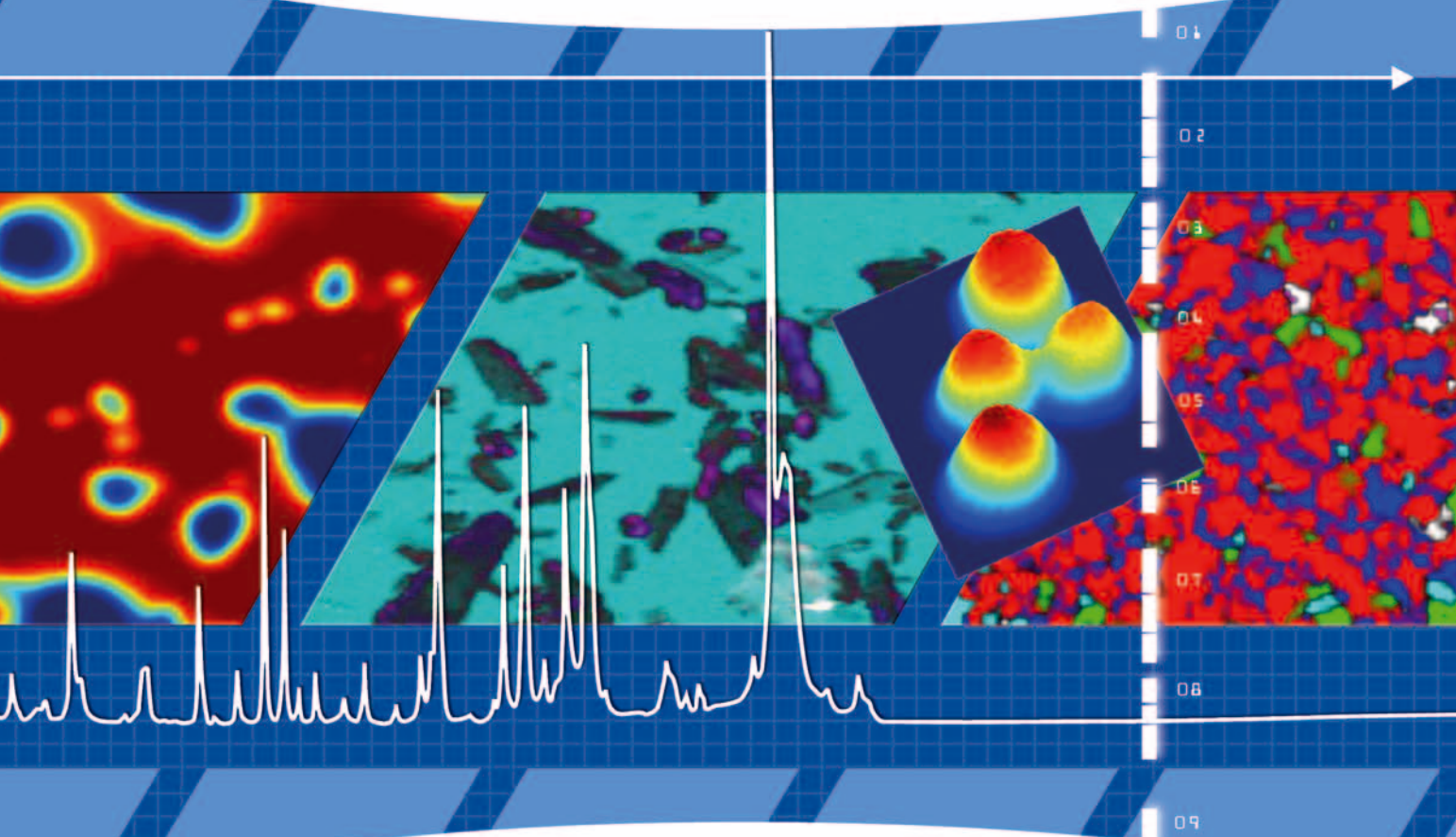
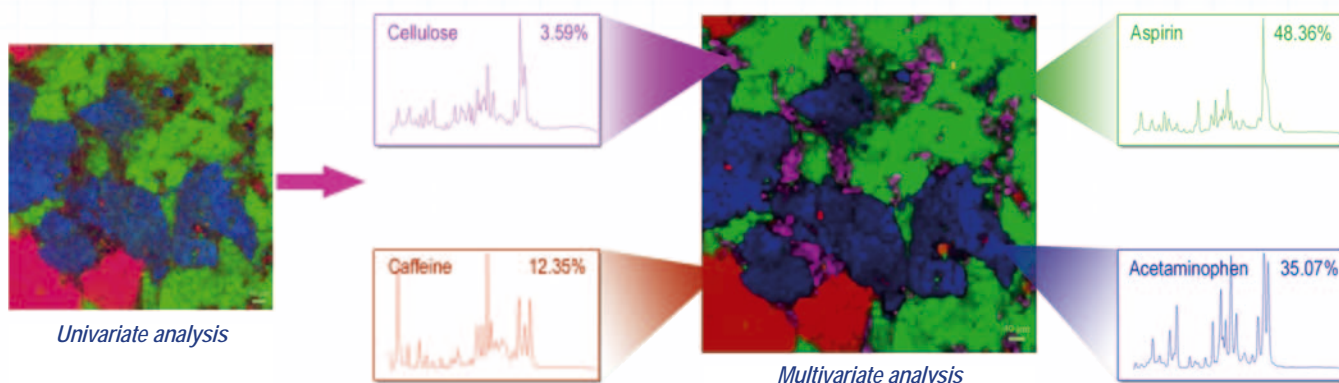


Innovative Solutions for Raman Imaging



Get the full picture of your sample

The new generation of confocal Raman microscopes offers a non-destructive and non-contact method of sample analysis at the sub-micron level. More particularly, Raman imaging provides the spatial distribution of the various molecular species within your sample, making it possible to produce fast and accurate chemical images.

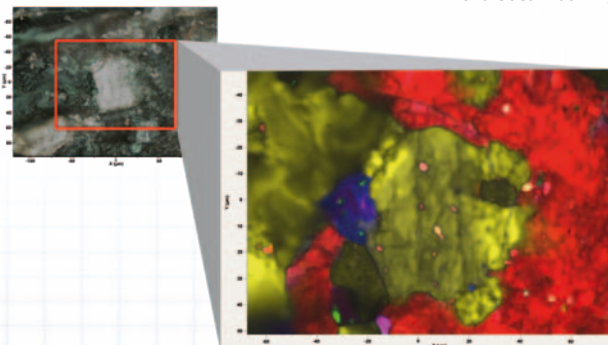


Raman image of a pharmaceutical tablet showing the spatial distribution of the different components and their corresponding Raman spectra

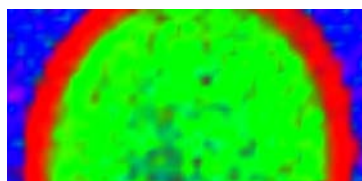
- Chemical component distribution
- Phase mapping and polymorph identification
- Micro-analysis of stress and molecular orientation
- Identification of functional groups in organic and biological samples

Applications

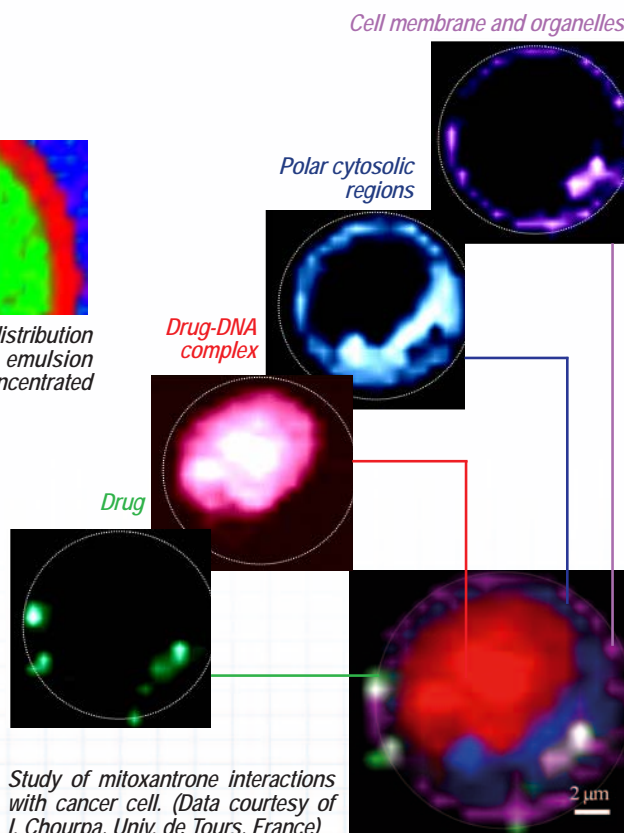
- Pharmaceutical industry
- Material science
- Semiconductors
- Life science
- Geology
- Forensics
- Art
- ... and many more



Geological sample obtained using SWIFT™ mapping mode, with microscope image insert and Raman "chemical" image foreground



Raman image of polymer distribution over a dry drop of latex emulsion showing polymer mainly concentrated in the outer red ring



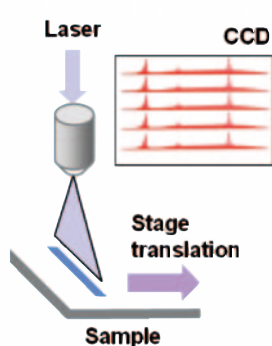
Study of mitoxantrone interactions with cancer cell. (Data courtesy of I. Chourpa, Univ. de Tours, France)

Innovative solutions for Raman imaging

The need for ever faster imaging with ever higher spatial resolution calls for innovative solutions that will push the envelope of today's instrument capabilities with no compromise on spectral performance. As the world leader in Raman spectroscopy, HORIBA Jobin Yvon is committed to offering the most advanced techniques for imaging your sample with ultimate sensitivity, speed, spatial and spectral resolution, and is the partner of choice for challenging applications.

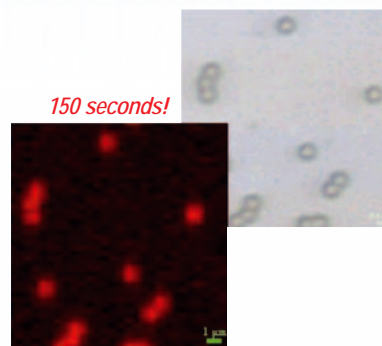
LineScan Imaging

An easy way to faster mapping or averaging



HORIBA Jobin Yvon was the first to introduce a line scanning mode which reduces acquisition time considerably by simultaneously recording many spectra along a line. Two-dimensional images are obtained faster than conventional point by point mapping.

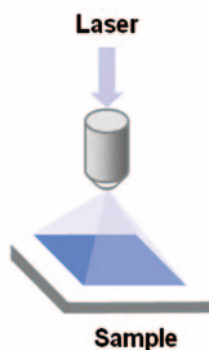
- High speed Raman image acquisition
- Lower laser power densities for sensitive samples
- Full spectral information available for data processing



Optical image and Raman image of polymer beads taken using the LineScan mode in 150 sec.

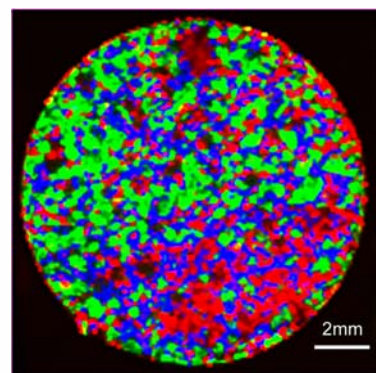
DuoScan™ NEW

Fast macro-mapping mode for large area screening



The DuoScan™ technology introduces a revolutionary method enabling fast and flexible confocal Raman mapping with sub-micron resolution. Its adaptive spot feature also allows for average measurements over a large area, ideal for measurement of sensitive samples. Combined with other mapping techniques such as SWIFT™, it allows for fast macro-mapping of very large samples without losing the confocal advantage.

- Fast and uniform scanning over large sample areas
- Truly confocal imaging with high depth resolution
- Covering the full spectral range from UV to IR
- Adaptive spot size for averaging and measurement of sensitive samples.



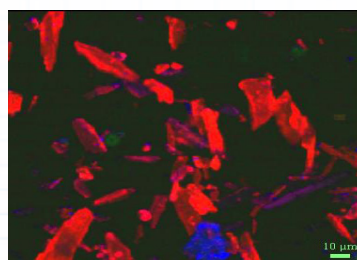
100% of this 12.5 mm diameter tablet surface was imaged in about 10 minutes by combining the SWIFT™ and DuoScan™ mapping techniques.

SWIFT™ NEW

Raman imaging at the speed of light

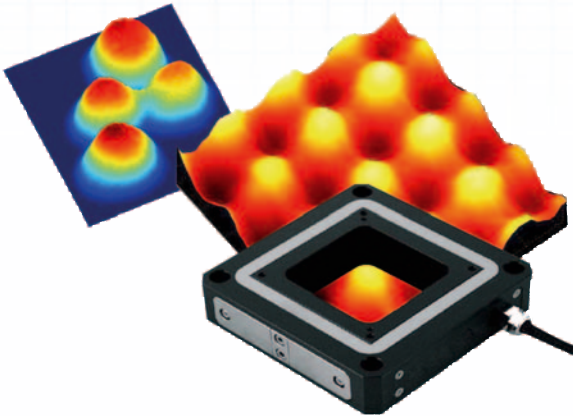
Thanks to new developments in detection and data collection, HORIBA Jobin Yvon is setting new records with acquisition times as fast as 7 ms per point. Whether for Raman or photoluminescence imaging, high quality images can now be obtained in a matter of minutes.

Raman Imaging on a pharmaceutical crystals using the SWIFT™ mapping mode, (30,000 spectra taken with 50 ms/pixel)

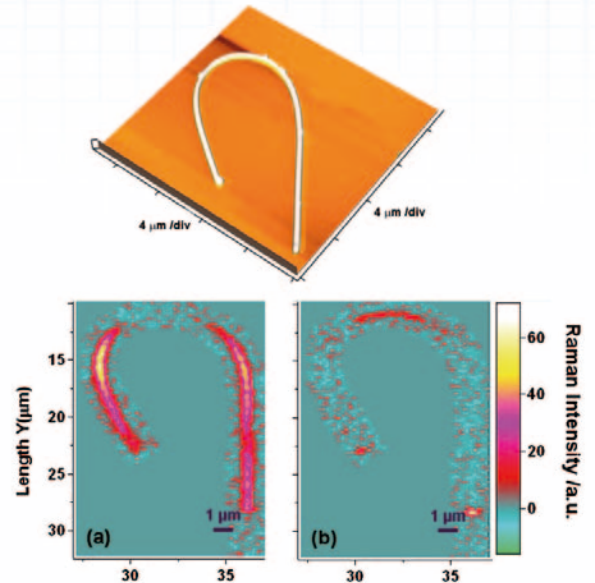


Take a step into the nano-world

The latest advances in Raman instrumentation have pushed the limits of Raman imaging into the nano-world. By incorporating new design and technological developments, it is possible to further improve spatial resolution and explore nano-objects such as nano-wires, carbon nano-tubes and nano-structured surfaces.



High resolution 200 x 200 x 200 μm piezo electric stage

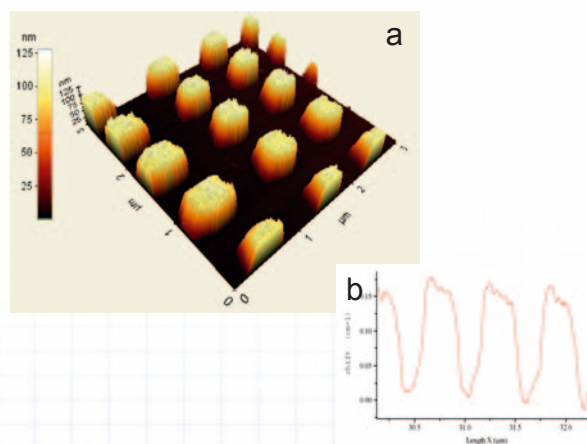


Measuring orientation of single GaN nanowire with different polarization selection. (Courtesy of F. Lagugné, D. Talaga, Univ. Bordeaux, France)

Moving Raman into a new dimension

To further expand the capabilities of your Raman system, HORIBA Jobin Yvon offers coupling solutions to other analytical techniques such as FT-IR, photoluminescence, and fluorescence lifetime measurements. Coupling to other non-optical imaging techniques like AFM enables you to go far beyond the diffraction limit, while keeping the chemical information that Raman spectroscopy brings.

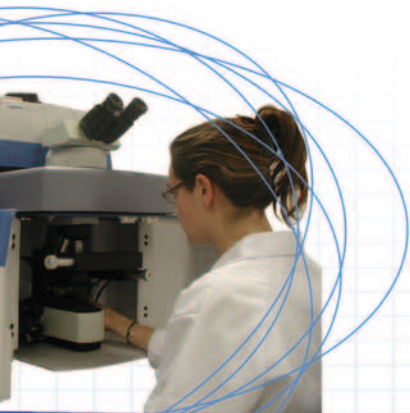
HORIBA Jobin Yvon provides robust systems combining Raman with AFM and scanning probe microscopy. Specialized interfaces allow new and emerging techniques, such as NanoRaman™ (also known as TERS, Tip-Enhanced Raman Scattering), to be explored with confidence.



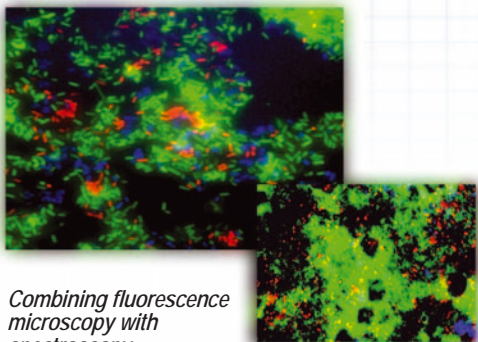
(a) 250 nm pillars of strained Si on SiGe substrate. AFM image
(b) Structure induced stress monitored using Si Raman peak shift



Depending on sample requirements inverted and side illumination options are available for coupling AFM to Raman microscopy.



Imaging options



Combining fluorescence microscopy with spectroscopy.
(Data courtesy of CEH, Oxford, UK)

• Microscope objectives

Standard objectives : 10X, 50X, 100X.

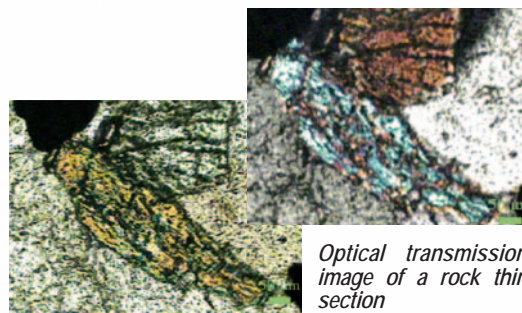
Also available: Long working distance, ultra long working distance, immersion (oil, water), UV or IR optimized

• Visualisation

Binoculars/trinoculars, polarized light, dark field, DIC, phase contrast, fluorescence filters

• Microscope configuration

Standard upright BX-41, inverted IX-71, open "free space" BXFM



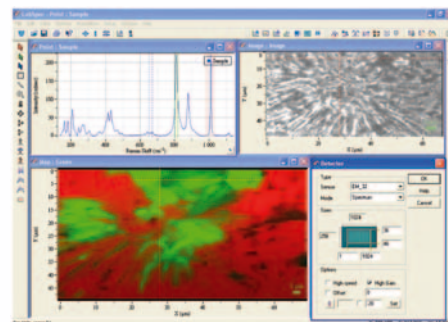
Optical transmission image of a rock thin section

Raman imaging fast and easy

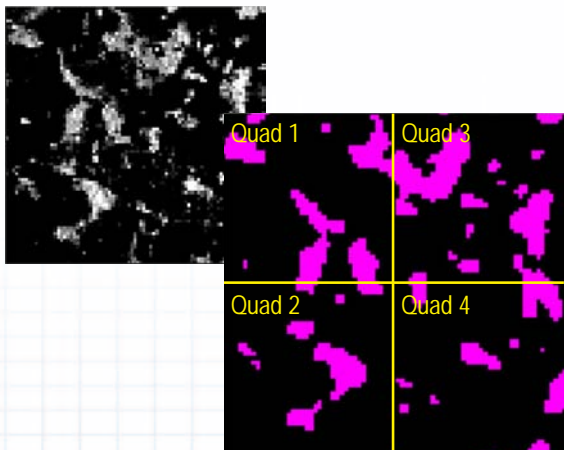
LabSpec software

The LabSpec software developed by HORIBA Jobin Yvon is an easy-to-use all-in-one software for both data acquisition and processing of hyperspectral images.

- Automatic Raman map generation
- Baseline correction, peak fitting and deconvolution
- Advanced modelling features, including multivariate analysis
- Supports multiple data file formats
- Compatible with most commercial spectral data processing software



LabSpec software screenshot



Advanced chemometric analysis

ISys® for use with HORIBA Jobin Yvon imaging systems has rapidly become the industry standard software product for processing chemical images. ISys® has been designed to meet the data processing requirements of both laboratory and process analytical technology environments.

Multivariate analysis tools in ISys® includes statistical pattern recognition such as clustering and chemometrics such as PCA, PCR, MLR and PLS. ALS and other factor based analysis algorithms are also provided. Image processing tools are what makes ISys® unique and include various image filters, image statistics and particle size analysis.

Binary image and spatial distribution image showing the number of particles in each zone.

RAMAN SPECTROSCOPY



SPECTROFLUOROMETRY



X-RAY FLUORESCENCE



DETECTORS



ATOMIC EMISSION SPECTROSCOPY



FORENSICS



Molecular and Microanalysis

- Raman Spectroscopy
- Spectrofluorometry
- X-Ray Fluorescence
- Photoluminescence
- Surface Plasmon Resonance imaging

Elemental Analysis

- X-Ray Fluorescence
- ICP - Spark - SDL Spectrometry
- Elemental Analyzers

Optical Components

- Gratings and OEM Spectrometers
 - VUV Instrumentation
- Modular Optical Spectroscopy
 - Detectors

Particle Size Analysis

Emerging Business

- Optical Characterization of Thin Films
 - Forensics

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CLASS 1 LASER PRODUCT

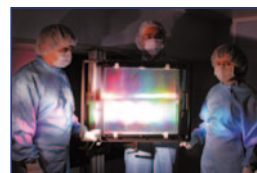
**$\lambda = 325 - 1064 \text{ nm}$, $P \leq 500 \text{ mW}$
VISIBLE OR INVISIBLE LASER
RADIATION
AVOID EXPOSURE TO BEAM
CLASS 3B LASER PRODUCT**

- The content of this catalogue is subject to change without prior notice
- It is forbidden to copy from the contents of this catalogue in part or in full
- Please read the instruction/operation manual before using these products

This instrument complies with 21CFR 1040.10 and IEC 60825-1 (08/2001)

*Laser safety classifications depend on individual systems and options

CUSTOM GRATINGS AND VUV BEAMLINES



OEM SPECTROMETERS AND GRATINGS



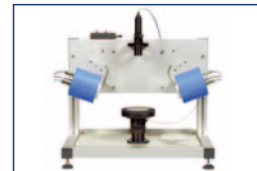
OPTICAL SPECTROSCOPY



PARTICLE SIZE ANALYSERS



ELLIPSOMETRY



THIN FILM PROCESS CONTROL

