

Nanofinder[®] FLEX 2

3D Confocal Raman, 2 lasers, fiber based, AFM combined

NEW

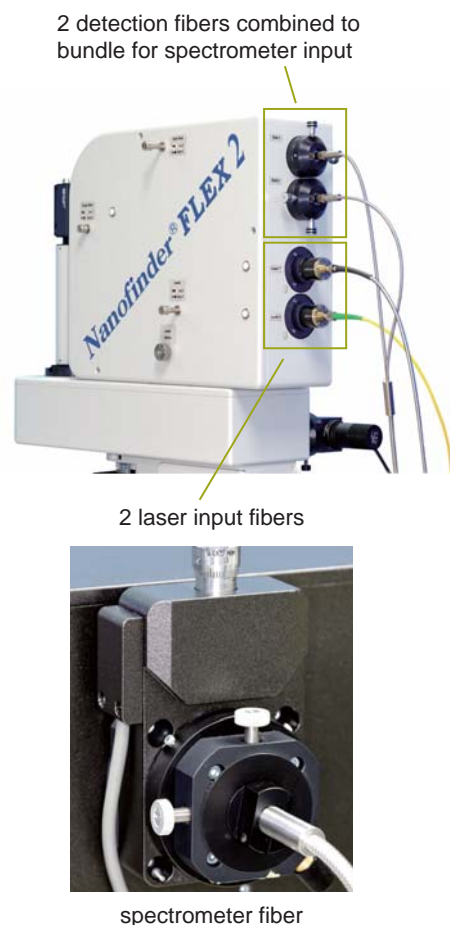
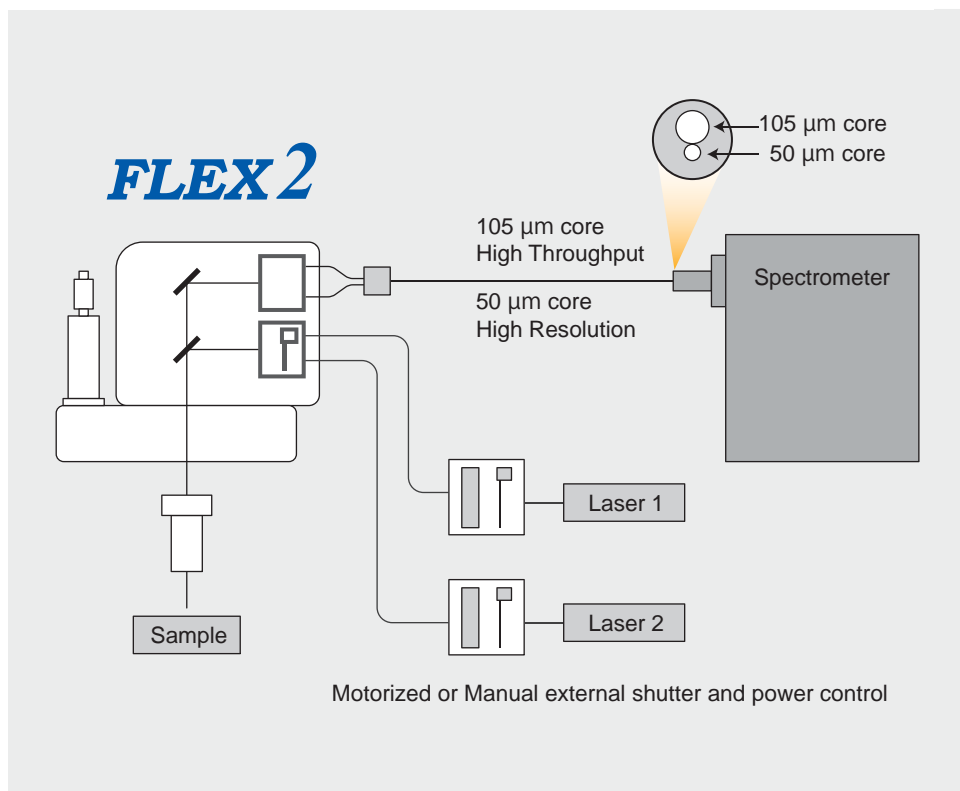


Key points

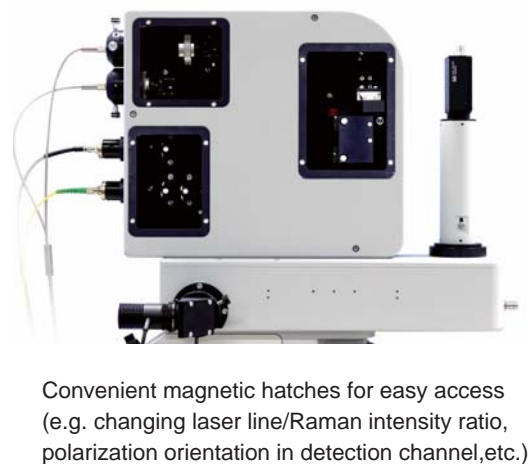
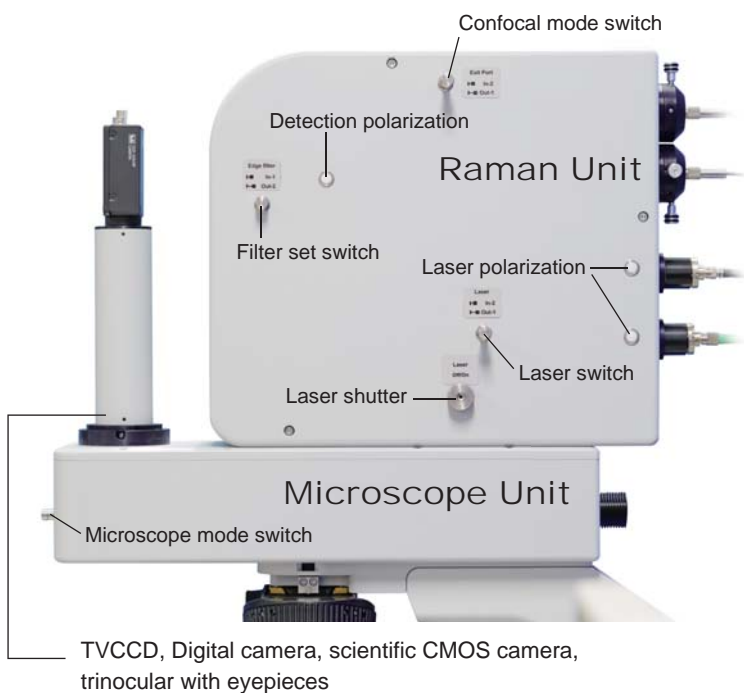
- Compact size
- 2 lasers, easily switchable
- 2 confocal operation modes, easily switchable :
 - High Spatial Resolution <math>< 350 \text{ nm}</math>
 - High Spectral Resolution <math>< 0.75 \text{ cm}^{-1}</math>~
 - High Throughput $\approx 40\%$

Smart design for easy use

All Fibers always connected
No fiber exchange or realignment needed



All switching by sliders



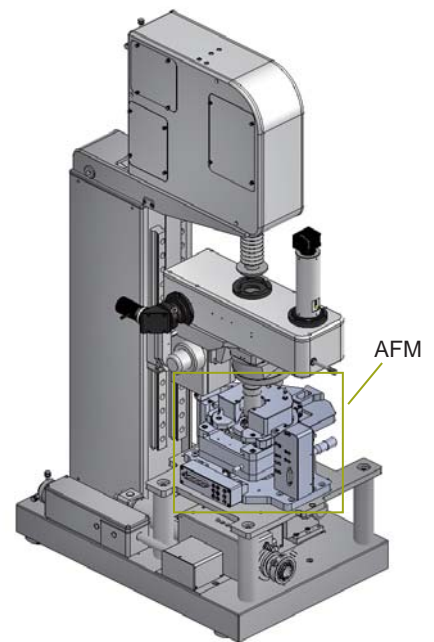
High quality optical Microscope

- White LED illumination
- Wide observation modes choice: Bright Field, Fluorescence (optional), Polarization (optional), etc.
- Sample observation/Raman measurement mode switch
- Compatible with standard Upright microscope frame and Free Space granite microscope frame for advanced operation modes.



Standard Upright Microscope

For handle or Step-Motor positioner, Piezo-stage scanner.

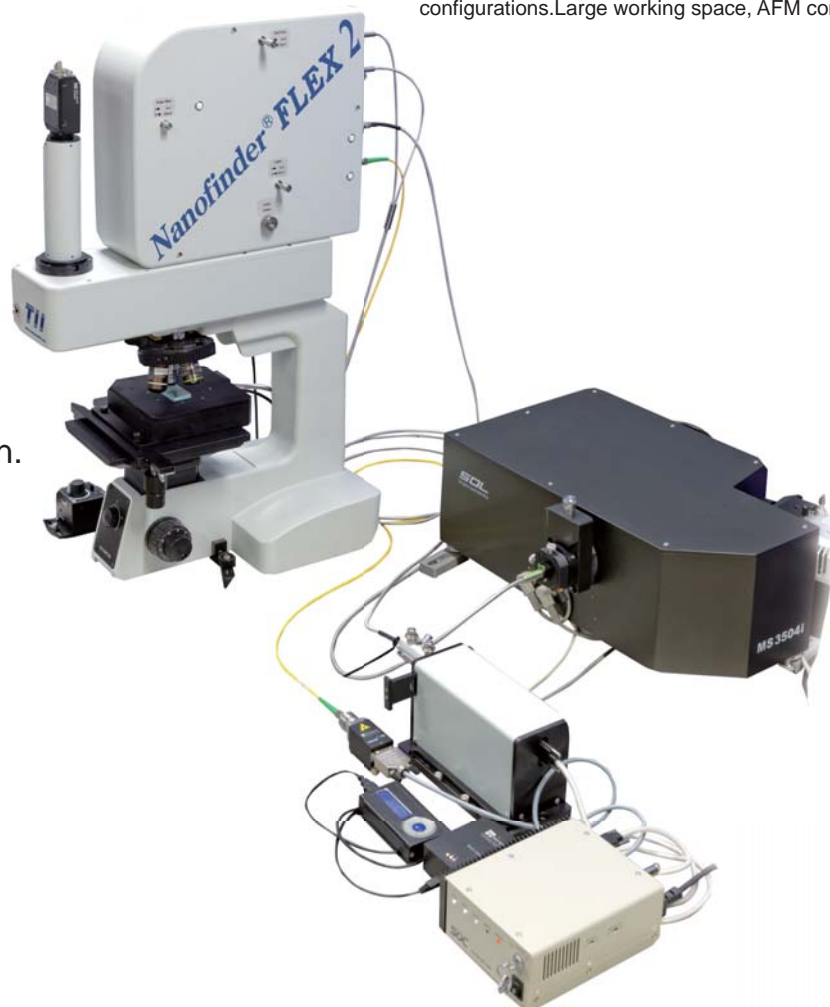


Free Space Granite Frame Microscope

Long travelling (150×150 mm) Step-Motor positioner, Upright, Transmission and Inverted microscope configurations. Large working space, AFM combined.



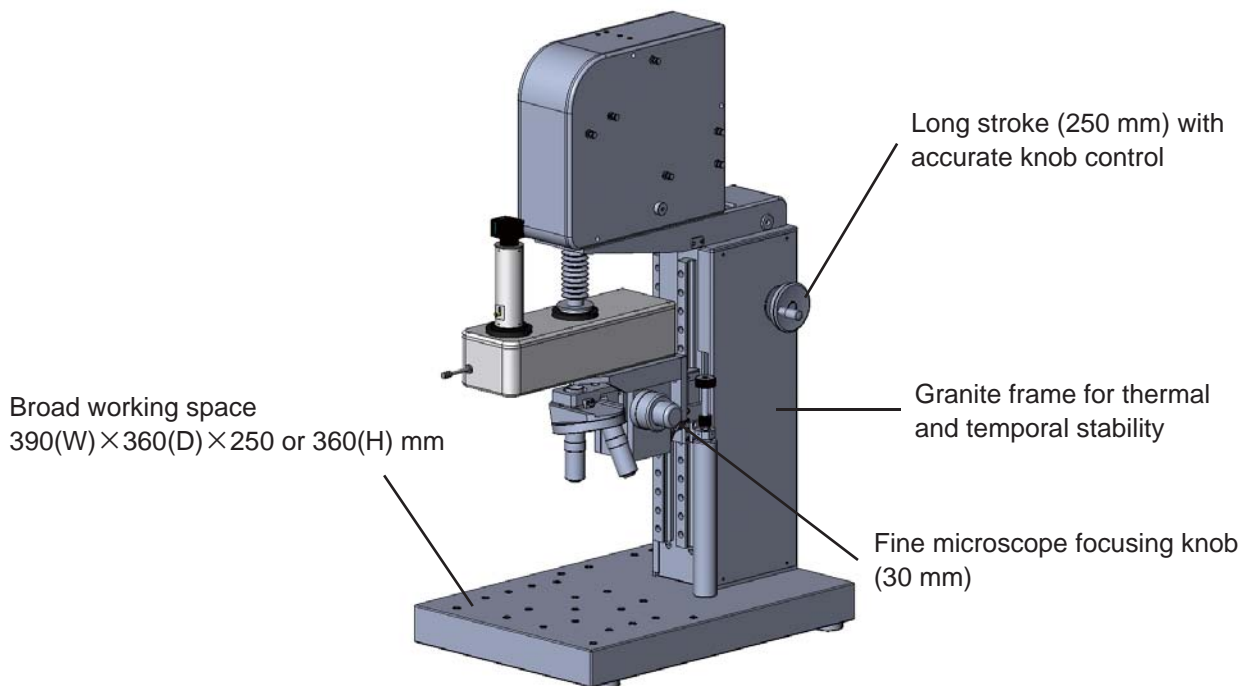
Free arrangement on optical table due to fiber design.



Granite Frame Microscope

Large working space

Flexible custom equipment and configuration

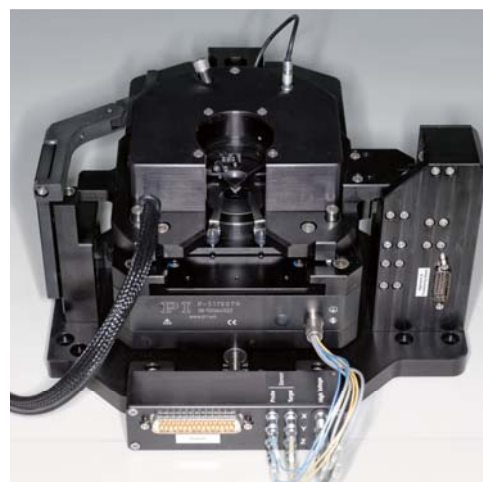


AFM choices

Best performance for AFM-Raman, TERS (Tip Enhanced Raman Spectroscopy),
SNOM (Scanning Near Field Optical Microscope)



"SMART" AFM for Upright microscope configuration.

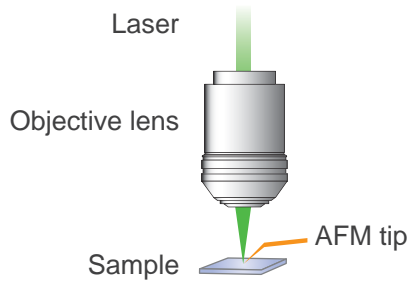


"CombiScope" AFM for Upright, Inverted and
Transmission microscope configurations.

AFM-Raman Structures

AFM-Raman reflection structure.

Microscope objective lens and AFM cantilever are at the top of the sample.



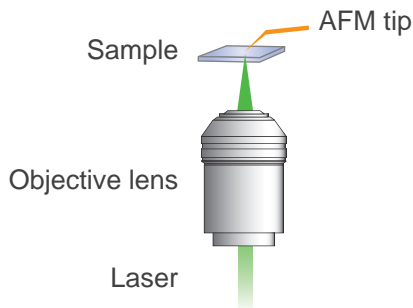
Microscope objective lens 100×NA0.7



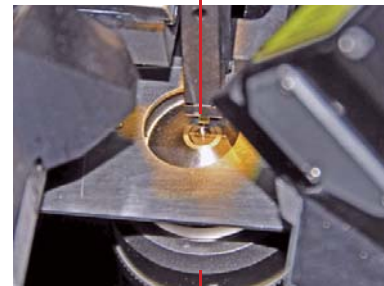
AFM cantilever

AFM-Raman transmission structure.

AFM cantilever is on the top, Microscope objective lens is on the bottom of the sample.



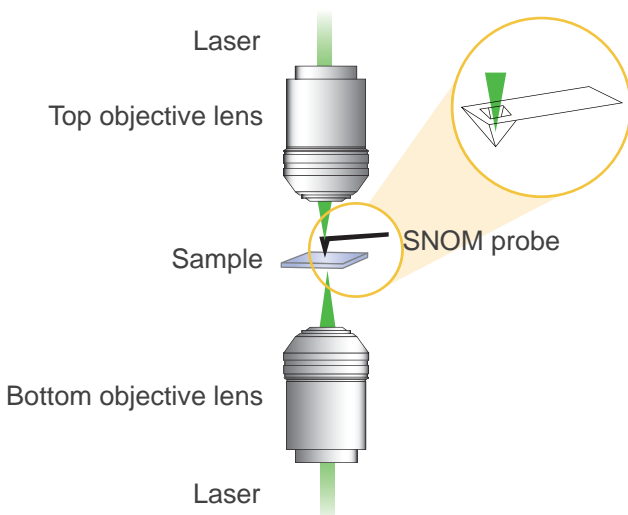
AFM cantilever



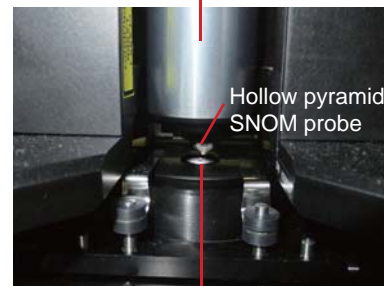
Microscope objective lens 100×NA1.4

Transmission SNOM structure.

Objective lenses are on the top and bottom of the sample. SNOM probe is in between.



Top Microscope objective lens



Bottom Microscope objective lens

Spectrometer choices

Throughput, Spectral resolution, Calibration convenience

350 mm imaging



415 mm SHR



520 mm imaging,SHR



Focal length,mm	350	415	520
F#	3.8	4.3	5.4
Dispersion 1 ^{a)} ,nm/mm	2.37	1.82	1.55
Dispersion 2 ^{b)} ,cm ⁻¹ /pix	2.04	1.59	1.33
Imaging	✓		✓
Mirror coating	Al,Silver, Gold,BB ^{c)}	Al	Al,Silver, Gold,BB ^{c)}
Number of gratings	4	3	4
SHR ^{d)} (Echelle grating)		✓	✓
Automatic calibration (optional)		✓	
Size (WxDxH),mm	510×395×200	535×400×260	635×339×270

- a) - for grating 1200 G/mm at 546 nm;
- b) - per one CCD pixel of 26 μm size;
- c) - Dielectric Broadband coating;
- d) - Super-High Resolution with echelle grating option (FWHM <0.5 cm⁻¹)

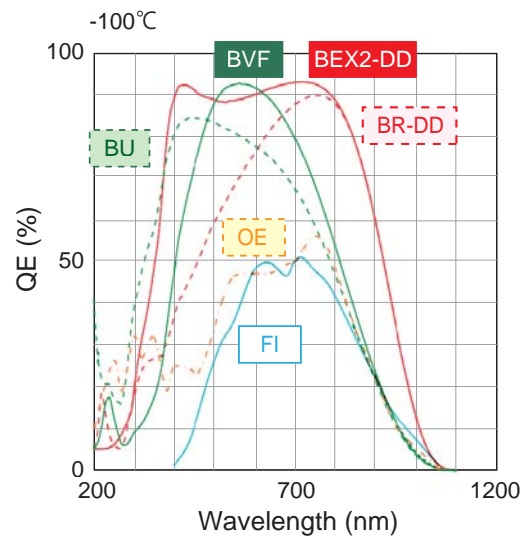
CCD detector



TE cooled spectroscopy CCD:
 Minimum Temperature : -100°C (water), -80°C (air)
 26×26 μm pixel size

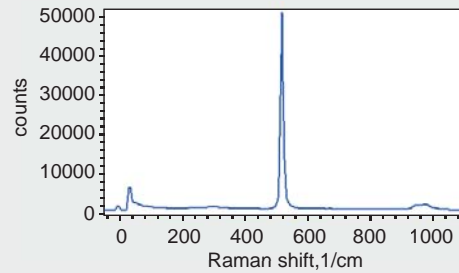
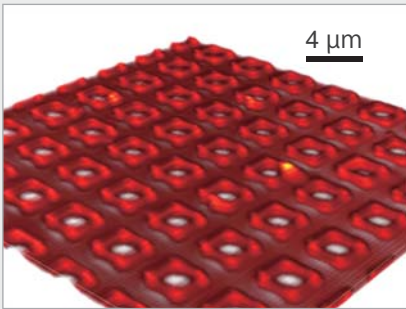
	Active (pixels)	BU	BVF	OE	FI	BR-DD	BEX2-DD
DU420A	1024×255	●	●	●		●	●
DU401A	1024×127		●		●	●	

Other CCD (including EM-CCD), APD detectors are available on request.



Data examples

Si device



Si wafer Raman spectrum.

Exposure **0.05 sec**

532nm laser

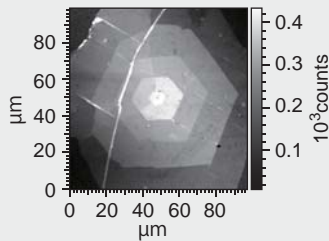
Laser power 12 mW

High system sensitivity permits fast 3D Raman imaging at 520 cm^{-1} .

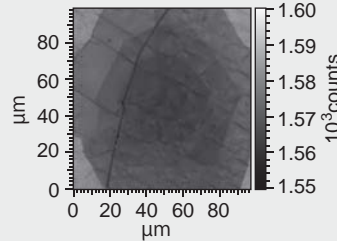
Mapping faster than 3 ms/point with full spectrum saving in every mapping point is possible (with optional 3 MHz ADC CCD)

Multilayer graphene

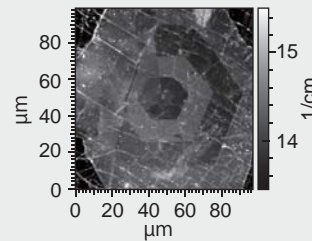
Sample courtesy of Prof. Dong Wang, Institute of Chemistry Chinese Academy of Sciences



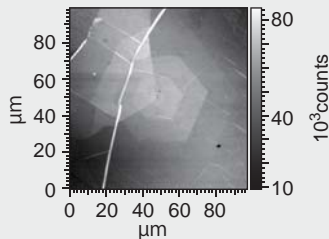
G-band intensity at around 1582 cm^{-1}



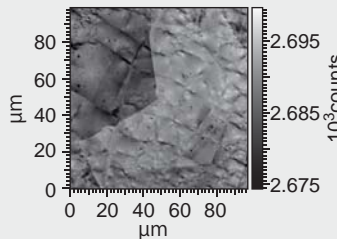
G-band peak position



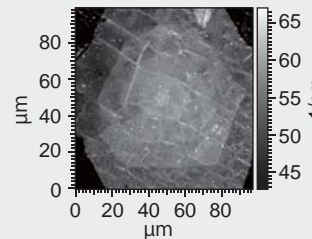
G-band FWHM



2D-band intensity at around 2685 cm^{-1}



2D-band peak position



2D-band FWHM

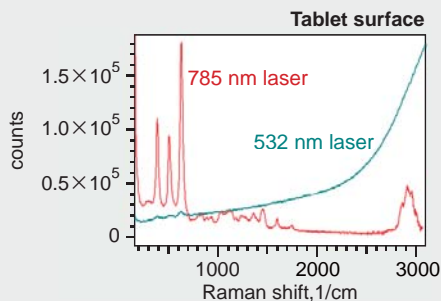
2D Raman images

532 nm laser.

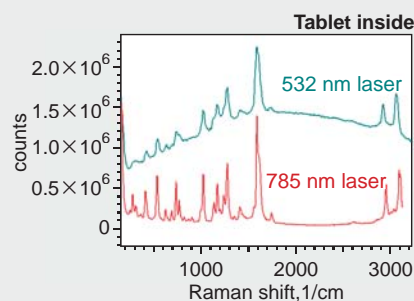
FitPeak software option applied.

Single Lorentzian curve fitting.

Pharmaceutical tablet



Tablet surface

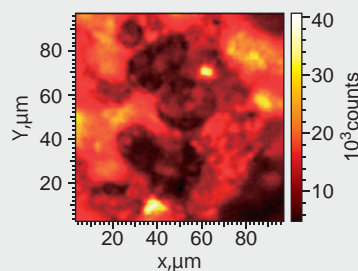
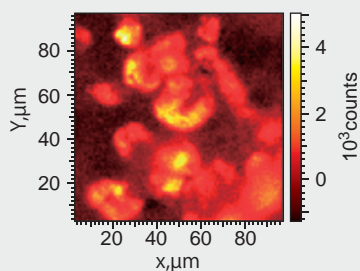


Tablet inside

Raman spectra from pharmaceutical tablet.

Strong fluorescence background with 532 nm laser

Spectra are throughput corrected



2D Raman images of the tablet at 470 cm^{-1} (left) at 1600 cm^{-1} (right).

785 nm laser

Main Specifications

Number of lasers: 2 (standard set 532 nm, 785 nm).

Optional laser wavelength: 355, 473, 488, 632.8, 830, 976 nm.

Detection fiber bundle: 2 fiber cores

-50 μ m core for High Resolution (HR) mode;

-105 μ m core for High Throughput (HT) mode.

Optional fibers available.

Standard scanner - piezo-stage X-Y-Z:

-100 μ m travel range;

-5 nm position repeatability.

Optional: other travel ranges, step-motor scanner, AFM scanner.

Laser	532 nm	785 nm
Wavenumber range (cm^{-1})	50~4000	40~3000
Dispersion ^{a)} ($\text{cm}^{-1}/\text{pix}$)	1.3 (at 546 nm)	0.49 (at 812 nm)
Spectral Resolution ^{a), b)} FWHM, typ (max) (cm^{-1})	<2 (2.6) (at 546 nm)	<0.75 (1) (at 812 nm)
Spatial resolution ^{b), c)} X-Y (nm)	<350	<500
Spatial resolution ^{b), c)} Z (nm)	<900	<900

a) with spectrometer $f=350$ mm, grating 1800G/mm, entrance slit 30 μ m, CCD pixel 26 μ m.

b) fiber 50 μ m core ("High Resolution" confocal mode)

c) with objective lens 100X NA=0.95

Size: Microscope with "Flex2" Raman unit footprint

● Olympus microscope frame: 270×380 mm

● Free Space Granite frame: 390×580 mm

Standard 350 mm spectrometer footprint: 510×395 mm

Power consumption: 100 V~15 A or 220 V~7.5 A

Advanced Software

- Full system control and 1-2-3D data analysis and visualization;
- Full Raman spectrum saving in every mapping point;
- Simultaneous multidetectors readout;
- Possibility to select mapping area on TV-CCD microscopic sample image;
- Fast scanning algorithm;
- Spectra stitching;
- Throughput correction;
- Macro-spot mapping;
- Image accumulation;
- Spectrum fitting with up to 5 Lorentzian or Gaussian curves;
- Deconvolution processing for 1D or 2D data
- Simultaneous AFM topography and Raman spectroscopy, same area and TERS functions.



Throughput correction lamp option

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