Datasheet

Hyperspectral Raman Microscope ATRH8500

Features

- Microscopic hyperspectral imaging, confocal micro-Raman spectroscopy, microscopic imaging;
- Micro-area positioning device, laser spot alignment and adjustment
- High power optical positioning system
- Automatic Raman imaging experiment, automatic focusing, automatic scanning;
- Broad reflection spectrum imaging measurement (400-1000nm)
- Automated hyperspectral imaging experiment;
- SNR Ratio >6000:1
- Unique software controls switching light path
- Quickly locate focus position
- High-quality objective lens5 million cameras
- Excitation wavelength: 532, 633, 785, 830, 1064nm optional
- USB2.0

Application

- Nanoparticles and new materials
- Universities and research institutes
- Biology
- Forensic Medicine Identification
- material science
- Medical Immunoassay
- Agriculture and food identification
- water pollution analysis
- Gem and inorganic mineral identification

Description

ATRH8500 adds a microscopic hyperspectral imager to the Raman microscope. The instrument is an advanced device that integrates a hyperspectral imaging microscope, an optical microscope and a raman spectrometer. Hyperspectral imaging microscopy and Raman spectrometer can be used to characterize and analyze the surface morphology, reflection hyperspectral imaging and Raman spectrum performance of nanomaterials respectively, thereby providing more comprehensive information on the sample and providing sharp Microscopic image. Users can improve work efficiency, spend more time on data collection and analysis, and truly realize in-situ detection and analysis of samples.

ATRH8500 is equipped with an objective lens specially designed for the Raman system, which makes the laser spot close to the diffraction limit, and then displays the focus information accurately and intuitively on the computer through a 5-megapixel camera. It overcomes the problem in ordinary Raman systems that the focal plane for collecting Raman signals is slightly higher or slightly lower than the actual optimal focal plane, thereby improving the quality of the Raman spectrum.

At the same time, ATRH8500 uses high-performance Raman specially optimized for micro-Raman systems. It is industry-leading in terms of sensitivity, signal-to-noise ratio, stability, etc., providing a strong guarantee for Raman research.

Model	Feature
ATRH8500MP	Mapping type (highest configuration, auto-focus, auto-scan type)

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1. Parameter

ATRH8500 (taking 785nm excitation wavelength as an example)	
Raman Spectroscopy Properties	
Spectral Range & Spectral Resolution	● 250~2700 @ 3-8 cm-1 ● 200~3500 @ 5-10 cm-1 ● 200~4300 @ 6-12 cm-1 ● Other wavelength ranges can be customized, as low as 50 cm^{-1}
Spectral Stability	σ/μ < 0.5%　(COT 8 hours)
Temperature Stability	Spectral shift ≤ 1 cm^{-1} (10~40 ℃)
Snr	>6000:1
Detector Dynamic Range	13000:1
Laser Center Wavelength	785nm (±0.5nm)
Microscope Camera System	3 or 5 megapixel industrial camera
Focus Method	conjugate focus
Laser Power	>500mW (software adjustable)
Minimum Laser Spot Diameter	>20 μm
Laser Stability	σ/μ <±0.2%
Laser Linewidth	0.08 nm
Microscopic Hyperspectral Imager Performance	
Operating Mode	Micro-area reflectance spectrum imaging
Spectral Range	390-1000nm
Best Spectral Resolution	1.3nm
Minimum Spatial Resolution	0.2　μ m
Number Of Spatial Bands	1200
Number Of Spectral Bands	1920
XY Scan Range	50×50um, 20×20um, 100×100um optional
Z Scan Range	5um, optional 2.5um, 10um
Scan Resolution	Horizontal 0.2nm, vertical 0.05nm
Microscopic imaging part	
Optical Objective Lens	5X/10X/20X/50X plan apochromatic objective lens
Optical Focus	Auto focus, auto imaging
Camera	5 million pixel CMOS sensor
X, Y Axis Electronically Controlled Two-Dimensional Platform	
Moving Range	50 X 50 mm，100×100mm optional
Mobile Resolution	0.1 μm
Positioning Accuracy	1.0 μm
Scan Speed	20mm/s
Z Axis (Auto Focus)	

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Focus Accuracy	≤ ±0.2μm
Maximum Stroke	20 mm
Focus Speed	No more than 10 seconds

2. Selection Guide

Model	Feature
ATRH8500BS	Base
ATRH8500AF	Auto Focus
ATRH8500MP	Mapping type (auto focus, auto scanning type)

Model	excitation wavelength*1/nm	Power /mW	Wavenumber/cm^{-1}	Resolution*2/cm^{-1}
ATRH8500-532	532	100	200~3700	7-12
ATRH8500-633	633	50	200~3500	4-6
ATRH8500-785-27	785	600	250~2700	4-6
ATRH8500-785-35			200~3500	6-8
ATRH8500-785-43	785	600	200~4300	8-11
ATRH8500-1064	1064	600	200~2600	12-15
ATRH8500-1064	1064	600	200~3500	15-20

Note:

*1 Other wavelengths can be customized

*2 The spectrometer uses a narrow slit, which can effectively improve the resolution of the Raman spectrum, but will reduce the sensitivity of the instrument. Therefore, if you need a high-resolution instrument, please indicate it when placing an order; Aopu Tiancheng's spectrometer is independently developed and produced, so Customized production can be carried out to provide Raman spectrometers with various wave number ranges and resolutions. Due to limited space, we will not list them one by one here. If necessary, please consult our sales engineers.

Example: The actual final model code is: ATRH8500MP-785-35

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Figure 2 ATRH8500 microscopic Raman functional structure indication diagram

3. Software

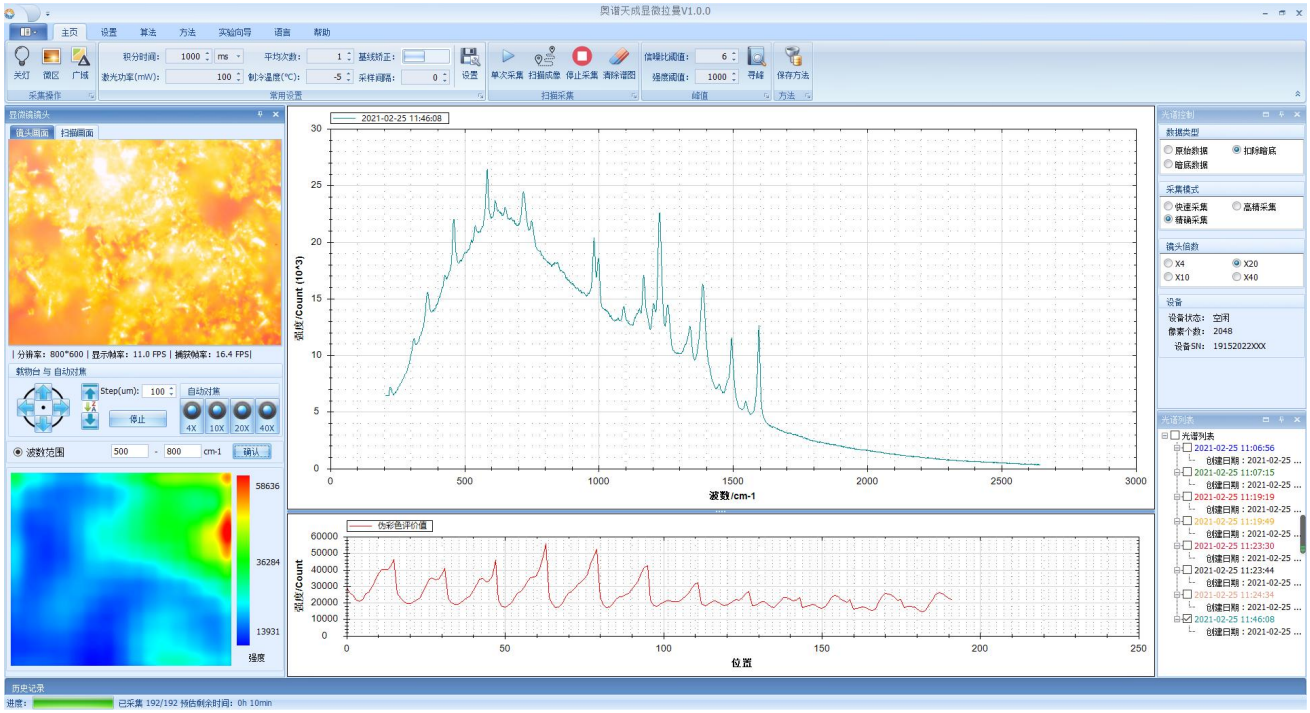

Figure 3 Software interface of ATRH8500

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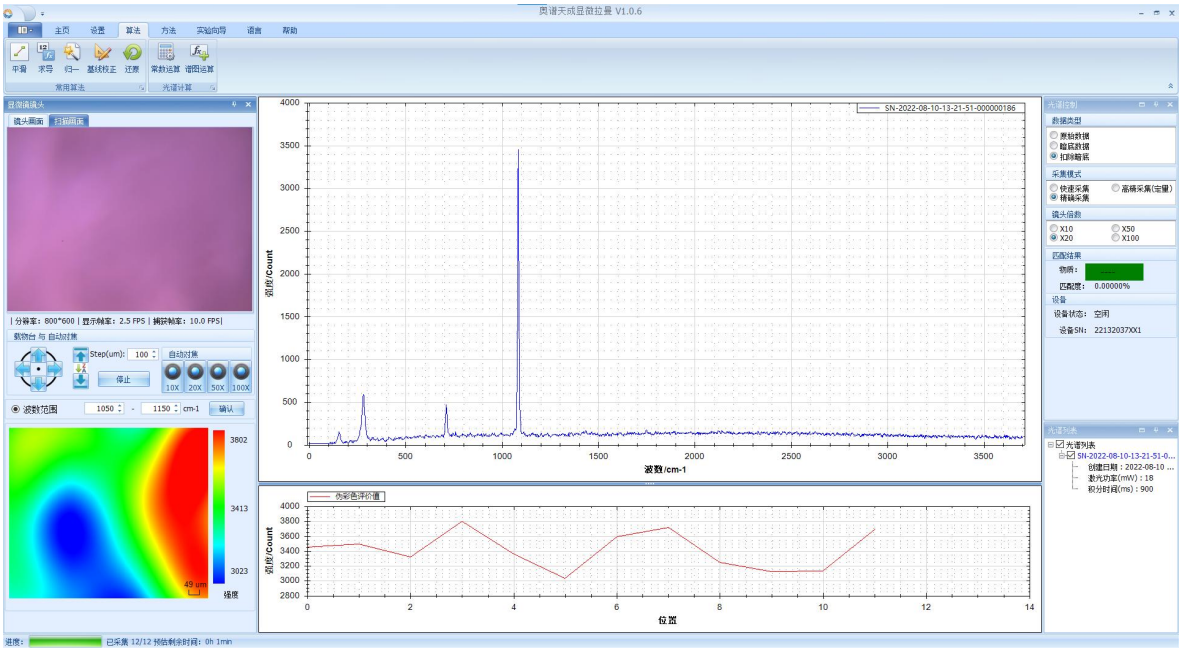

Figure 4 Software interface of ATRH8500

4. ATRH8500 Physical Picture

Figure 6 ATRH8500 physical picture

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5. Optical Performance

1.1 Spectral performance

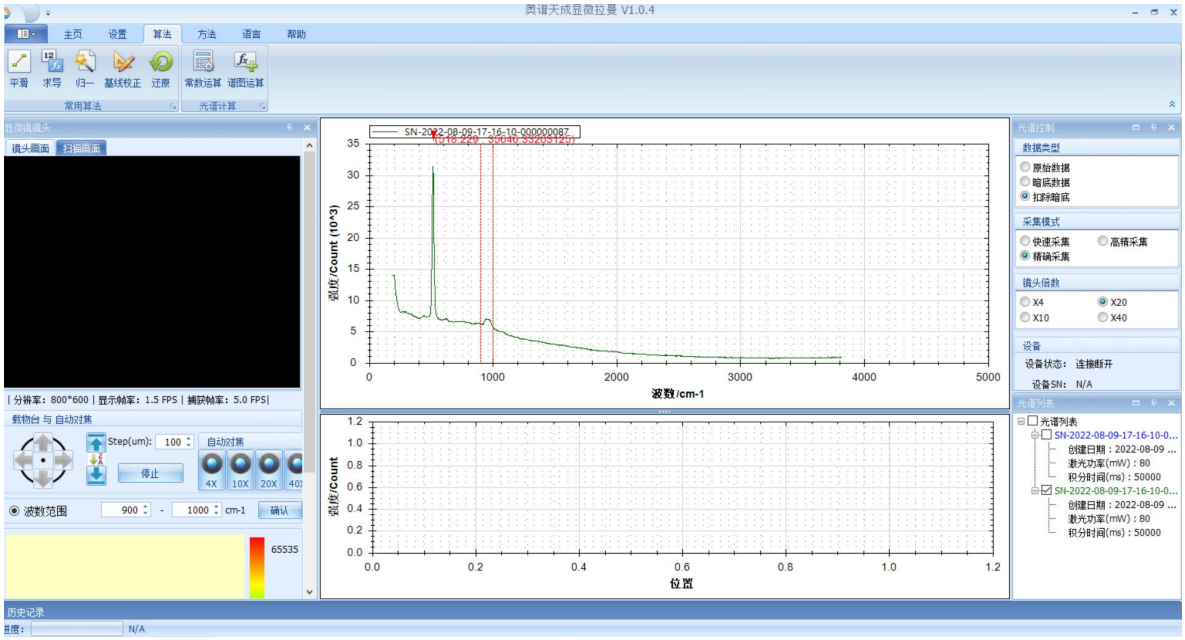

Figure 7 Spectrum of single crystal silicon tested by ATRH8500

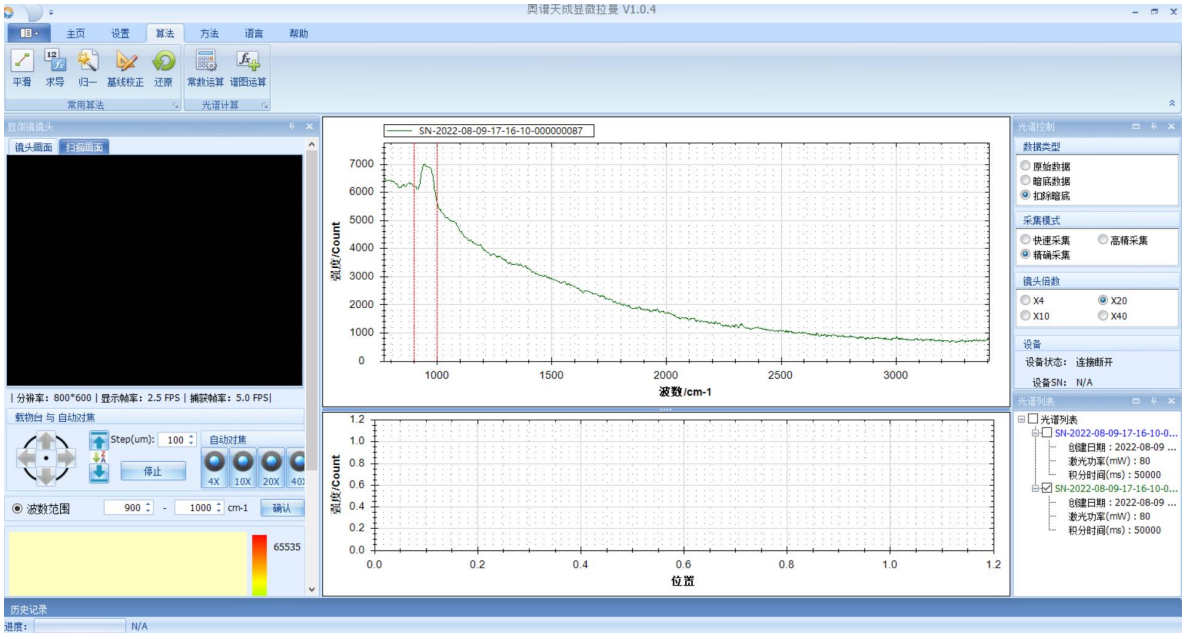

Figure 8 Partial enlargement of the second-order peak of the single crystal silicon Raman spectrum tested by ATRH8500

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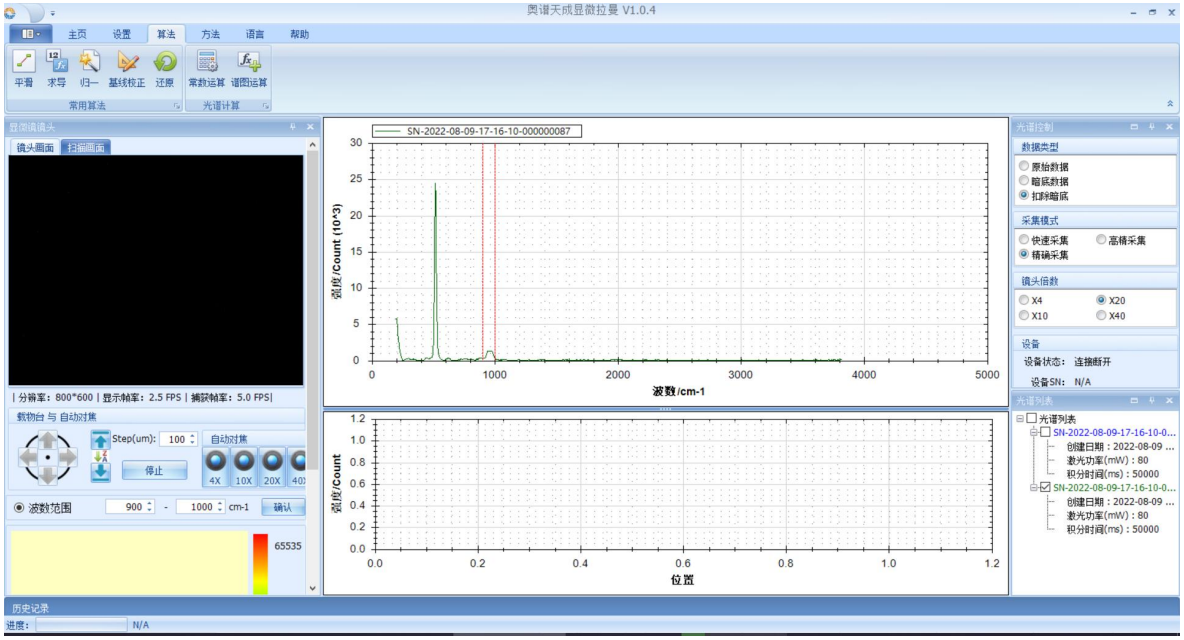

Figure 9 ATRH8500 test single crystal silicon spectrum (after baseline correction)

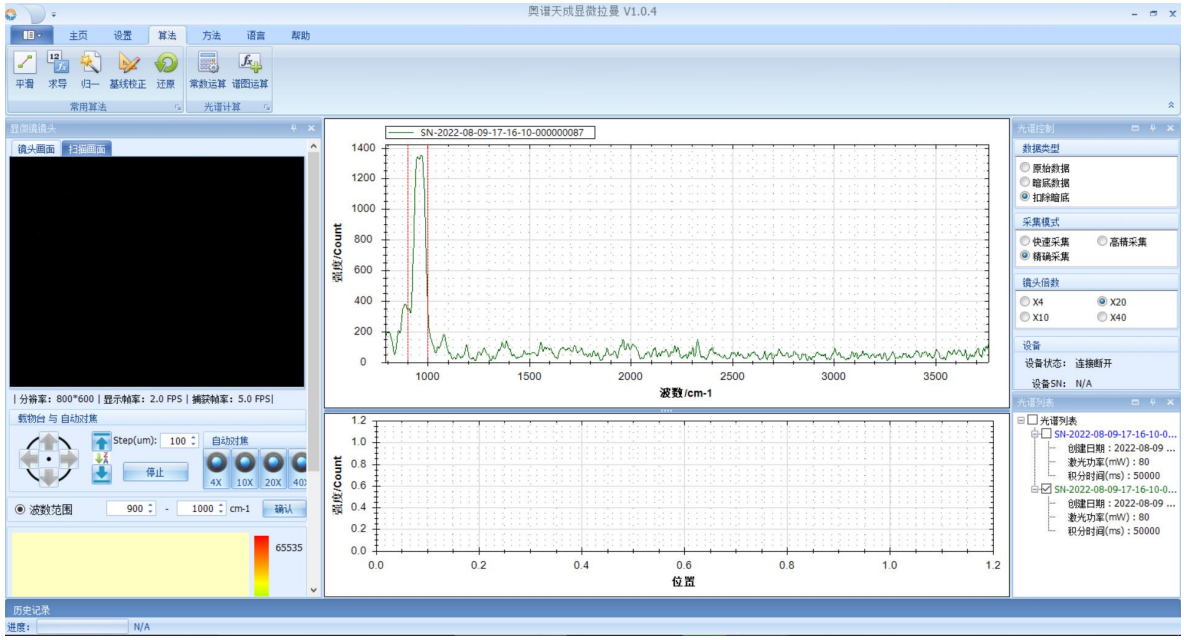

Figure 10 Partial enlargement of the second-order peak of the Raman spectrum of single crystal silicon tested by ATRH8500

Figure 11 Acetonitrile Raman spectrometer collected by ATRH8500-785

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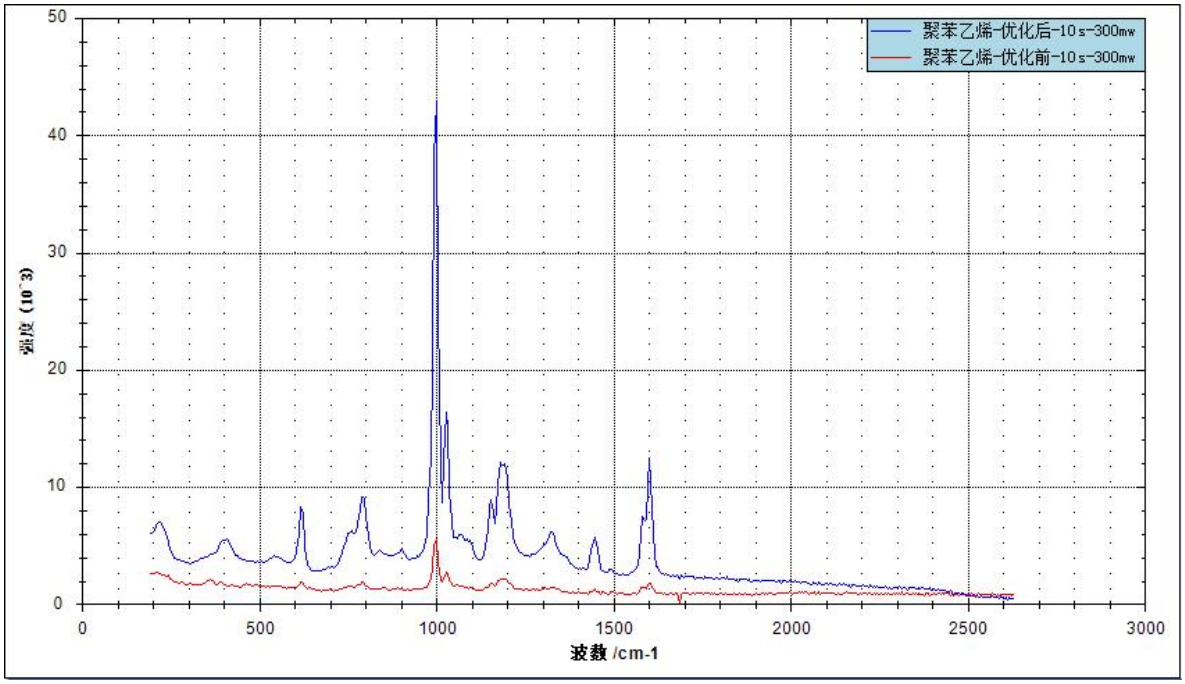

Figure 12 The optical path of ATRH8500-1064 has been extremely optimized. After optimization, the optical path efficiency is increased by 8 times, and the signal-to-noise ratio is increased by 8 times.

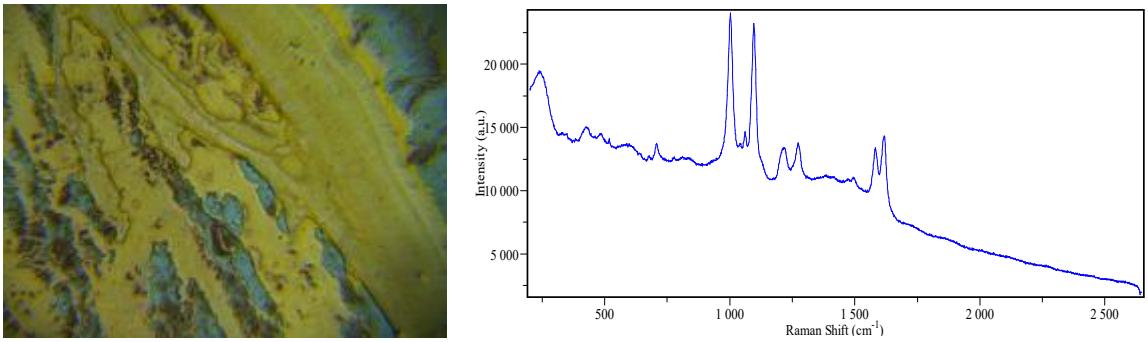

Figure 13 Sers experiment 1 performed by ATRH8500 (the left picture is the sample picture, the right picture is the Sers Raman spectrum)

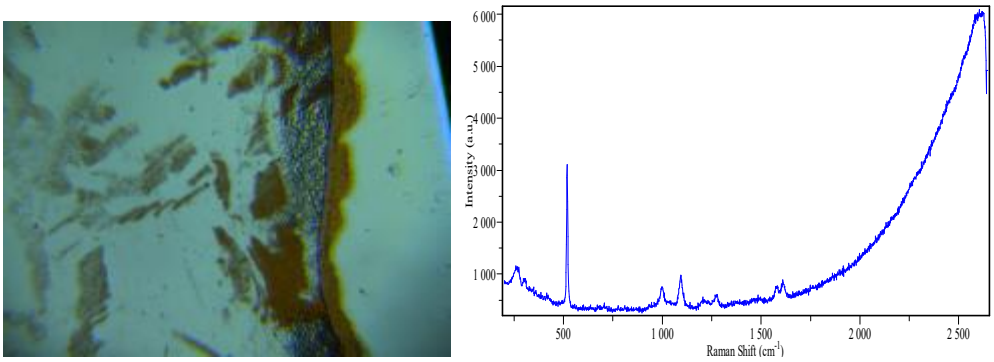

Figure 14 Sers experiment 2 performed by ATRH8500 (the left picture is the sample picture, the right picture is the Sers Raman spectrum)

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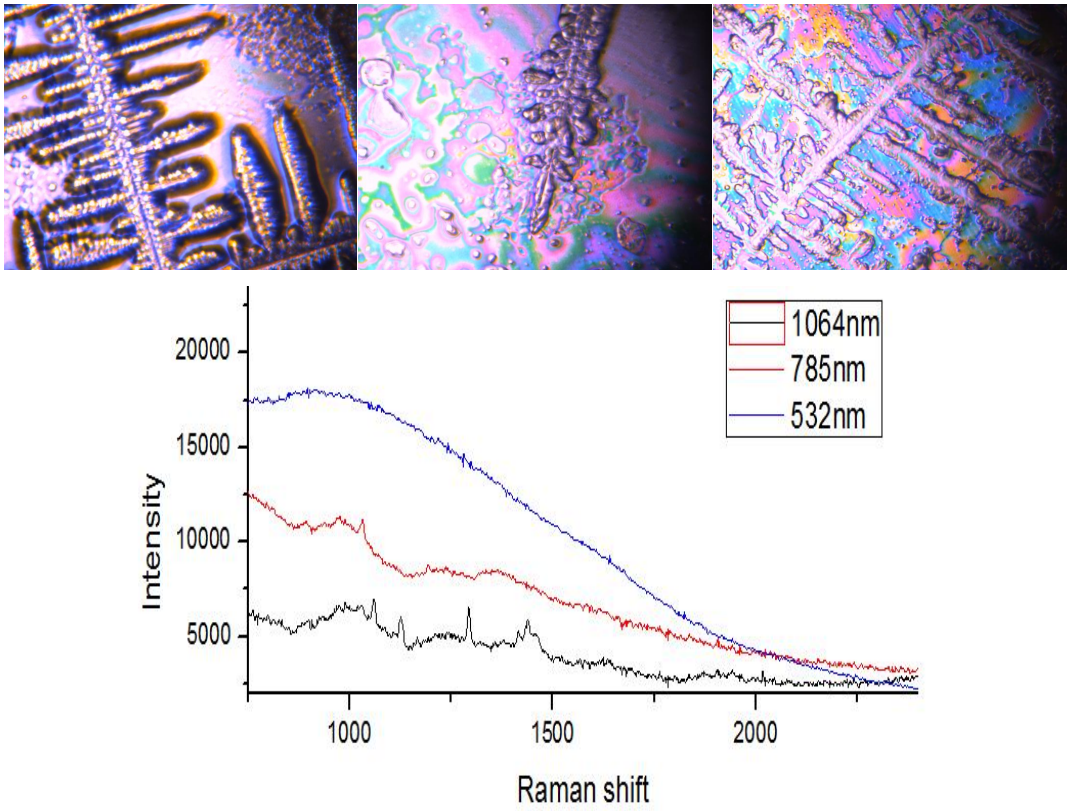

Figure 15 ATRH8500 test for cell metabolites. The top three pictures are surface morphology pictures, and the bottom picture is its Raman spectrum. They were tested with ATRH8500-1064, ATRH8500-785, and ATRH8500-532 respectively.

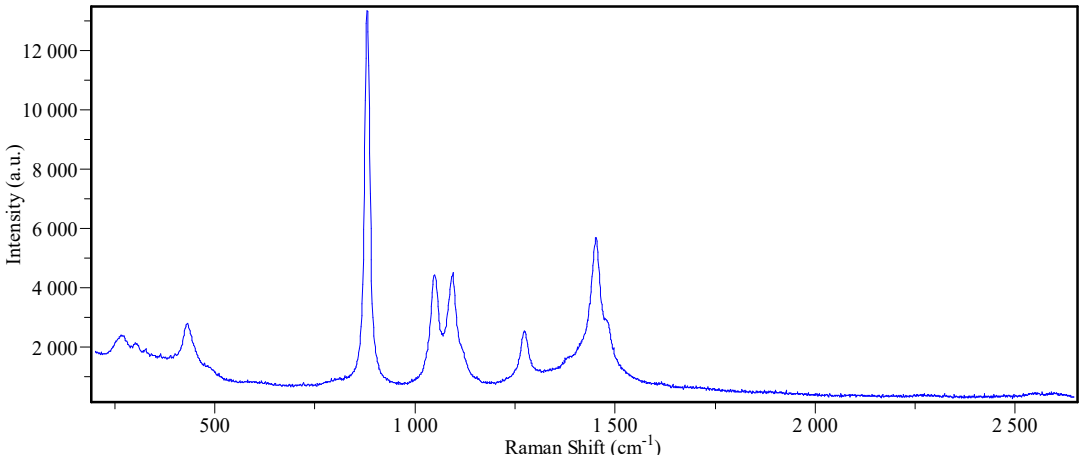

Figure 16 Raman spectrum of ATRH8500 testing alcohol (500mW, 1S integration time)

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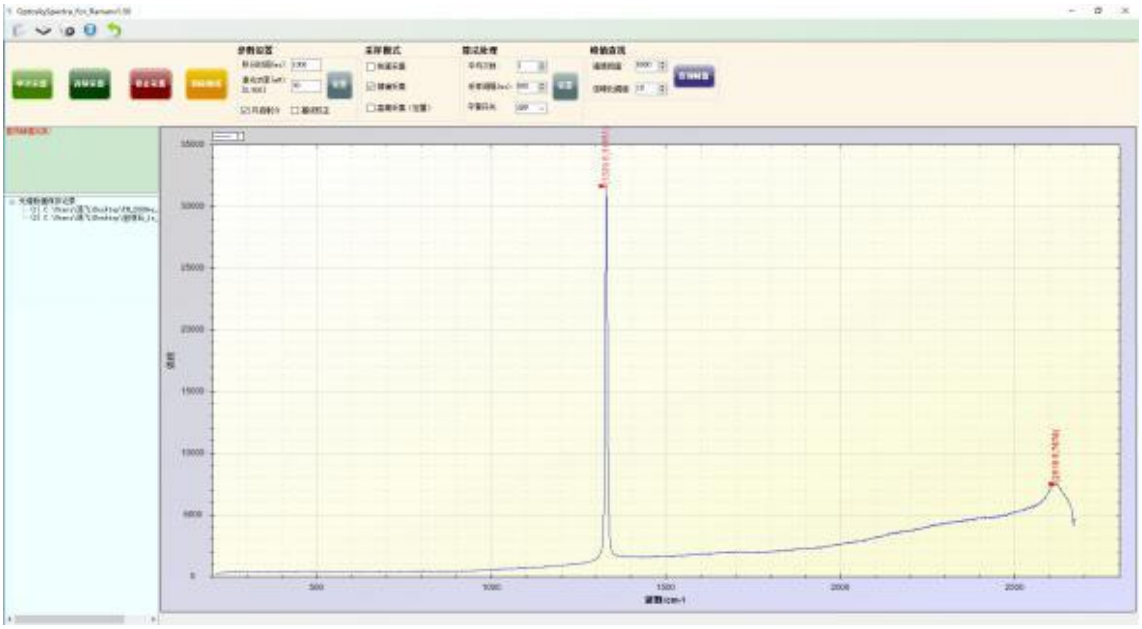

Figure 17 Raman spectrum of ATRH8500 test diamond (30mW, 1S integration time)

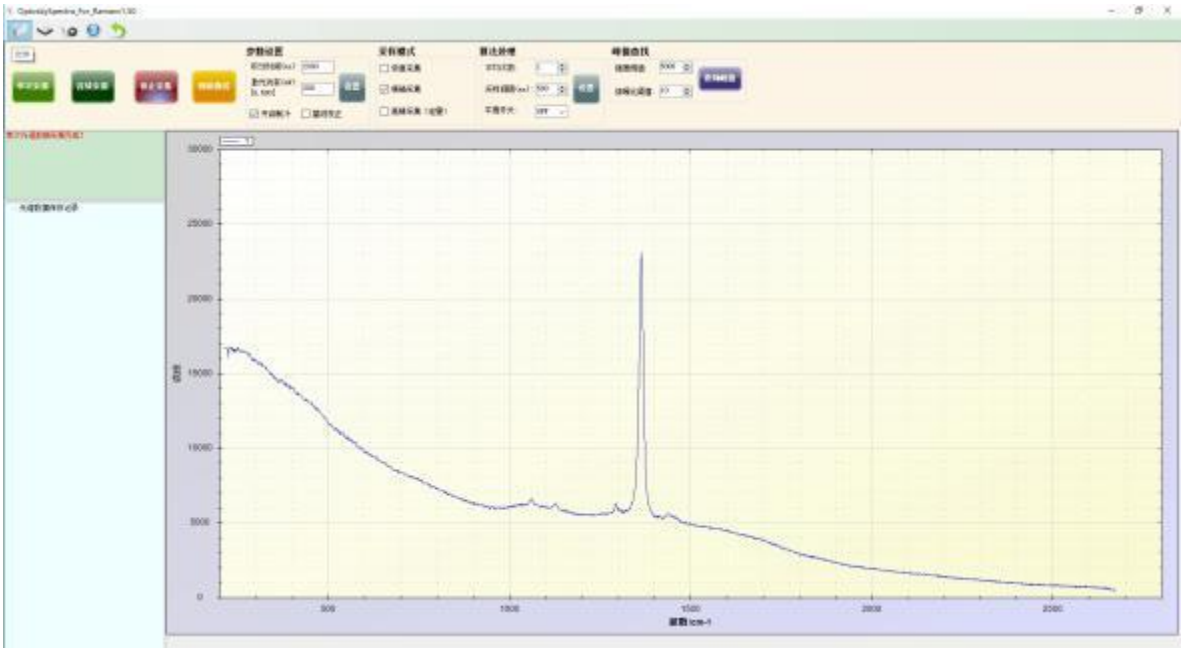

Figure 18 Raman spectrum of ATRH8500 testing boron carbide (PN) (200mW, 2S integration time)

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