OPTOSKY
Spectroscopy Solutions

Datasheet

Auto-focus Raman Microscope

ATR8300

Features

- Automatic Raman experiment, auto focus, auto scan.
- Ultra-high sensitivity, S/N ratio>6000:1.
- True focus to ensure more accurate Raman images.
- Ultra-high spatial resolution.
- Unique software control switching optical path.
- Super high stability.
- Imported optical components, good product performance.
- Quick positioning, quickly find the focus position.
- High-quality objective lens, micron-scale light spot.
- 3 million cameras, clear and precise images.
- Excitation wavelength: 532, 633, 785, 830, 1064nm optional, other excitation wavelengths can be customized.
- Equipped with high-performance spectrometer.
- USB2.0 interface directly connected to the computer.

Application

- Nanoparticles and new materials
- Universities and research institutes
- Biological Sciences
- Forensic Medicine Identification
- Material science
- Medical immune analysis
- Agriculture and food identification
- Water pollution analysis

Description

The ATR8300 series combines the advantages of microscopes and Raman spectrometers. The microscopic Raman detection platform makes it possible to "what you see is what you measure". The visual and precise positioning of the Raman detection platform allows the observer to detect the Raman signals of different surface states on the sample, and simultaneously display the detected signals on the computer. The micro-area shape of the position greatly facilitates the detection of Raman micro-areas.

The ATR8300 high-end version can be fully automatic focusing, automatic scanning, one-button operation, batch experiments, uniformity scanning, etc., without waiting, and can obtain high-reliability scanning and imaging Raman data;

ATR8300 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 3 million camera. It overcomes the problem that the focal plane for collecting Raman signals in common Raman systems is slightly higher or slightly lower than the actual best focal plane, thereby improving the quality of Raman spectroscopy.

ATR8300 has no moving parts for optical path switching, all optical components are assembled in solid state, and the work is very stable, which perfectly solves the optical path loss of camera imaging and realizes the separation of camera imaging and Raman signal collection, so as to obtain the best signal strength.

At the same time, ATR8300 uses high-performance Raman specially optimized for micro-Raman system, whether it is sensitivity, signal-to-noise ratio, stability, etc., it is the industry-leading level, providing a strong guarantee for Raman research.

Model	Features
ATR8300BS	Base
ATR8300AF	Auto Focus
ATR8300MP	Mapping (Highest configuration, auto focus, auto scan type)

1503 Bld. A04, 3rd Software Park, Jimei, Xiamen, 361005, China
Tel: +86-592-6102588

1.Ordering information

Model	Features
ATR8300BS	Base
ATR8300AF	Auto Focus
ATR8300MP	Mapping（Auto focus, auto scan type）

Model	Excitation wavelength*1/nm	Power /mW	Wavenumber range/cm^{-1}	Resolution*2/cm^{-1}
ATR8300-532	532	100	200~3700	9-12
ATR8300-633	633	50	200~3500	9-12
ATR8300-785-27	785	600	250~2700	4-7
ATR8300-785-35			200~3500	6-8
ATR8300-785-43	785	600	200~4300	8-11
ATR8300-1064	1064	600	200~2600	12-15
ATR8300-1064-35	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 it will reduce the sensitivity of the instrument. Therefore, if you need a high-resolution instrument, please specify when placing an order; Optosky's spectrometer is independently developed and produced, so Customized production is available to provide Raman spectrometers with various wavenumber ranges and resolutions. Due to limited space, we will not list them one by one. If necessary, please consult our sales engineers.

*3 The parameters in the table only represent the standard product parameters of Optosky; for other parameters, Optosky can provide comprehensive and sufficient customized services.

Example: The actual final model code is: ATR8300MF-785-35

2.Technical parameters

ATR8300（Take 785nm excitation wavelength as an example）	
Spectral Range and 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, down to 50 cm^{-1}
Spectral Stability	$\sigma/\mu < 0.5\%$ (COT 8 hours)
Temperature stability	Spectral shift ≤ 1 cm^{-1} (10~40 ℃)
SNR	>6000:1

1503 Bld. A04, 3rd Software Park, Jimei, Xiamen, 361005, China
Tel: +86-592-6102588

Detector	Semiconductor cooling 2048*64 pixel back-illuminated infrared enhanced CCD
Detection wavelength range	200nm~1100nm
Pixel size	14 μm×14 μm
Detector dynamic range	13000:1
Laser center wavelength	785nm (±0.5nm)
Microscope Camera System	3 or 5 million pixel industrial camera
Focus mode	Conjugate focus
Maximum laser power	>550mW (software adjustable)
Laser spot diameter	>1μm
Laser stability	σ/μ<±0.2%
Laser line width	0.08 nm
Communication mode	USB2.0
X, Y axis electric control two-dimensional platform	
Range of movement	50×50 mm
Mobile resolution	0.1μm
Positioning accuracy	1μm
Scanning speed	20mm/s
Z axis (autofocus)	
Focus accuracy	≤±0.2μm
Maximum stroke	20 mm
Focus speed	Less than 10 s
Weight, power consumption	
Weight	Control box part: < 6.9Kg Microscope part: < 8.8Kg
Power supply and power consumption	AC100~240V, about 50W

3.Operating software interface

1503 Bld. A04, 3rd Software Park, Jimei, Xiamen, 361005, China
Tel: +86-592-6102588

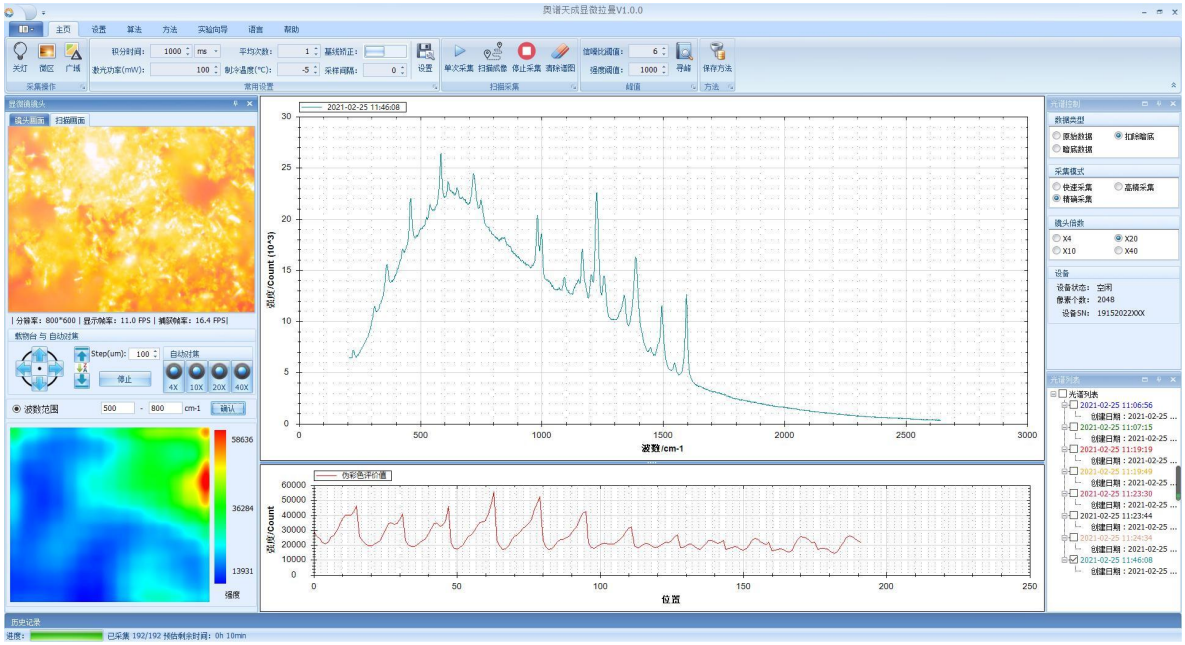


Figure 1 ATR8300 software interface.

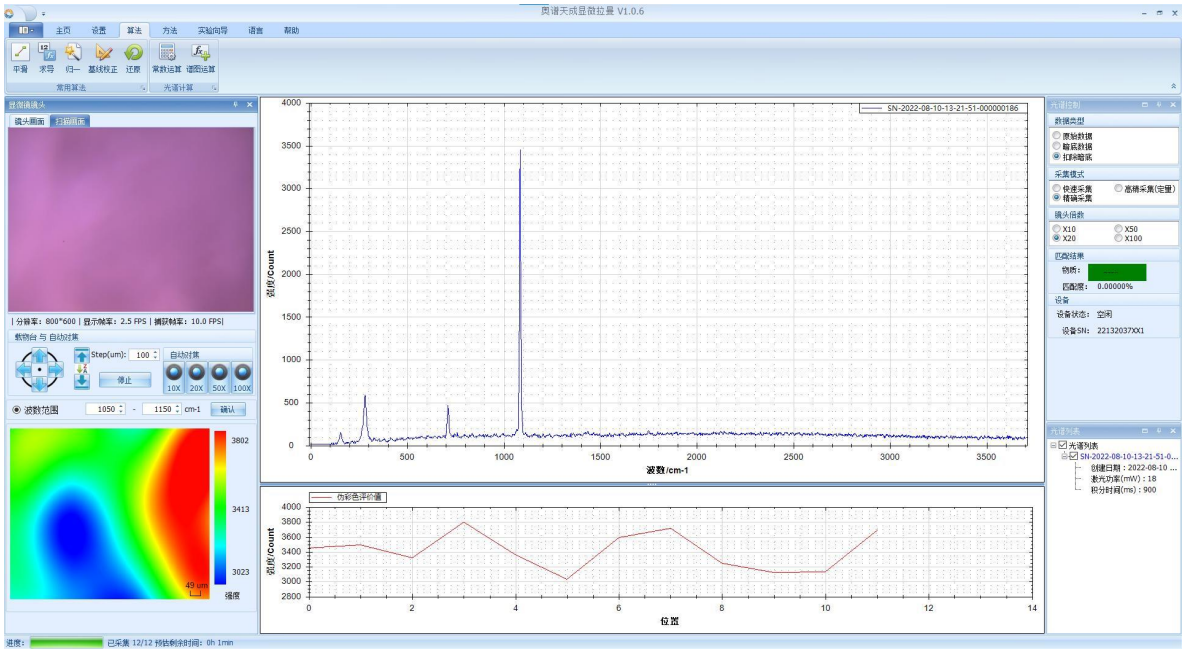


Figure 2 ATR8300 software interface.

4.ATR8300 Physical map

1503 Bld. A04, 3rd Software Park, Jimei, Xiamen, 361005, China
Tel: +86-592-6102588

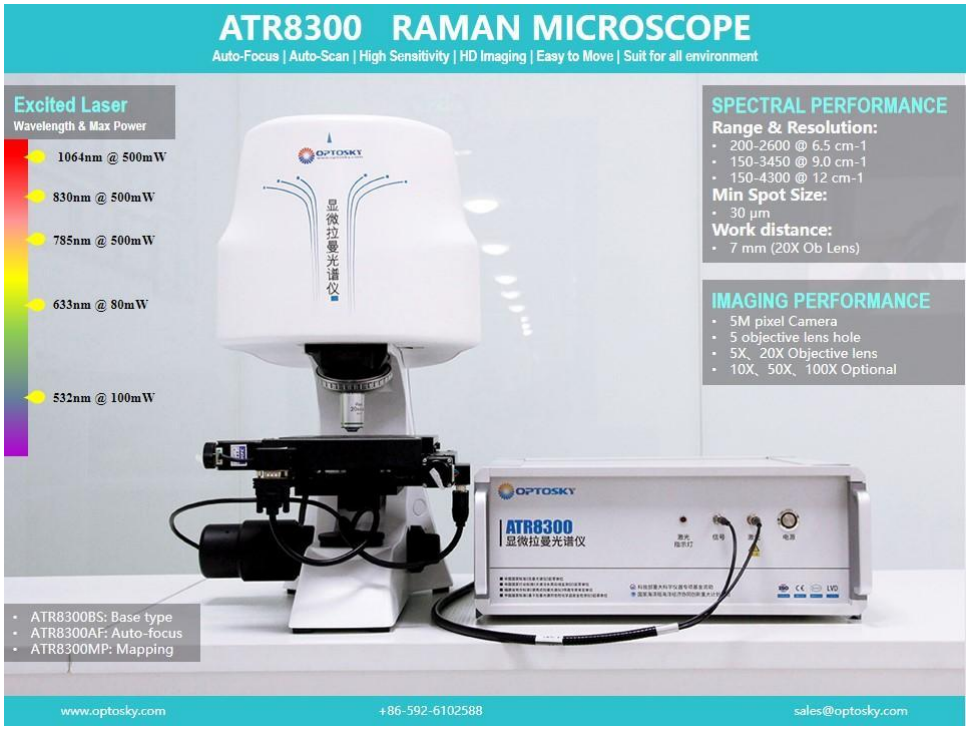


Figure 3 ATR8300 Raman Microscope Overview.

Figure 4 ATR8300 physical map.

5.Optical properties

5.1 Spectral performance

1503 Bld. A04, 3rd Software Park, Jimei, Xiamen, 361005, China
Tel: +86-592-6102588

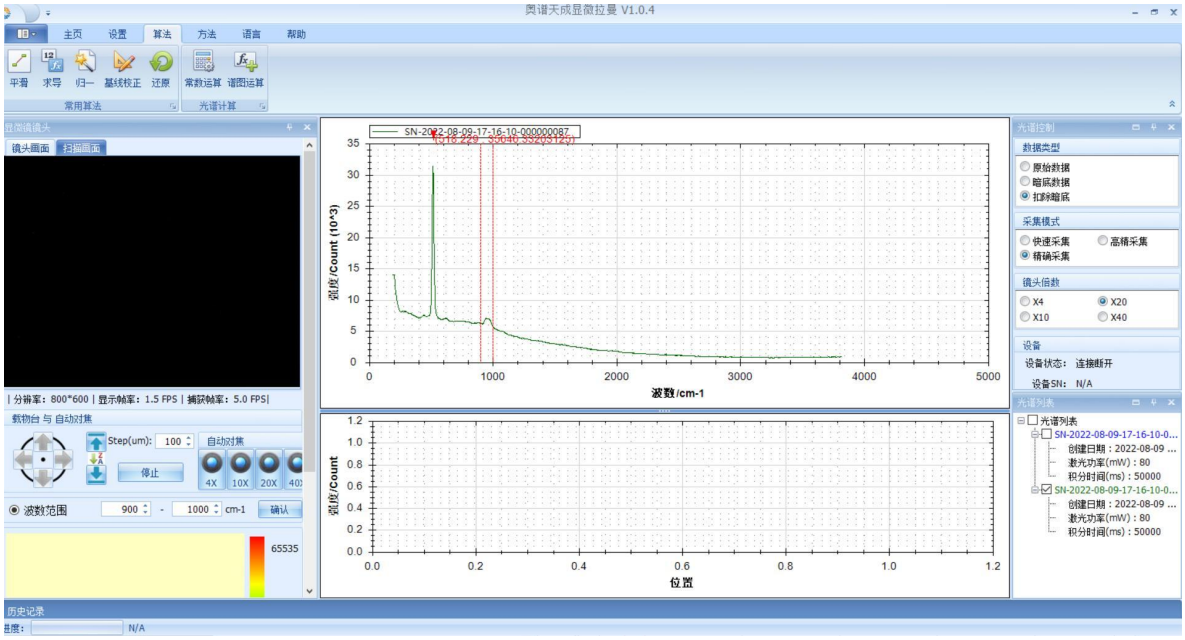


Figure 5 ATR8300 tests the spectrum of single crystal silicon.

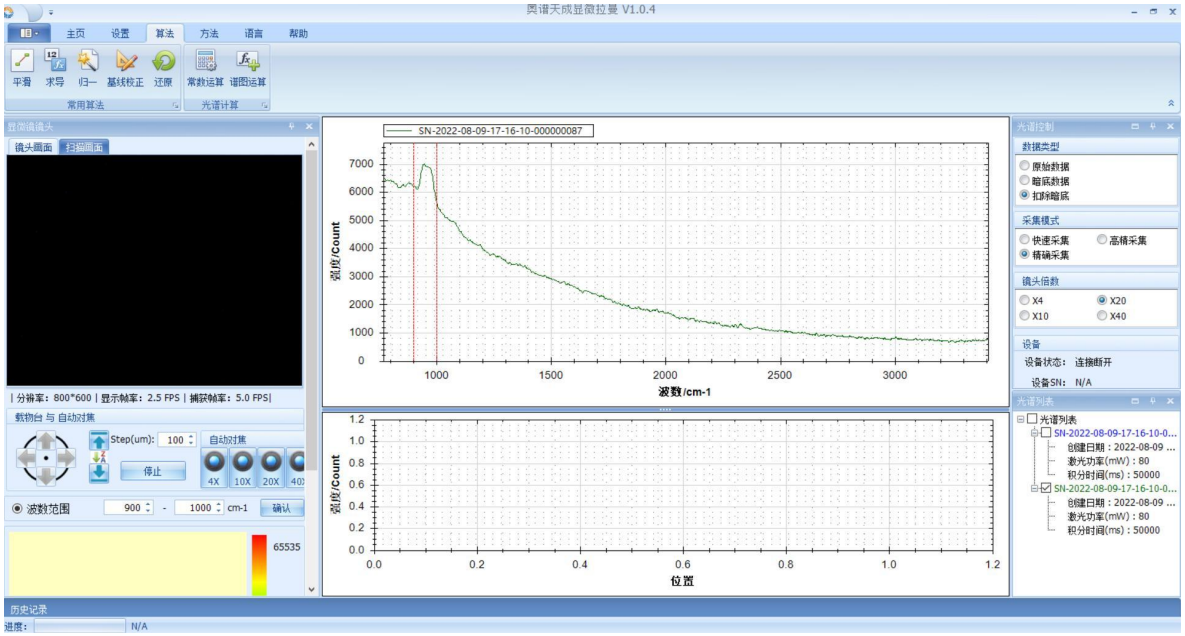


Figure 6 Partial enlargement of the second-order peak of the Raman spectrum of single crystal silicon tested by ATR8300.

1503 Bld. A04, 3rd Software Park, Jimei, Xiamen, 361005, China
Tel: +86-592-6102588

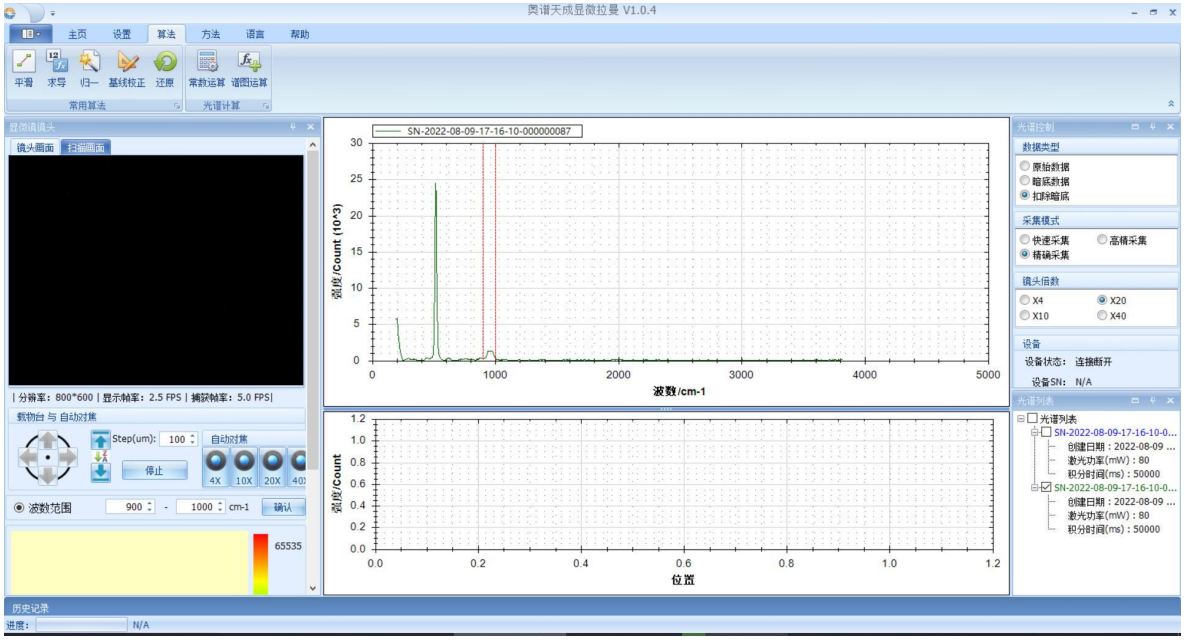


Figure 7 ATR8300 tests the spectrum of single crystal silicon (after baseline correction).

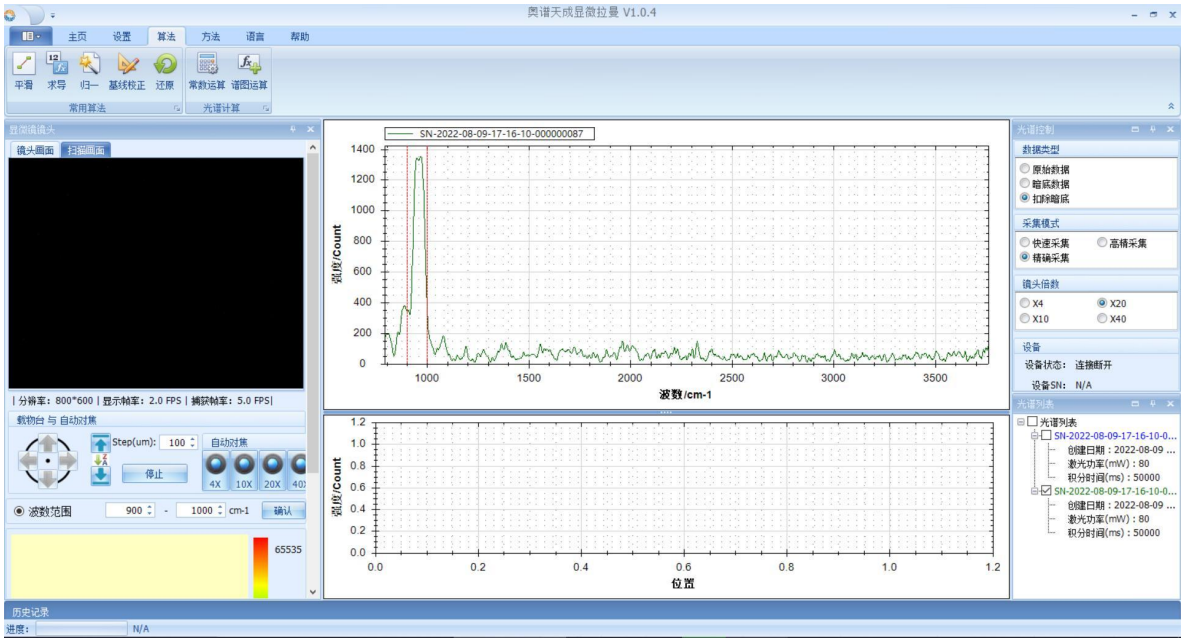


Figure 8 Partial enlargement of the second-order peak of the Raman spectrum of single crystal silicon tested by ATR8300.

1503 Bld. A04, 3rd Software Park, Jimei, Xiamen, 361005, China
Tel: +86-592-6102588

Graphene Raman signal acquisition

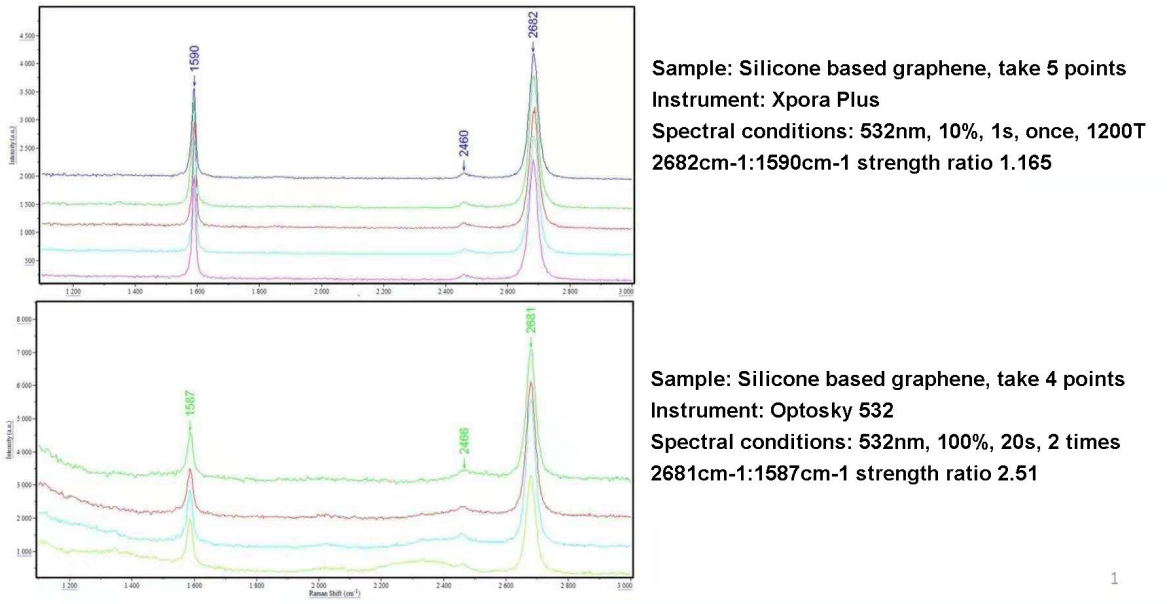


Figure 9 The graphene Raman spectrum signal measured by Optosky ATR8300-532 and its comparison with the signal measured by Horiba Xplora Plus.

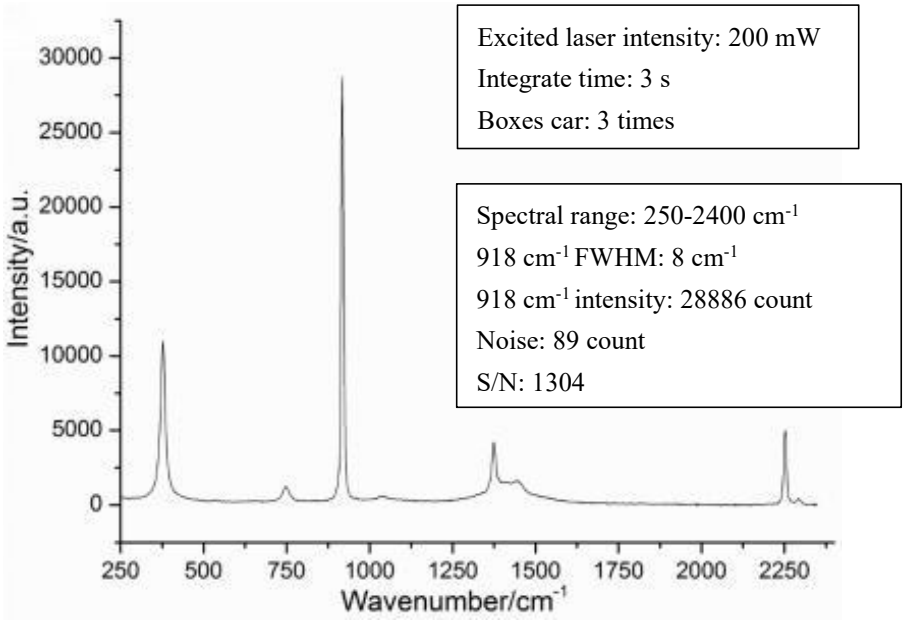


Figure 10 Acetonitrile Raman spectrometer collected by ATR8300-785.

1503 Bld. A04, 3rd Software Park, Jimei, Xiamen, 361005, China
Tel: +86-592-6102588

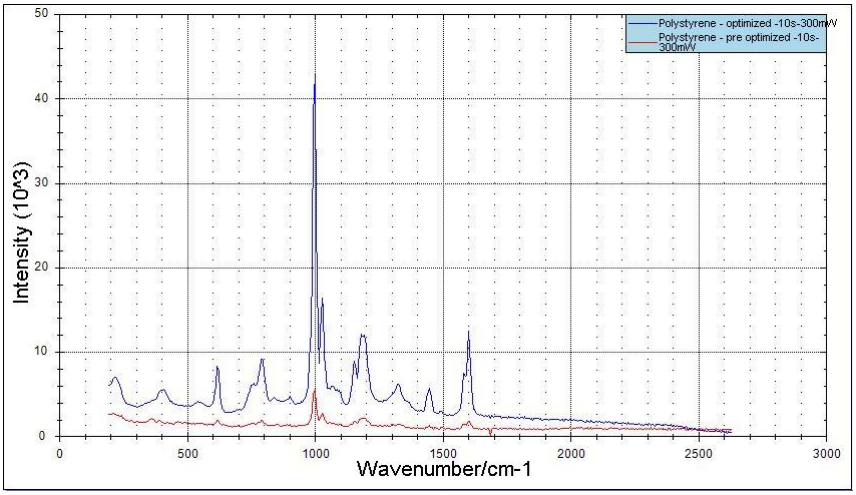


Figure 11 The optical path of ATR8300-1064 has been extremely optimized. The optimized optical path efficiency has been increased by 8 times, and the signal-to-noise ratio has been increased by 8 times.

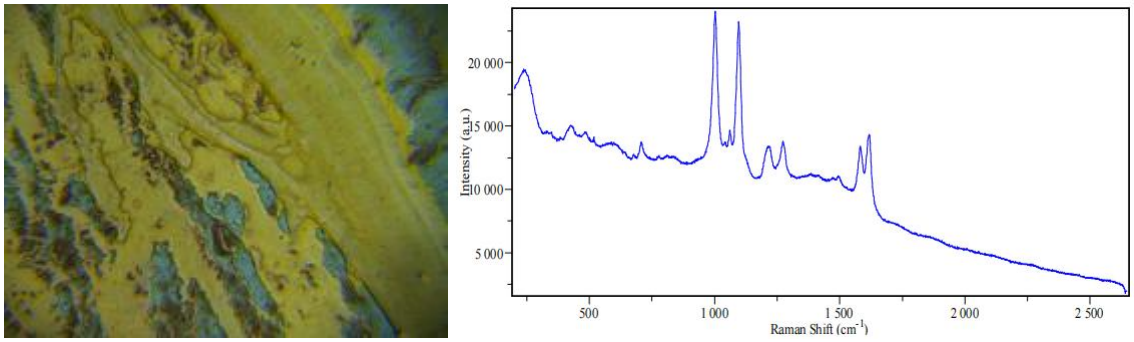


Figure 12 Sers experiment 1 performed by ATR8300 (the left picture is the sample picture, the right picture is the Sers Raman spectrum).

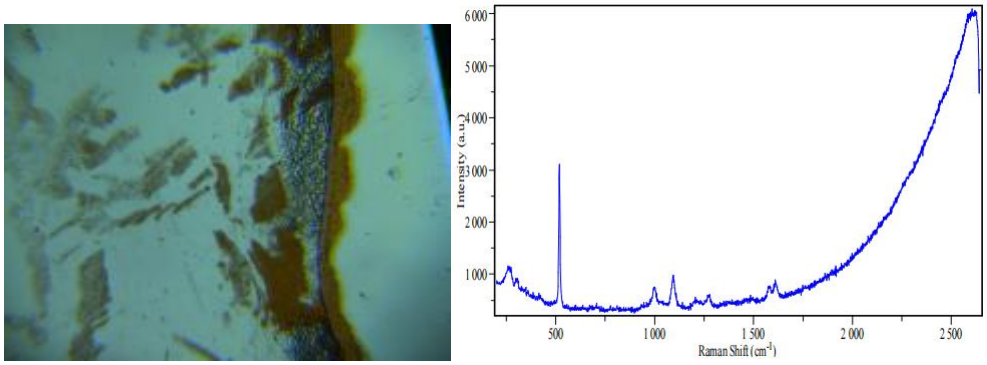
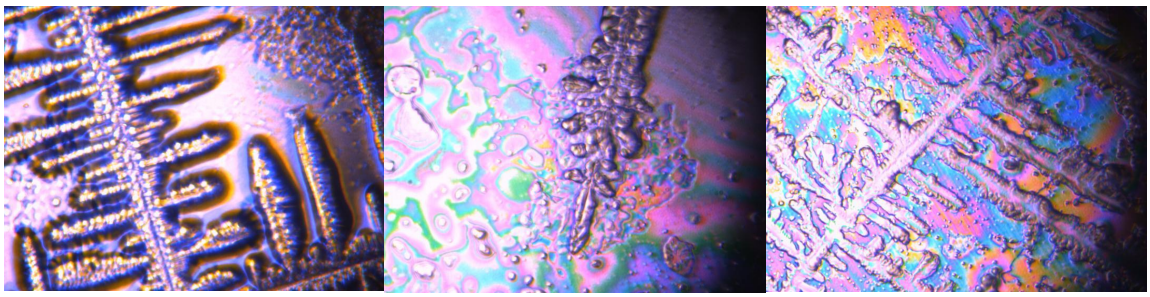


Figure 13 Sers experiment 2 performed by ATR8300 (the left picture is the sample picture, the right picture is the Sers Raman spectrum).



1503 Bld. A04, 3rd Software Park, Jimei, Xiamen, 361005, China
Tel: +86-592-6102588

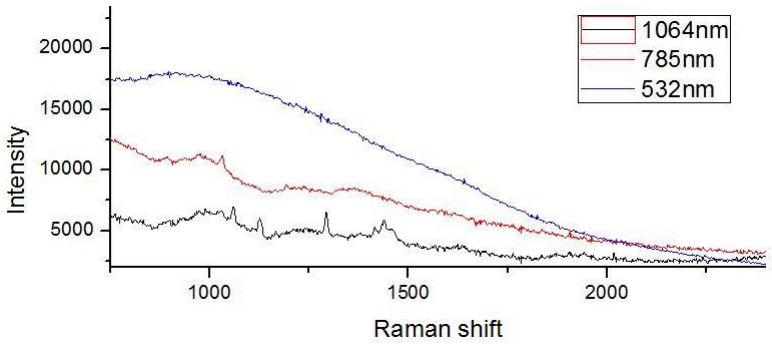


Figure 14 ATR8300 is used to test cell metabolites. The top three pictures are surface morphology pictures, and the bottom is its Raman spectrum. They were tested with ATR8300-1064, ATR8300-785, and ATR8300-532 respectively.

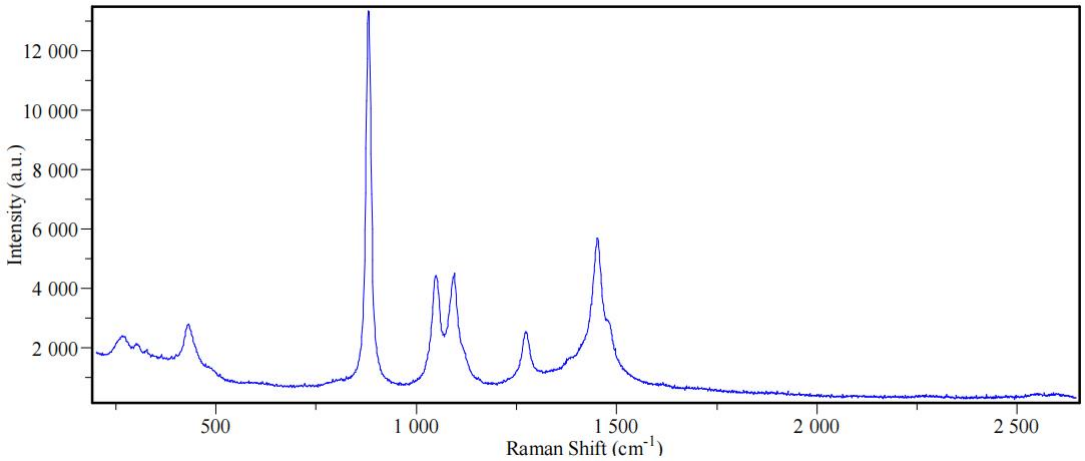


Figure 15 ATR8300 tests the Raman spectrum of alcohol (500mW, 1S integration time).

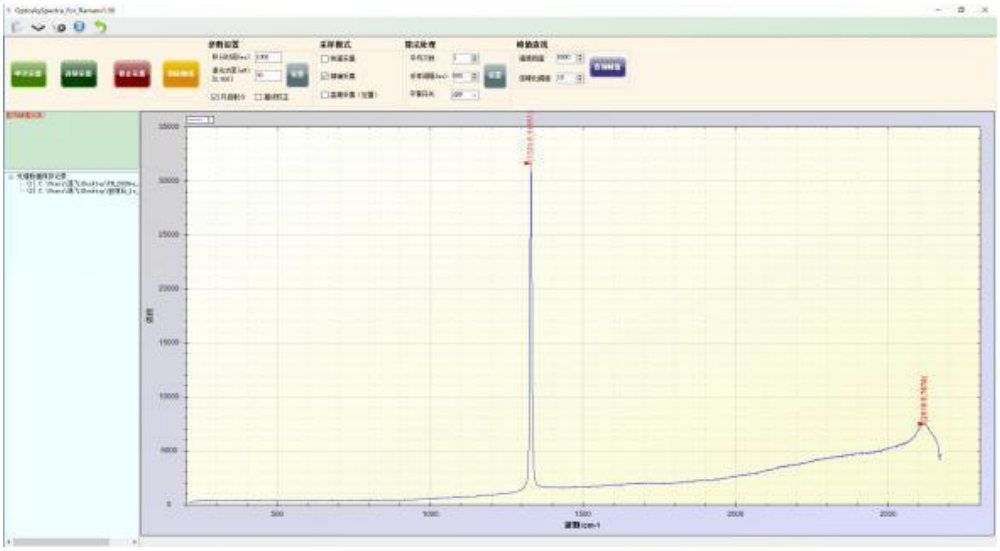


Figure 16 ATR8300 tests the Raman spectrum of diamond (30mW, 1S integration time).

1503 Bld. A04, 3rd Software Park, Jimei, Xiamen, 361005, China
Tel: +86-592-6102588

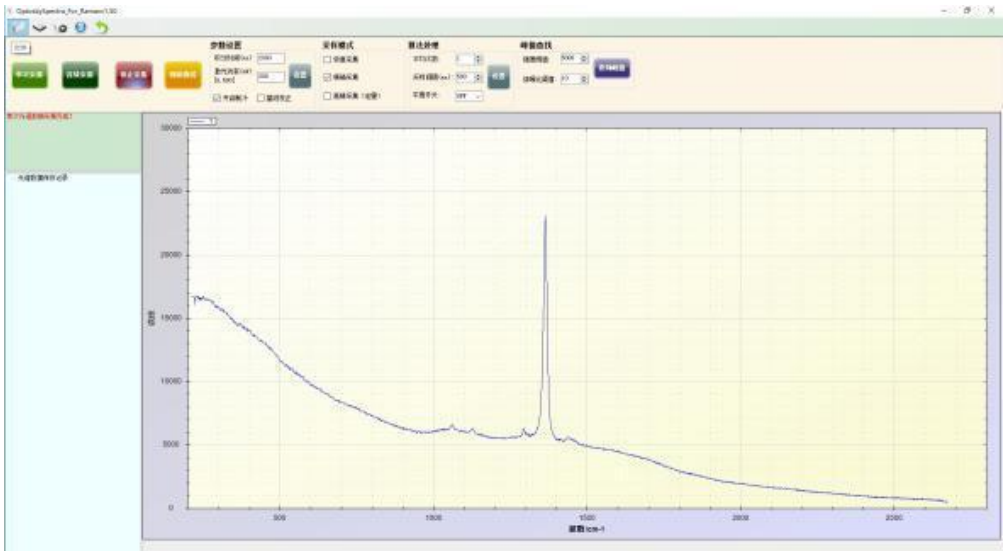


Figure 17 ATR8300 tests the Raman spectrum of boron carbide (PN) (200mW, 2S integration time).

5.2 Spectral resolution

5.2.1 Raman spectrum of Tylenol

Excited laser intensity: 200 mW Integrate time: 10 s	Raman spectra of Tylenol showed the resolution condition in the long wavelength region.

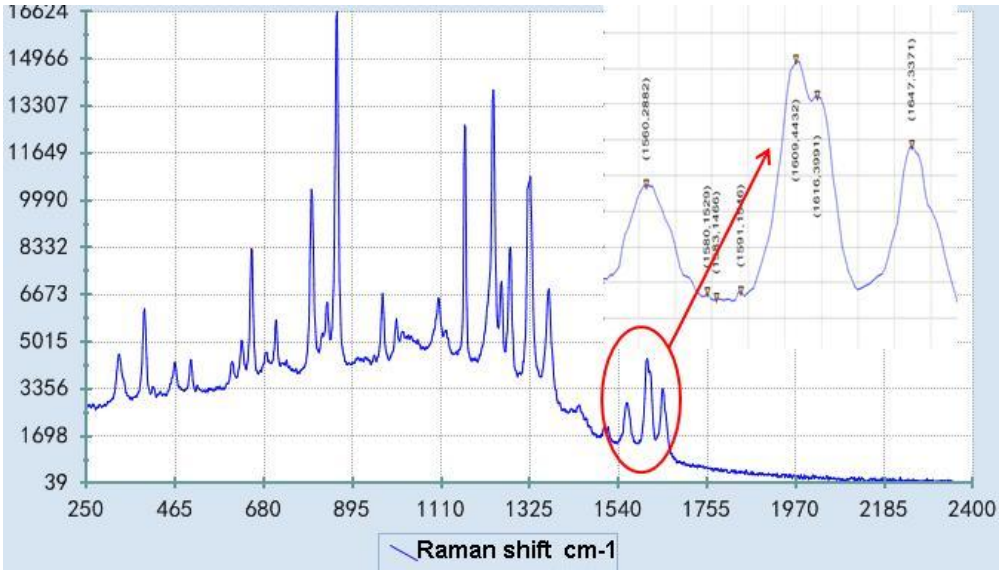


Figure 18 Raman spectrum of Tylenol. The Raman vibration peak at 1610/1615 cm-1 can be clearly distinguished in the figure.

5.2.2 Raman spectrum of gasoline

Excited laser intensity: 200mW Integrate time: 10 s Boxes car: 1 time	Raman spectra of petrol 93# showed the resolution condition in the short wavelength region.

1503 Bld. A04, 3rd Software Park, Jimei, Xiamen, 361005, China
Tel: +86-592-6102588

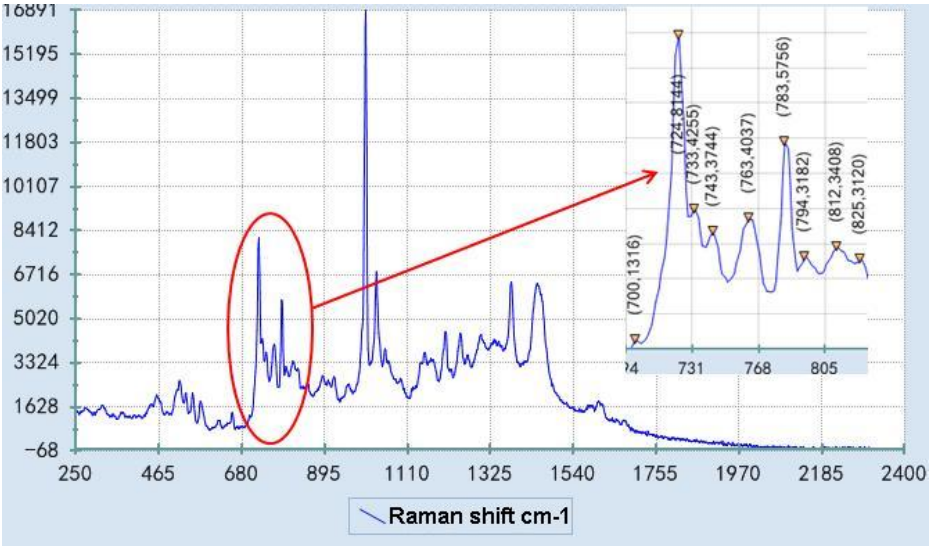


Figure 19 Raman spectrum of 93# gasoline. 723/732/742cm^{-1} Raman shift can be clearly distinguished.

6.Stability

Figure 3.1 and Figure 3.2 are the temperature stability test of ATR8300, which is stable from 5-40℃. At each temperature node, the spectrometer remains stable for more than 1 hour. The test sample is acetonitrile, the wave number drift is less than or equal to 1cm-1 (Figure 3.1), and the peak intensity change is less than 10% (Figure 3.2).

1503 Bld. A04, 3rd Software Park, Jimei, Xiamen, 361005, China
Tel: +86-592-6102588

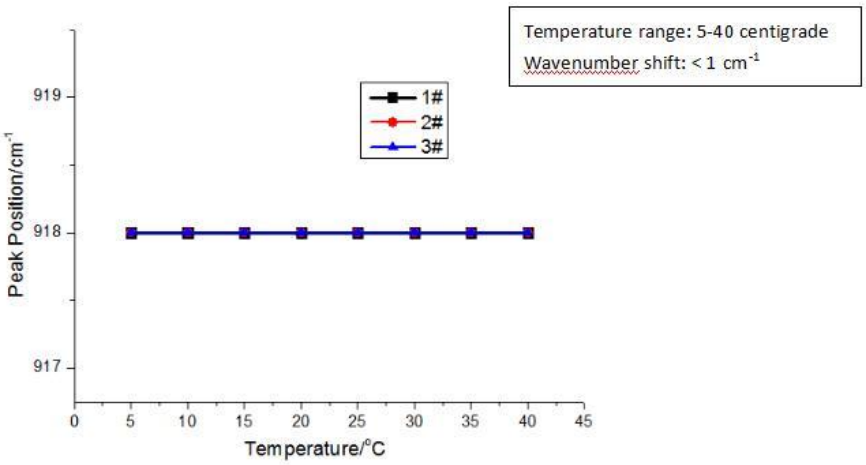


Fig. 3.1 Wavenumber shift results testing from 5 °C to 40 °C of fives ATR2000 portable Raman spectrometers

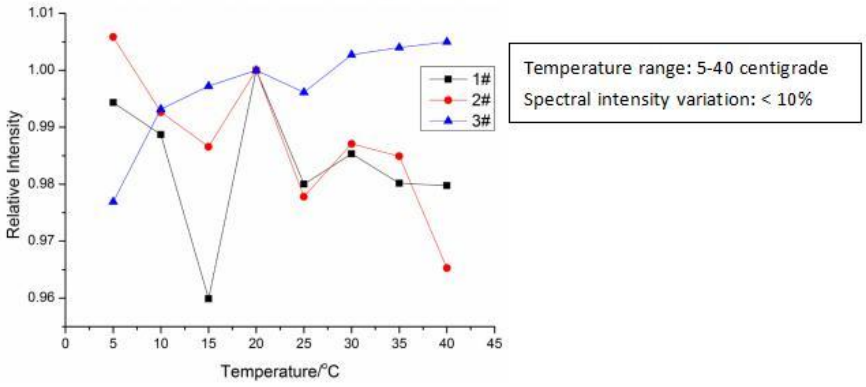


Fig. 3.2 Intensity variation testing from 5 °C to 40 °C of fives ATR2000 portable Raman spectrometers

7.Instrument details

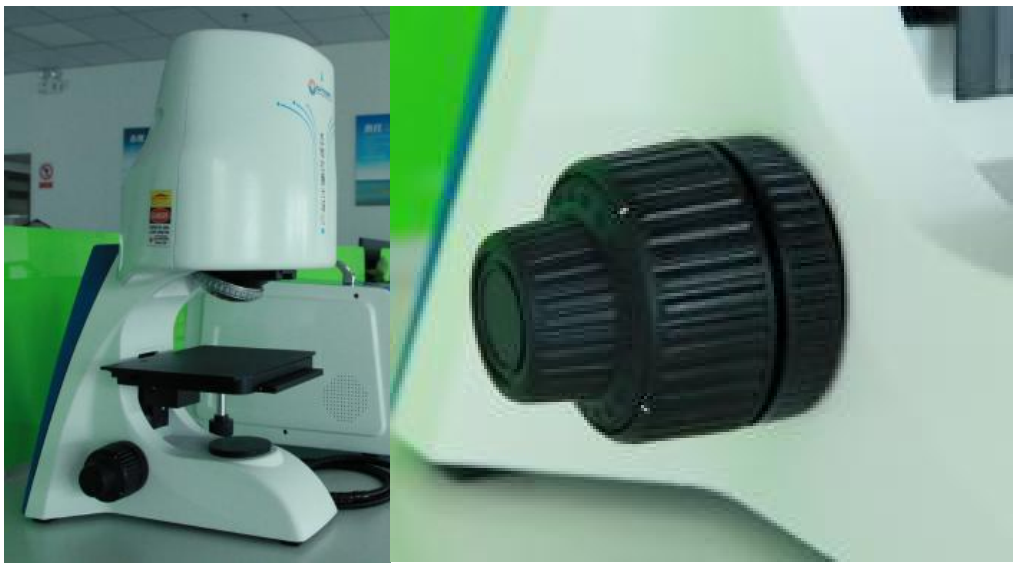


Figure 20 Imported high-stability microscope stand. X, Y, Z three-dimensional high-precision adjustment. The adjustment knob has suitable damping and a smooth adjustment feel. Weigh up to 5.6 Kg. It is not easily

1503 Bld. A04, 3rd Software Park, Jimei, Xiamen, 361005, China
Tel: +86-592-6102588

knocked over, and is very stable.

Figure 21 High transmittance objective for Raman signals. Objective focal length up to 8 mm.

1503 Bld. A04, 3rd Software Park, Jimei, Xiamen, 361005, China
Tel: +86-592-6102588

1503 Bld. A04, 3rd Software Park, Jimei, Xiamen, 361005, China
Tel: +86-592-6102588