

Confocal Raman Microscope

ATR8100

Features

- Ultra-high sensitivity, SNR >2000:1;
- HD capacitive touch screen;
- Windows operating system;
- Built-in lithium battery;
- Quick positioning and focus;
- Micron-level light spot;
- 5 million pixel cameras;
- Excitation wavelength: 532, 633, 785, 830, 1064nm optional;
- Equipped with high-performance spectrometer

Application

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

Description

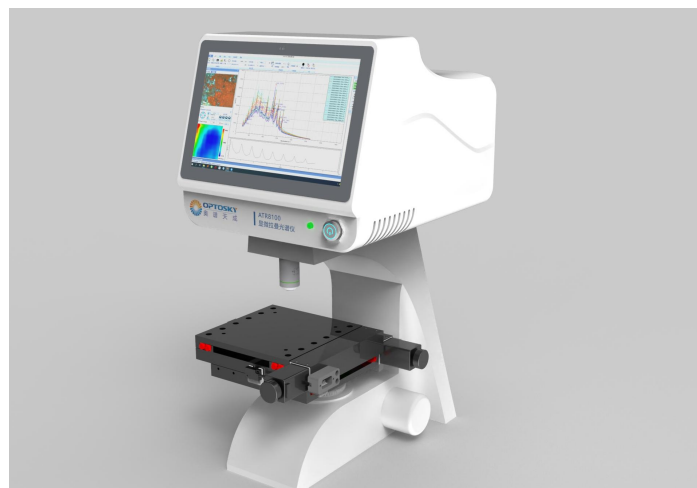
The ATR8100 series combines the advantages of microscopes and Raman spectrometers. The Micro-Raman detection platform is a visual and precise positioning Raman detection platform, which allows the user to detect the Raman signals of different surface states on the sample, and can be displayed simultaneously on the computer, which is greatly Facilitates Raman micro-area detection.

ATR8100 is equipped with an objective lens specially designed for the Raman system, which makes the laser spot close to the diffraction limit. The focus information is accurately and intuitively displayed on the computer through a 5-megapixel camera, which improves the quality of the Raman spectrum.

ATR8100 adopts a unique moving part without optical path switching (patented), which perfectly solves the loss of optical path for camera imaging, realizes the separation of camera imaging and Raman signal collection, and obtains the best signal strength.

At the same time, ATR8100 uses high-performance Raman specially optimized for micro-Raman systems. It is industry-leading in terms of sensitivity, SNR, stability, etc., providing a strong guarantee for Raman research.

| Model | Feature |
|-----------|--|
| ATR8100BS | Base |
| ATR8100AF | Auto Focus |
| ATR8100MP | Mapping type (highest configuration, auto-focus, auto-scan) |



1. Selection guide

Table 1 ATR8800 product selection table

| Model | Excitation Wavelength | Laser Power/mW | Minimum starting wave number | Maximum wave number range | minimum resolution/cm ⁻¹ |
|----------------|---|----------------|------------------------------|---------------------------|-------------------------------------|
| ATR8100-532 | 532 nm | 100mW | 100 cm ⁻¹ | 3200cm ⁻¹ | 5~9 |
| ATR8100-638 | 638 nm | 80mW | 100 cm ⁻¹ | 3200cm ⁻¹ | 5~9 |
| ATR8100-785-27 | 785 nm | 350mW | 100 cm ⁻¹ | 2500cm ⁻¹ | 3~6 |
| ATR8100-785-35 | | | 100 cm ⁻¹ | 3300cm ⁻¹ | 5~8 |
| ATR8100-785-40 | | | 100 cm ⁻¹ | 3800 cm ⁻¹ | 8~11 |
| ATR8100-1064 | 1064 nm | 600mW | 100 cm ⁻¹ | 2300 cm ⁻¹ | 10~15 |
| ATR8100DC | The detector is cooled to -70°C; SNR up to 11000:1; Integration time up to 1.2 hours; Adapt to excitation wavelengths 532, 638, 785, 830nm,etc | | | | |
| ATR8100LT | The detector is cooled to -20°C; SNR up to 1500:1; Integration time up to 1.3h; Better dark current; Adapt to excitation wavelengths 532, 638, 785, 830nm,etc | | | | |

Ordering Guide:

Example:

ATR8100AF-Pro-532: autofocus, cooled type, excitation wavelength 532nm

ATR8800MP-Pro-1064: scanning imaging, long integration time detector, excitation wavelength 1064nm

2. Technical parameters

| ATR8100 (Take 785nm excitation wavelength as an example) | |
|--|--|
| Spectral Resolution | 3-6 cm ⁻¹ (different models and different spectral ranges, slightly different) |
| Spectral range | 250~2700、200~3500、200~4300 cm ⁻¹ (Other wavelength ranges can be customized, as low as 50 cm ⁻¹) |
| Spectral Stability | $\sigma/\mu < 0.5\%$ (COT 8 hours) |
| Temperature Stability | Spectral shift $\leq 1 \text{ cm}^{-1}$ (10~40 °C) |
| SNR | >2000:1 |
| Detector | 2048 Pixel |
| Detection Wavelength Range | 200nm~1100nm |
| Pixel Size | 14 μm * 14 μm |
| Detector Dynamic Range | 13000:1 |
| Laser Center Wavelength | 785nm ($\pm 0.5\text{nm}$) |
| Microscope Camera System | 5 million pixel industrial camera |
| Focus Method | conjugate focus |
| Laser Power | >350mW (Software Adjustable) |
| Laser Spot Diameter | >1 μm |

| | |
|--------------------|--|
| Laser Stability | $\sigma/\mu < \pm 0.2\%$ |
| Laser Linewidth | 0.08 nm |
| Communication Mode | USB2.0 |
| 2D Platform | |
| Moving Range | 50 X 50 mm |
| Moving Resolution | 0.1 μm |
| Movement Method | Manual or electric |
| Z axis | |
| Focus Accuracy | $\leq \pm 0.2 \mu\text{m}$ |
| Maximum Stroke | 20 mm |
| focus Mode | Manual or electric |
| Battery Life | Built-in large-capacity lithium battery, battery life is up to 4 hours, and longer battery life can be customized. |

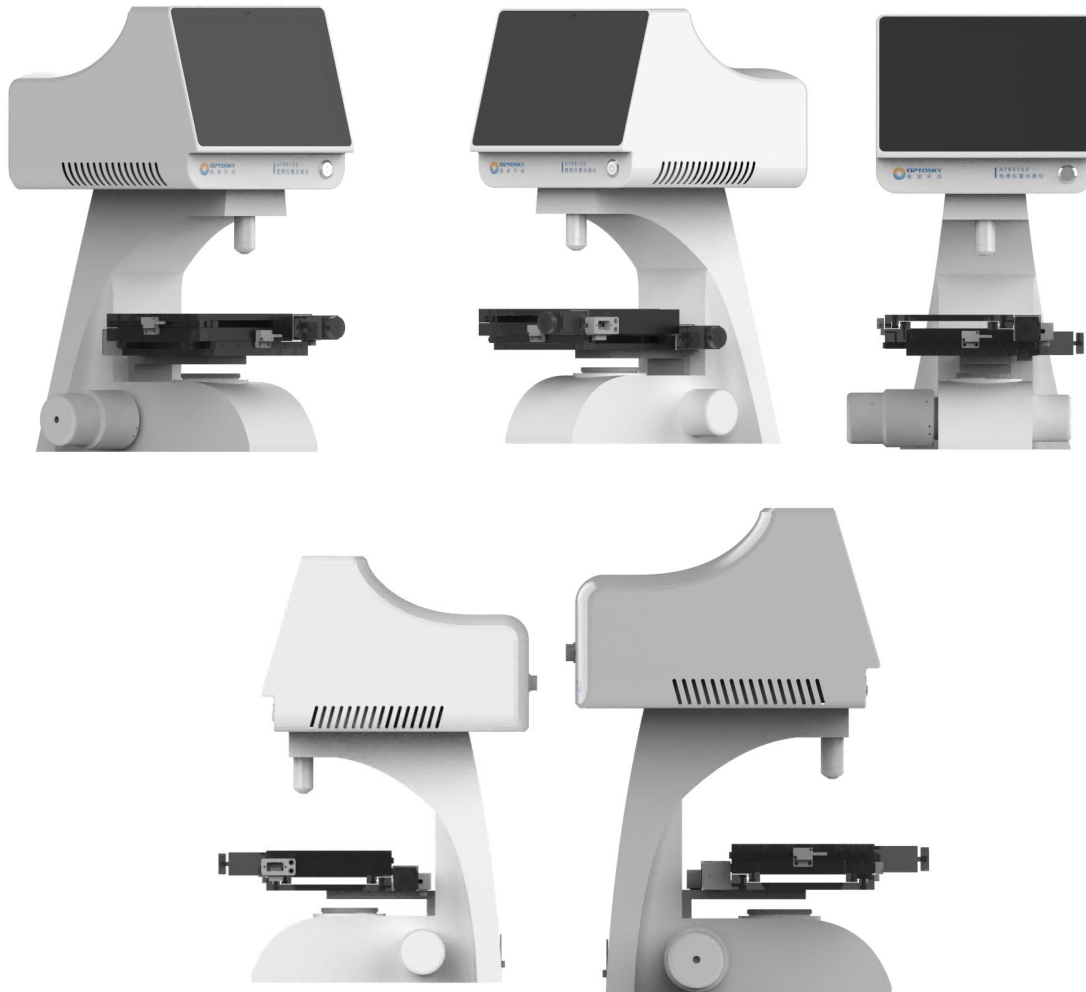


Figure 1 ATR8100 Microscope Raman functional structure indication diagram

3. Operating software interface

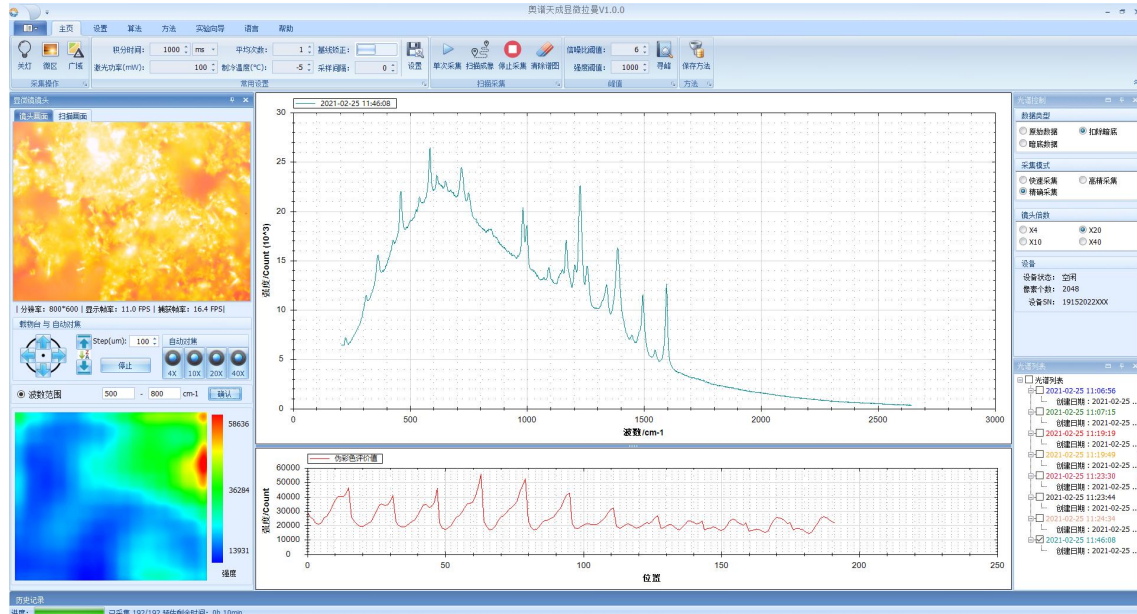


Figure 2 ATR8100 software interface

4. Optical properties

The optical path of ATR8100 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.

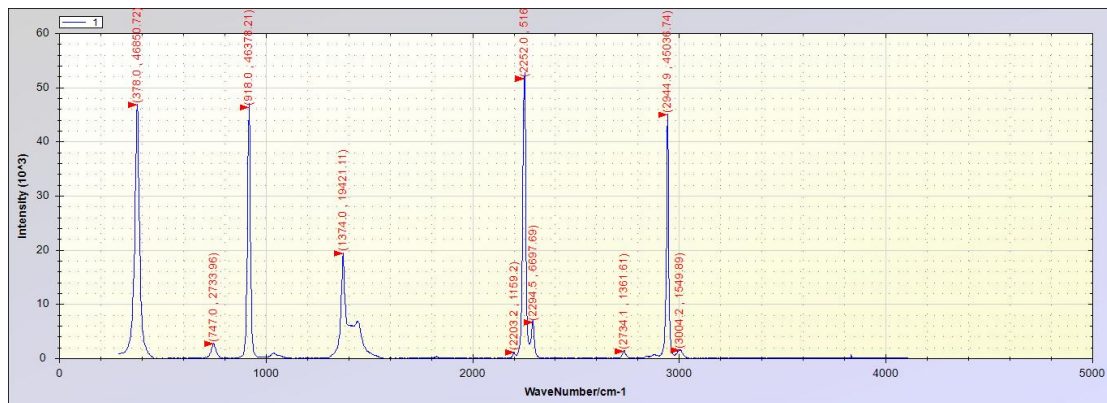


Figure 3 Raman spectrum curve test results; sample: acetonitrile, laser power: 130mW, measurement integration time: 4000ms.

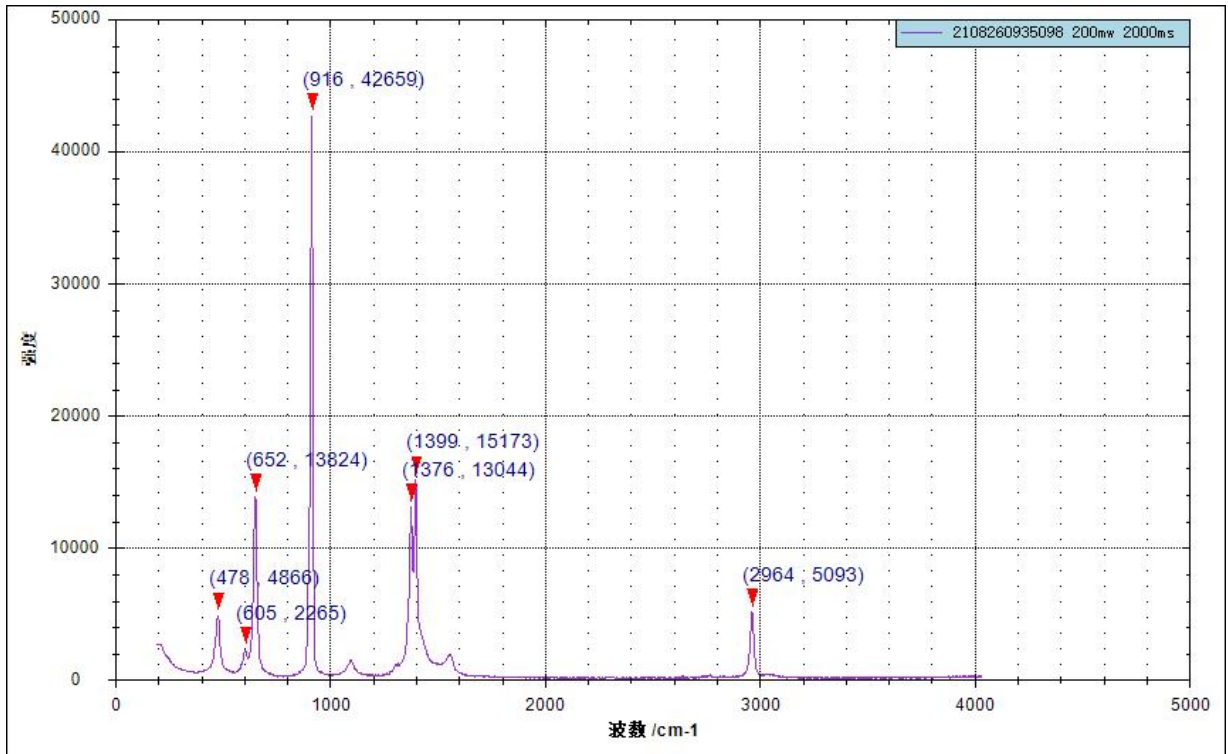


Figure 4 Raman spectrum of methane measured by ATR8100

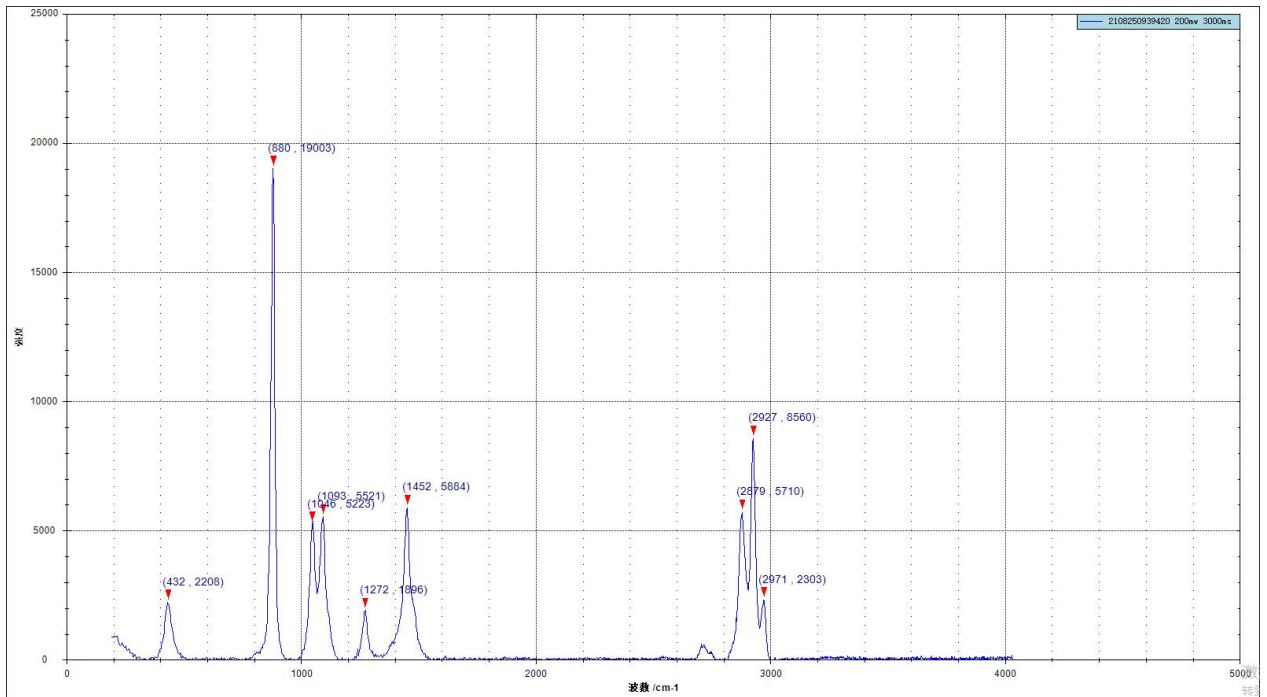


Figure 5 Raman spectrum of celecoxib measured by ATR8100

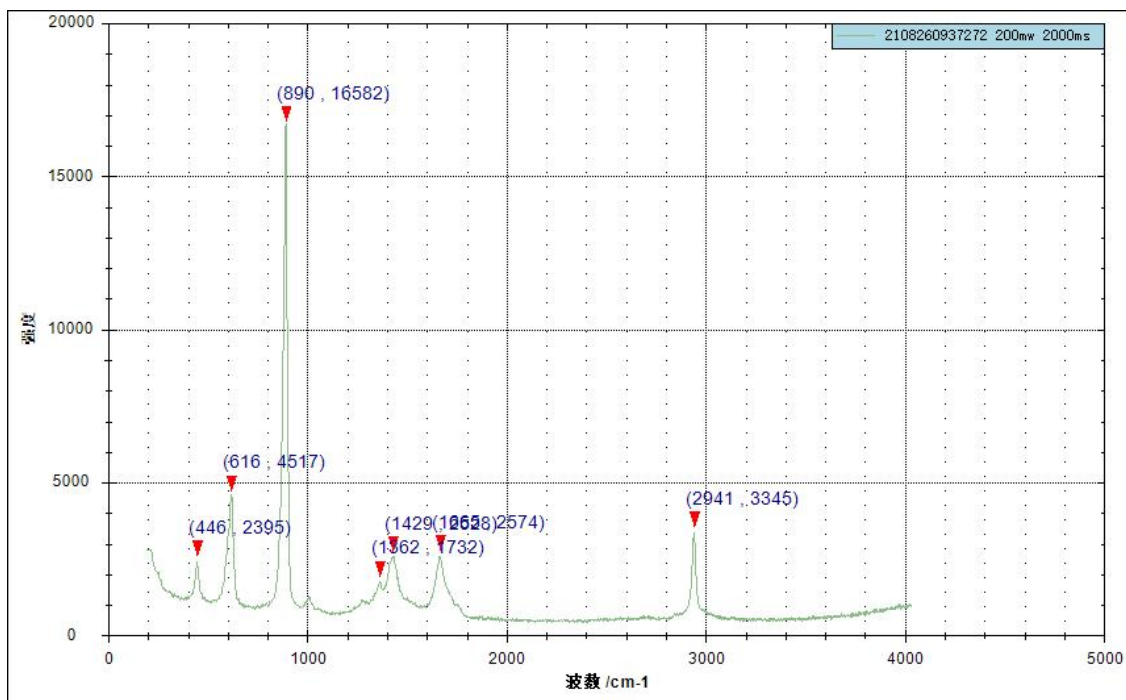


Figure 6 Raman spectrum of acetic acid measured by ATR8100

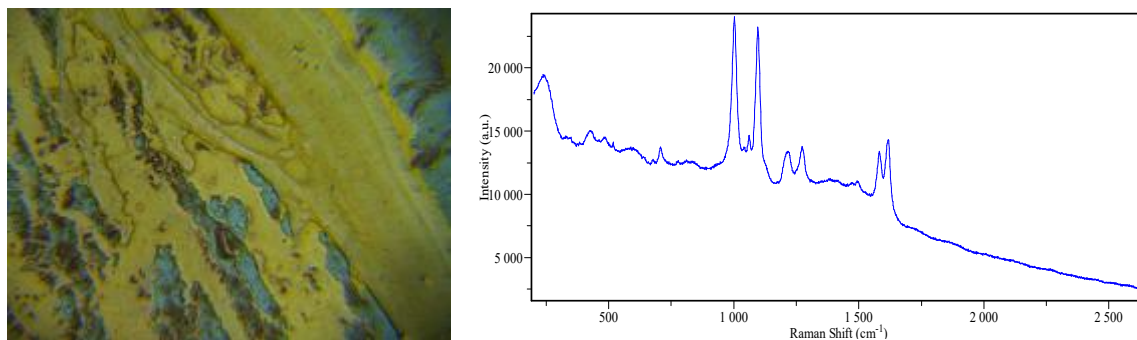


Figure 7 Sers experiment 1 performed by ATR8100 (the left picture is the sample picture, the right picture is the Sers Raman spectrum)

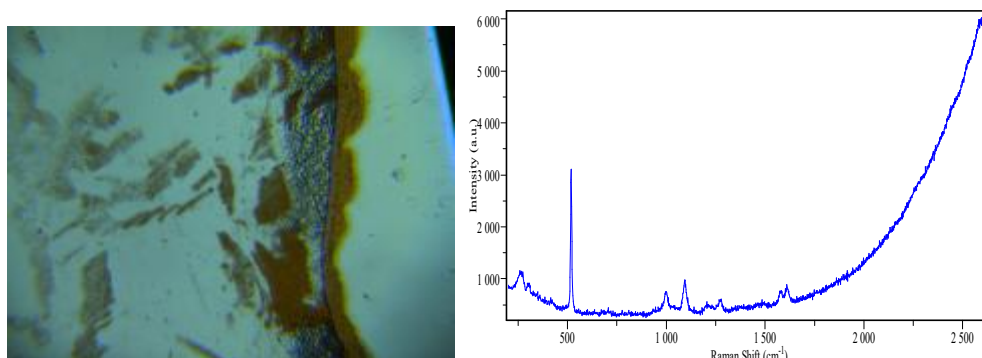


Figure 8 Sers experiment 2 performed by ATR8100 (the left picture is the sample picture, the right picture is the Sers Raman spectrum)

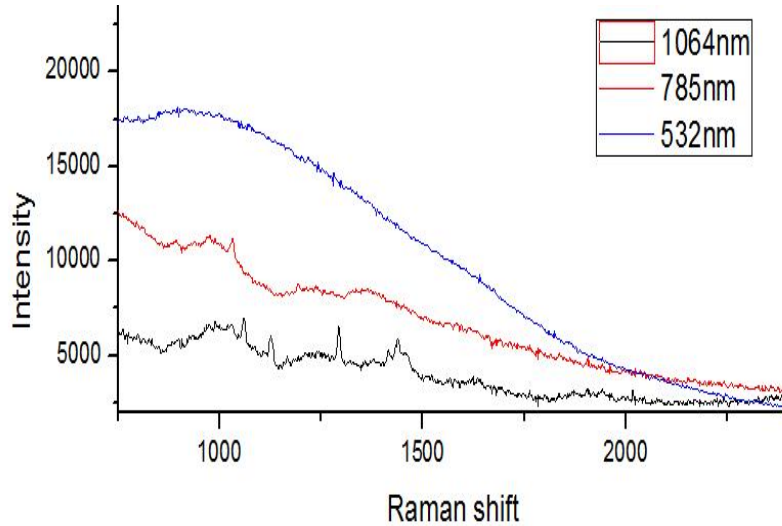
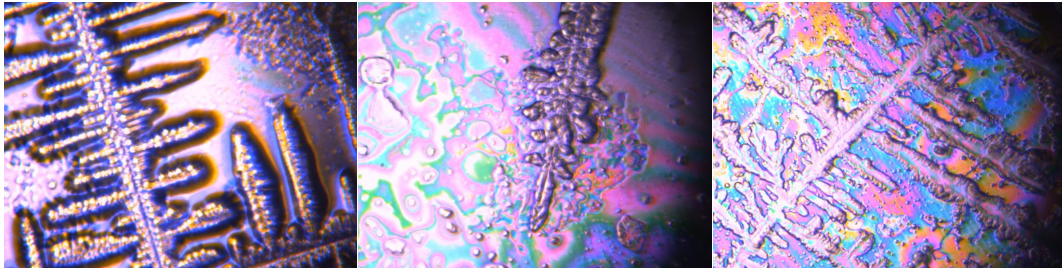


Figure 9 ATR8100 experiment to test cell metabolites. The top three pictures are surface morphology pictures, and the bottom picture is its Raman spectrum. They were tested with ATR8100-1064, ATR8100-785, and ATR8100-532 respectively.

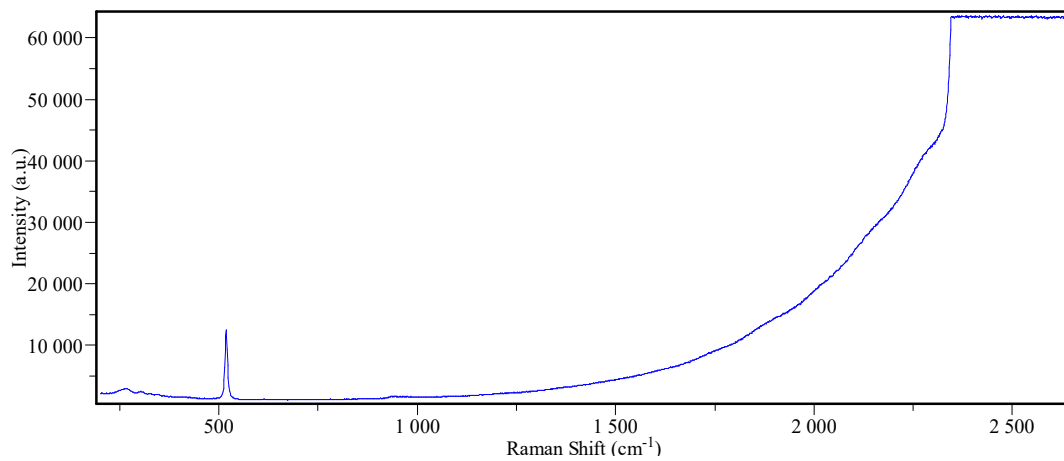


Figure 10 Raman spectrum of Si tested by ATR8100 (500mW, 1S integration time)

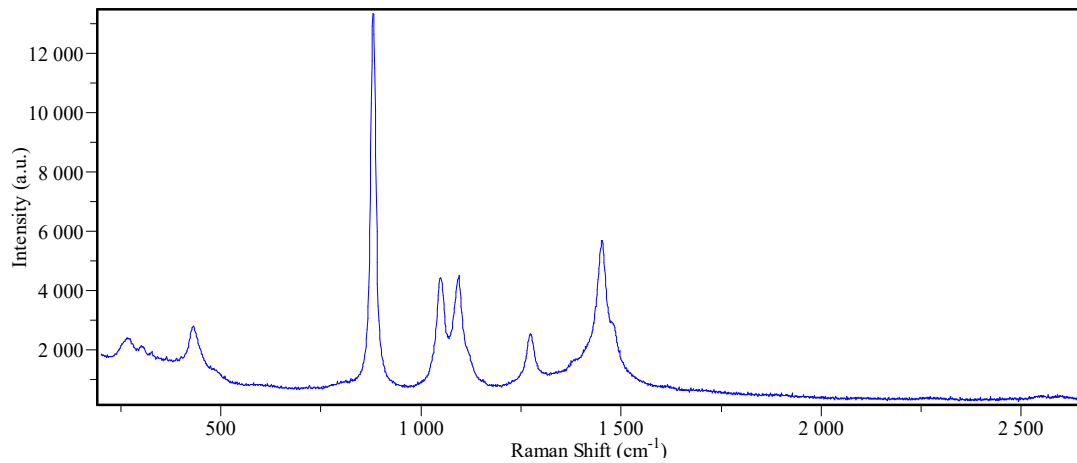


Figure 11 Raman spectrum of alcohol tested by ATR8100 (500mW, 1S integration time)

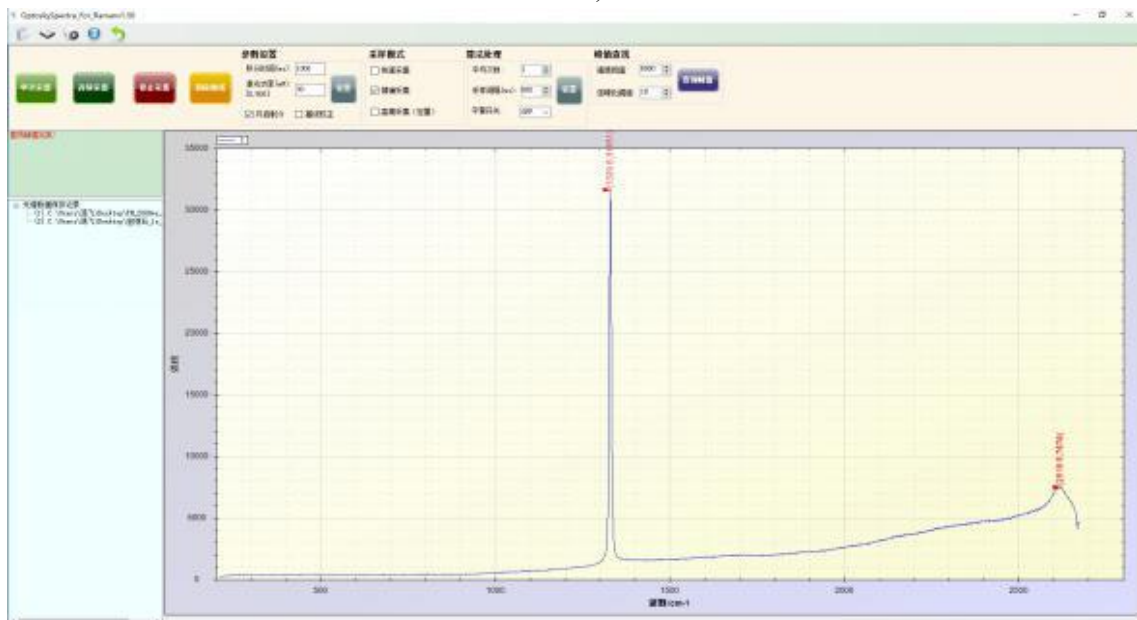


Figure 12 Raman spectrum of ATR8100 test diamond (30mW, 1S integration time)

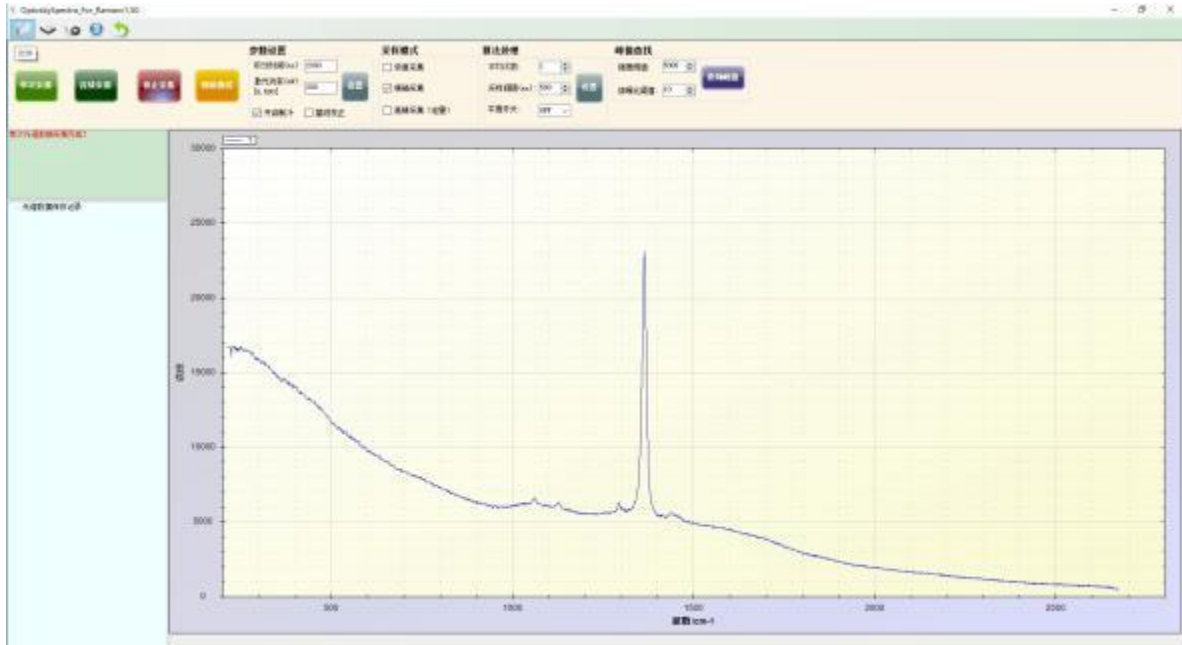


Figure 13 Raman spectrum of boron carbide (PN) tested by ATR8100 (200mW, 2S integration time)

5. Stability

The picture below is the temperature stability test of ATR8100, which is stable from 5-40°C. At each temperature node, the spectrometer remains in a stable state for more than 1 hour. The test sample is acetonitrile. The wave number drift is less than or equal to 1cm⁻¹, and the peak intensity change is less than 10%.

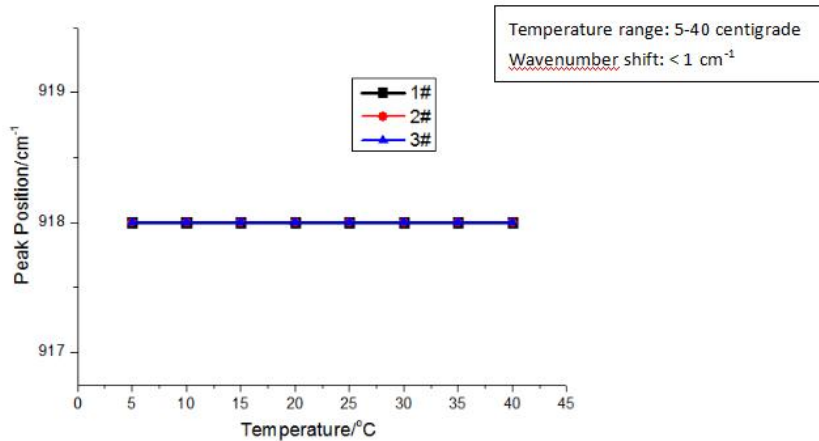


Fig. 3.1 Wavenumber shift results testing from 5 °C to 40 °C of five ATR2000 portable Raman spectrometers

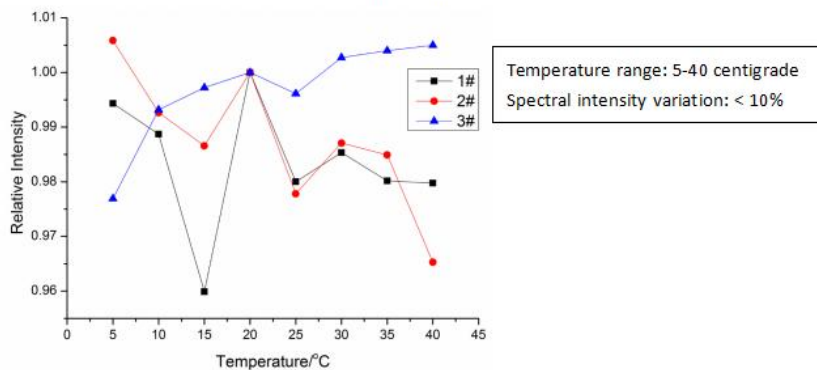


Fig. 3.2 Intensity variation testing from 5 °C to 40 °C of five ATR2000 portable Raman spectrometers

6. Ordering Information

| Model | Excitation wavelength/nm | Maximum power /mW | Wave number range/cm ⁻¹ | Resolution/cm ⁻¹ |
|-------------------------------------|--------------------------|-------------------|------------------------------------|-----------------------------|
| ATR8100-532 | 532 | 100 | 200~3700 | 5~7 |
| ATR8100-638 | 638 | 80 | 200~3500 | 4~6 |
| ATR8100-785 | 785 | 350 | 200~4000 | 6~10 |
| ATR8100-1064 | 1064 | 600 | 200~2600 | 8~12 |
| Other wavelengths can be customized | | | | |