| Confocal Raman Microscope | ATRH8800 |
|---|---|

## 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;
- Wide-band range hyperspectral imaging (390-1000nm);
- 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

ATRH8800 adds a microscopic hyperspectral imager to the confocal Raman microscope. The instrument is an advanced device that integrates a hyperspectral imaging microscope, an optical microscope and a high-resolution confocal Raman microscope. Hyperspectral imaging microscopy and confocal micro-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.

ATRH8800 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, ATRH8800 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.

# 1. Parameter

| ATRH8800 Parameter | |
|---|---|
| Excitation Lasers | Select up to four from 266、325、532、638、785、1064nm |
| Laser Power | 266nm：30 mW<br>325nm：30mW<br>532nm：  100mW<br>633nm：80mW<br>638nm：80mW<br>785nm：350mW<br>1064nm：500mW |
| Spectroscopic Spectrum | Asymmetric C-T optical path |
| Focal Length | 350mm、510mm、810mm optional |
| Built-in Gratings | Standard configuration: 3 pieces; 300 lines, 600 lines, 1200 lines, 1800 lines, 2400 lines optional |
| Detector | 1) Deep cooling area array CCD: 2000X256 pixels |
| Objective Lens | 2) Deep cooling high sensitivity EMCCD: 1600X200 pixels |
| Microscopic illumination | 3) Deep cooling area array InGaAs CCD: 512X1 pixels |
| Lighting Method | Up to 2 detectors can be integrated, choose one from detector 1# or detector 2#; |
| Camera System | Standard configuration: 4X, 10X, 20X, 50X; |
| Focus Method | Optional configuration: 100X |
| Laser Spot Diameter | High brightness and long life white LED |
| Laser Stability | epi-illumination |
| Communication Mode | 5 million pixel industrial camera |
| Hyperspectral imaging parameters | |
| Imaging Method | Push broom |
| Spectral Range | 390- 1000nm |
| Spatial Channels | 1200 |
| Wavelength Channels | 1920 |
| Spectral Resolution | 1.3 nm |
| Imaging Speed | <60s |
| X, Y axis two-dimensional platform | |
| Movement Method | Fully electric, manual optional |
| Imaging Range | 50 X 50 mm, 100 X 100 mm optional |
| Mobile Resolution | 0.1  μm |
| Positioning Accuracy | 1  μm |
| Scan Interval | Software settings, minimum 1 μm |

# Datasheet

| Scan Speed | 20mm/s |
|---|---|
| Nanodisplacement Stage (Optional) | Minimum displacement resolution 2nm, displacement accuracy 10nm |
| Z axis (auto focus) | |
| Focus Accuracy | ≤ ±0.2 μm |
| Maximum Stroke | 20 mm |
| Focus Speed | Less than 10 s |
| Nanodisplacement Stage (Optional) | Minimum displacement resolution 2nm, displacement accuracy 10nm |
| Physical parameters | |
| Size /mm | ATRH8800-FL350：905(L)×58.3(W)×643(H)<br>ATRH8800-FL510：1009(L)×58.3(W)×643(H)<br>ATRH8800-FL810：1520(L)×68.3(W)×643(H) |
| Weight | ATRH8800-FL350：59 Kg<br>ATRH8800-FL510：63 Kg<br>ATRH8800-FL810：78 Kg |
| Working environment | |
| Voltage | 100~240VAC |
| Peak power | <500W |
| Other motivations | No need |
| emission | none |
| Platform requirements | Air-floating vibration isolation optical platform |
| Working temperature and humidity | Constant temperature (25±2℃), constant humidity (50±10%) |
| cleanliness | Level 10,000 and above |



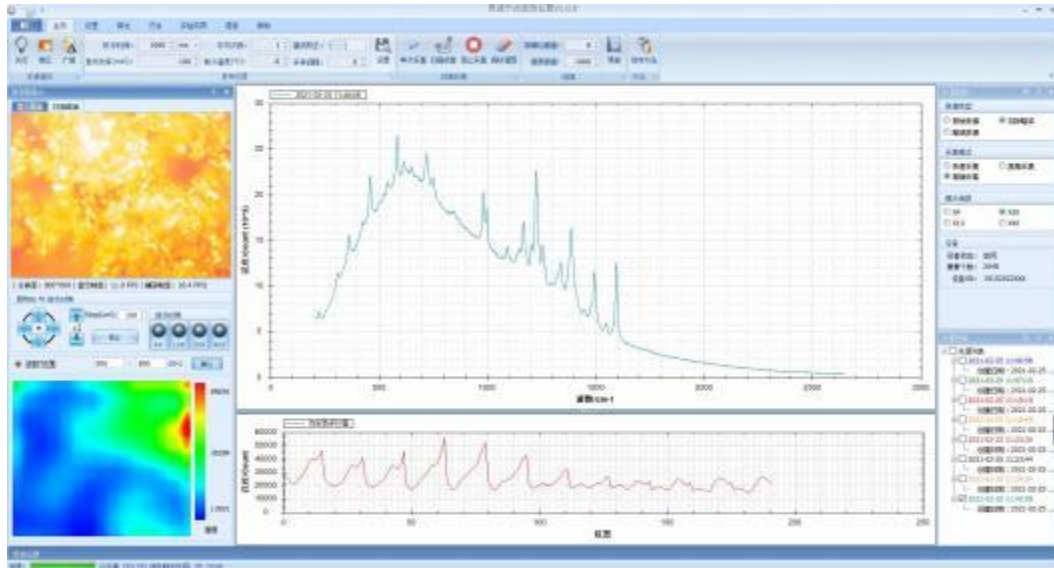Figure 2 ATRH8800 microscopic Raman functional structure indication diagram
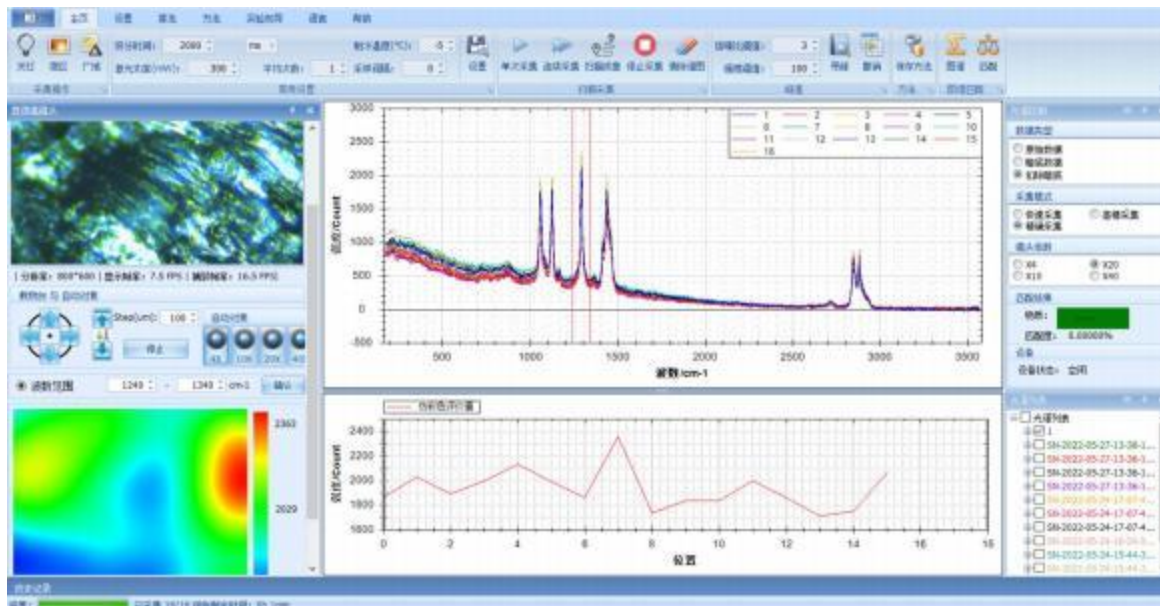
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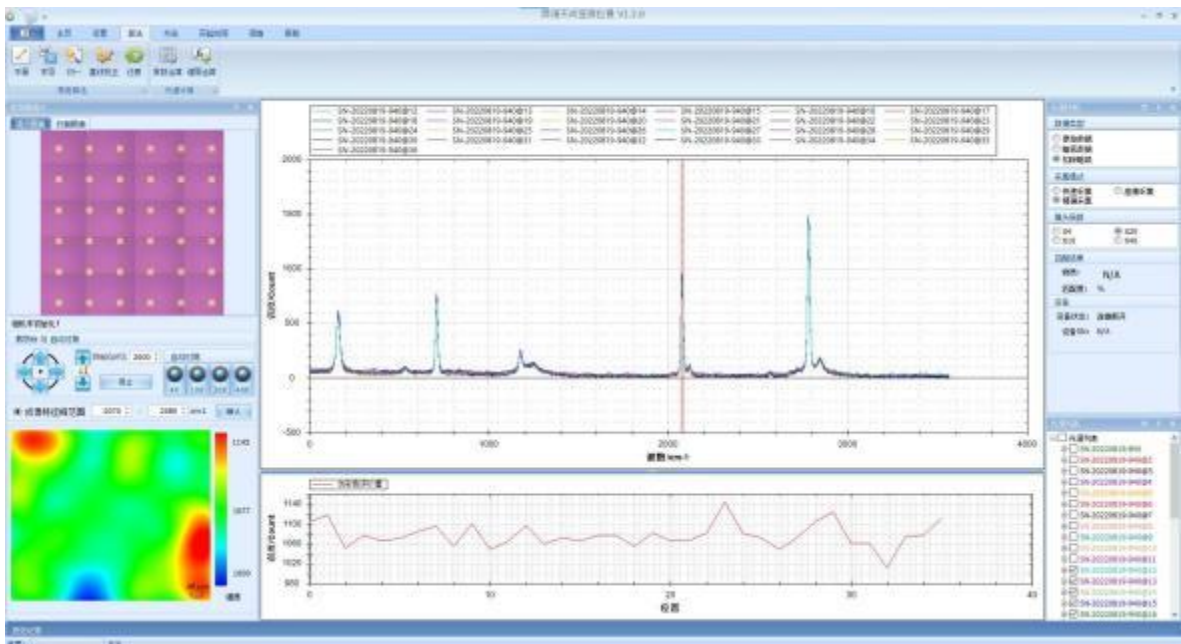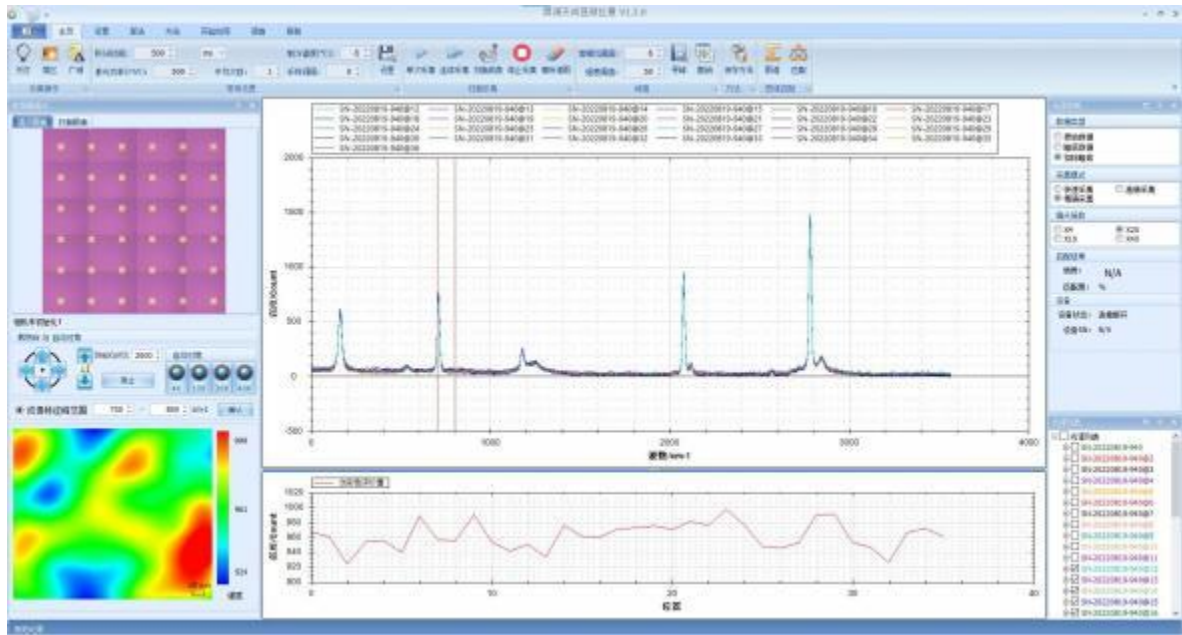Figure 3 Software interface of
ATRH8800



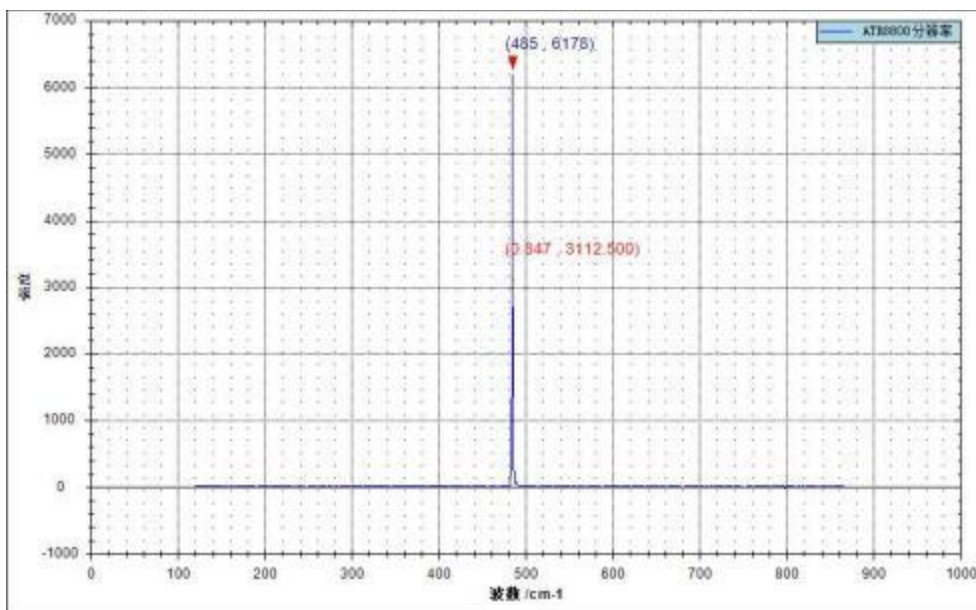Figure 4 Software interface of
ATRH8800

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Figure 5 test results indicate: the instrument resolution reaches 0.847 cm-1, test specification: tested according to the national standard "General Specifications for Raman Spectrometers" method, test equipment: ATRH8800-FL510, test light source: mercury argon lamp, collection spectrum line: 546.08 nm
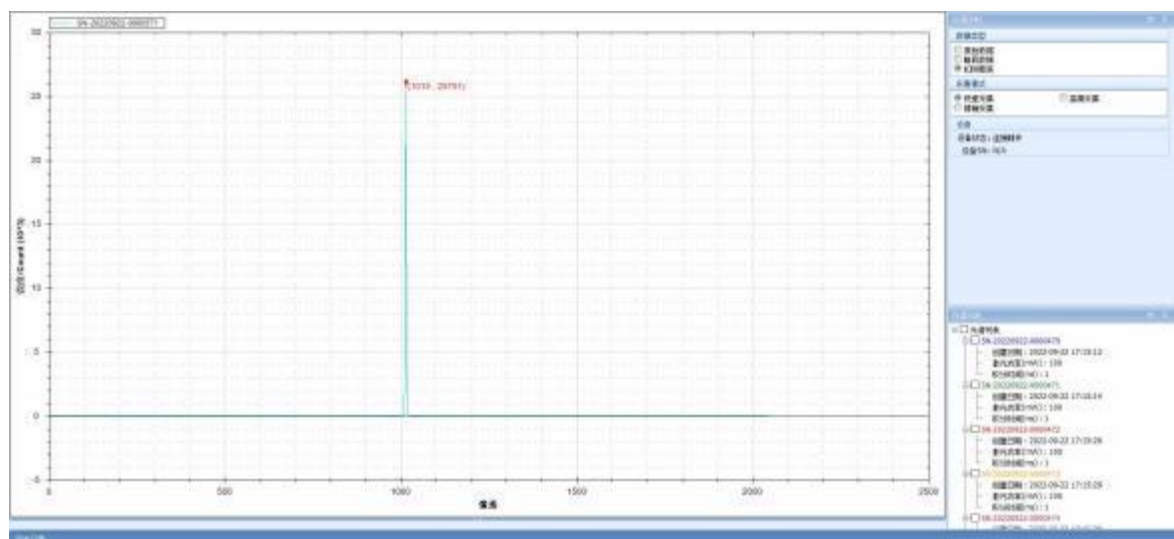


Figure 6 Spectrum of ATRH8800-FL510 test

# 2. Selection Guide

Table 1 ATRH8800 Selection Guide

| Model | Focal Length | excitation wavelength/nm*3 | Laser power/mW | Maximum wave number range*1*2 | Optimal resolution/cm-1*4 |
|---|---|---|---|---|---|
| ATRH8800-FL350 | 350mm | 325 | 30 | 50~ 10000 | 2.6 |
| | | 532 | 100 | 5 ~ 10000 | 1.4 |
| | | 638 | 80 | 5 ~ 10000 | 1.4 |
| | | 785 | 350 | 5 ~ 10000 | 2. 1 |

| | | 1064 | 500 | 50～10000 | 5.2 |
|---|---|---|---|---|---|
| ATRH8800-FL510 | 510mm | 325 | 30 | 50~10000 | 1.9 |
| | | 532 | 100 | 5～10000 | 0.9 |
| | | 638 | 80 | 5～10000 | 0.9 |
| | | 785 | 350 | 5～10000 | 1.4 |
| | | 1064 | 500 | 50～10000 | 3.6 |
| ATRH8800-FL810 | 810mm | 325 | 30 | 50~10000 | 1. 1 |
| | | 532 | 100 | 5～10000 | 0.45 |
| | | 638 | 80 | 5～10000 | 0.45 |
| | | 785 | 350 | 5～10000 | 0.86 |
| | | 1064 | 500 | 5～10000 | 2.3 |

**ATRH8800LT: deep cooling to -30℃, ultra-long integration time (up to 1.3h)**

**ATRH8800EM: Deeply cooled area array EMCCD detector**

**ATRH8800BS: basic type**

**ATRH8800AF: Autofocus type**

**ATRH8800MP: Scanning imaging Mapping, autofocus**

Note:

*1: Maximum wave number range, related to the selection of excitation wavelength;

*2: The standard configuration is 150cm-1, and the minimum wave number range can be customized to 5cm-1, 50cm-1;

*3: Other excitation wavelengths can be customized;

*4: The optimal resolution is related to the slit width of the spectrometer; if the slit width is further reduced, the resolution can be further improved;

*5: The parameters in the table only represent the parameters of the company's standard products; Aopu Tiancheng instruments are all independently developed and produced products, and the corresponding parameters can be customized;

**Ordering Guide:**

Naming example:

ATRH8800AF-LT-FL350-532+638: Autofocus, long integration time, focal length of 350mm, dual excitation wavelengths: 532nm and 633nm respectively

ATRH8800MP-EM-FL810-532+638+1064: scanning imaging, EMCCD detector, focal length of 810mm, excitation wavelength of three wavelengths: 532nm, 633nm and 1064nm respectively