OPTOSKY
Spectroscopy Solutions

Datasheet

Portable Raman Spectrometer ATR3110

Features

- High sensitivity detector
- Sensor cooled to -10°C
- Detachable optical fiber probe design, very
- convenient to use
- Ultra-low noise circuitry
- Powerful PC-side spectral analysis software
- Peak search and display
- USB 2.0
- User-friendly interface

Application

- Nanoparticles and New Materials
- Research Institutes
- Biological Sciences
- Forensic Identification
- Material Science
- Medical Immunoassay
- Agriculture and Food Identification
- Gemstone and Inorganic Mineral Identification
- Environmental Science

Description

ATR3110 portable Raman spectrometer fit to laboratory work. With high reliable performance, excellent low stray light , it enables a wide range of application, especially in sectors of biochemical analyzer, public safety, food safety, pharmaceutical engineering etc.

It provides free powerful software function facilitated the spectral analysis in wide application. The remote experiment through internet access makes the test item much easier. ATR3110 built-in excellent algorithm, which can identify substances at ease, meanwhile it can add one's own spectral data.A user-friendly interface for both technical & non-technical users to make their job easier. High-quality hardware configuration and robust multivariate algorithms guarantee accurate, uniform and reliable results detected.

Model	Wavelength range（cm-1）	Resolution（cm^{-1}）*
ATR3110-26	200~2600	6
ATR3110-35	200~3500	8
ATR3110-43	200~4300	10

Product data information is current as of publication data. Products conform to specifications per the terms of Optosky Standard warranty.

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1. Parameter

ATR3110			
Interface	USB 2.0		
Integration time	4ms~120s		
Power supply voltage	DC 5V±5%		
Operating temperature	-10~45 ℃		
Operating humidity	< 95%		
Dimensions(L*W*H)	30×22.5×13.2 cm3		
Weight	7 Kg		
Reliability			
Spectral stability	σ/μ < 0.5%　(COT 8 hours)		
Temperature stability	Spectral shift ≤ 1 cm-1 (10~40 ℃)		
Spectral intensity variation (in 5 ~ 40°C)	<±5%		
Optical parameters			
Spectral Range (cm^{-1})	200~2600	200~3500	200~4300
Resolution (cm^{-1})	4~6	6~8	7~10
SNR	>3000:1 (918 cm-1 of Acetonitrile , 10s accumulation, 200mW)		
Entrance Slit	50 μm		
Optical System	F/4 C-T Cross-Symmetrical Optical Path		
Focal Length	98 mm for incidence and output		
Detector			
Type	Ultra-High Sensitivity Fast-Cooling CCD		
Cooling Temperature	-10 ℃		
Detection Range	200~1100 nm		
Effective Pixels	2048*64		
Dynamic Range	50000：1		
Pixel Size	14μm×14μm		
Full Well Capacity	300 Ke-		
Sensitivity	QE>40%, 6.5 μV/e-		
Excitation Light			
Central Wavelength	785nm (±1nm)		
Laser Linewidth	0.08 nm		
Output Power	≥500 mW		
Power Stability	σ/μ <±0.2%		
Raman Probe			
Working Distance	6 mm		

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Optical Density	OD>8
Numerical Aperture	0.3
Aperture	7mm

2. Optical Performance

General spectral performance

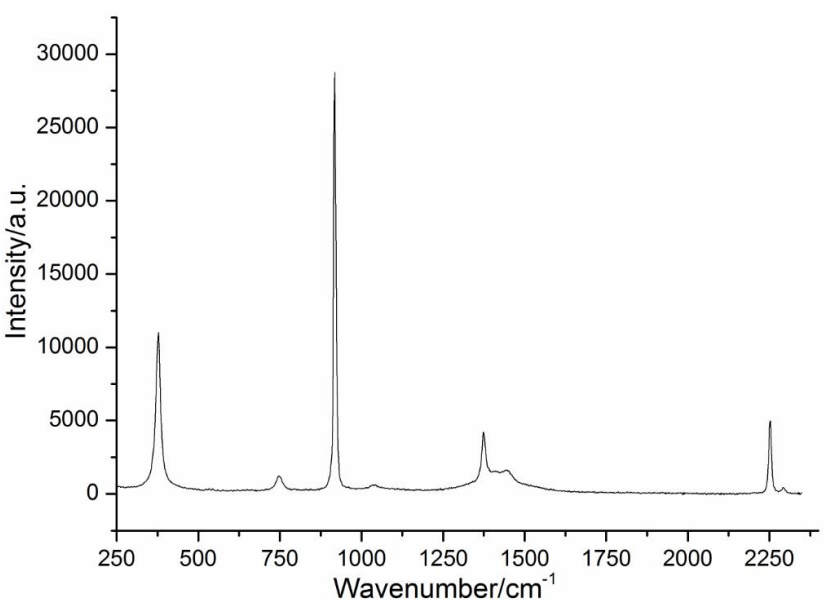

Figure 1 Raman spectra of acetonitrile

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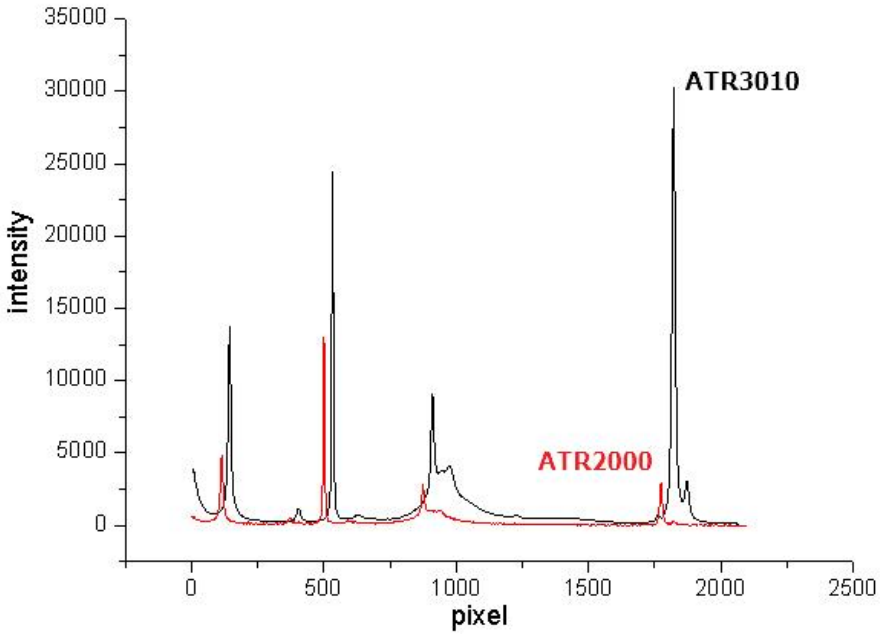

Figure 2 Sensitive of ATR3110vs ATR2000

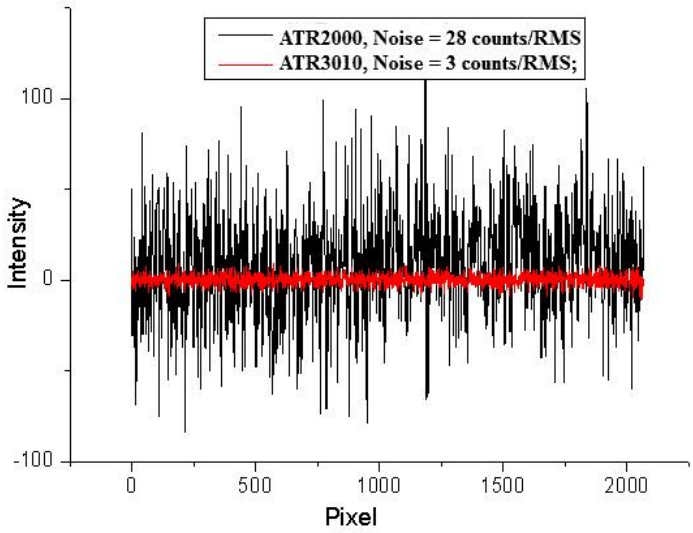

Figure 3 Noise of ATR3110 vs ATR2000

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Spectral Resolution

Raman spectral of Tylenol

Excited laser intensity: 200 mW
Integrate time: 10 s
Boxes car: 1 time

Raman spectra of Tylenol showed the resolution condition in the long wavelength region. That is better than 6 cm^{-1}.

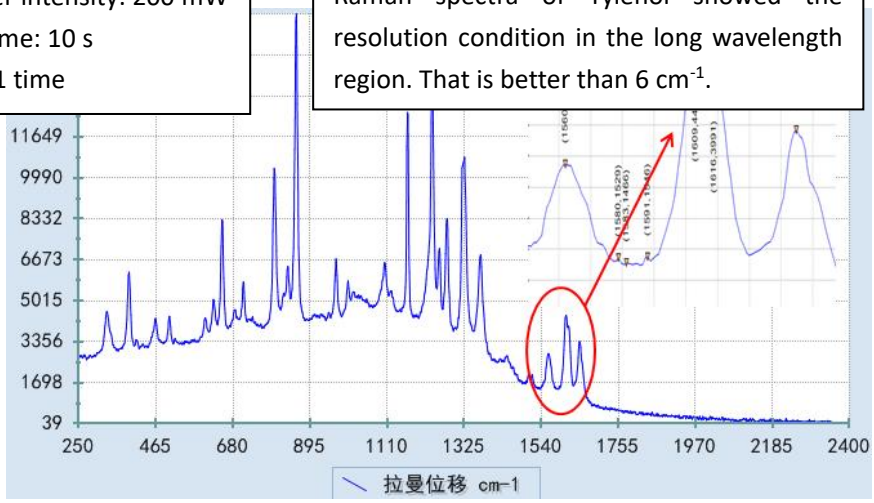

Fig.2.2 Raman spectrum of Tylenol， the vibration mode 1610/1615 cm^{-1} can be resolved.

Raman spectral of petrol

Excited laser intensity: 200 mW
Integrate time: 10 s
Boxes car: 1 time

Raman spectra of petrol 93# showed the resolution condition in the short wavelength region.

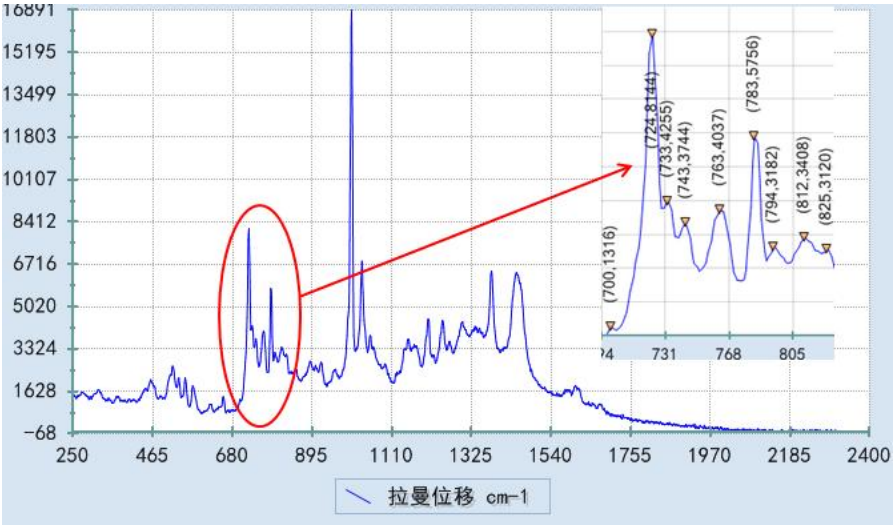

Fig.2.3 Raman spectrum of petrol 93#, the vibration mode 723/732/742cm^{-1} can be resolved.

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3. Reliability

Figure 3.1 and Figure 3.2 showed the temperature reliability testing results of fives ATR3110portable Raman spectrometers. The testing temperature range was from 5 ºC to 40 ºC. The spectrometer was kept more than 1 hour at every temperature spots. Acetonitrile was used as the standard sample in the testing. The testing results were calculated using 918 cm^{-1} of acetonitrile. The wavenumber shift was 1 cm^{-1} or less(as show in Fig. 3.1). The peak intensity variation was less than 10% (as show in Fig. 4).

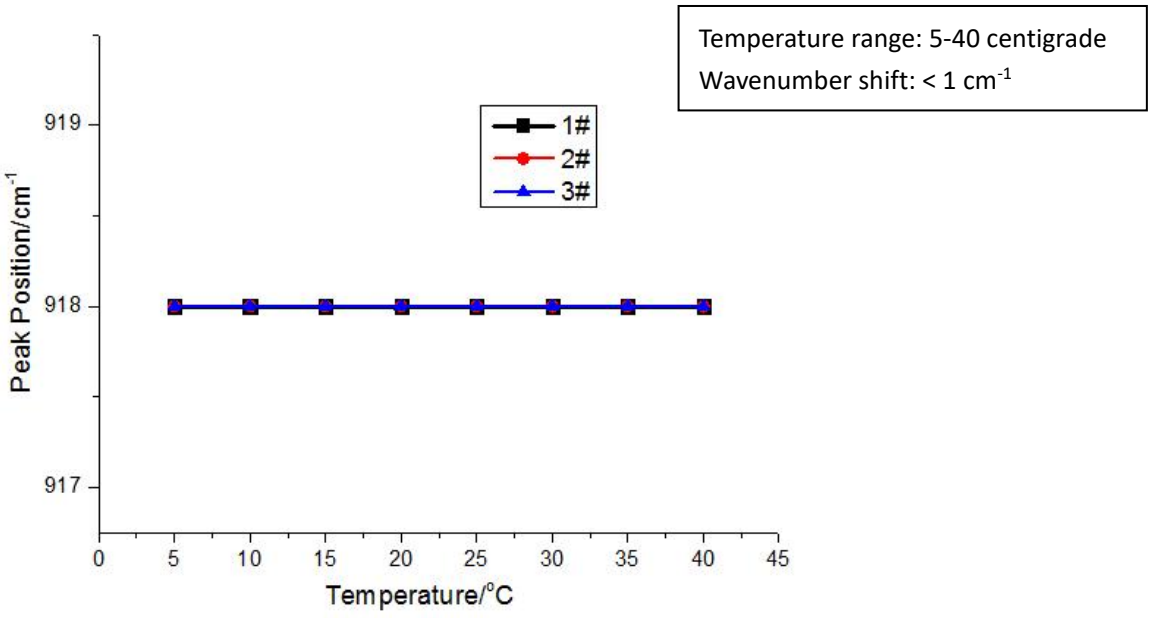

Fig. 3.1 Wavenumber shift results testing from 5 ºC to 40 ºC of fives ATR3110portable Raman spectrometers

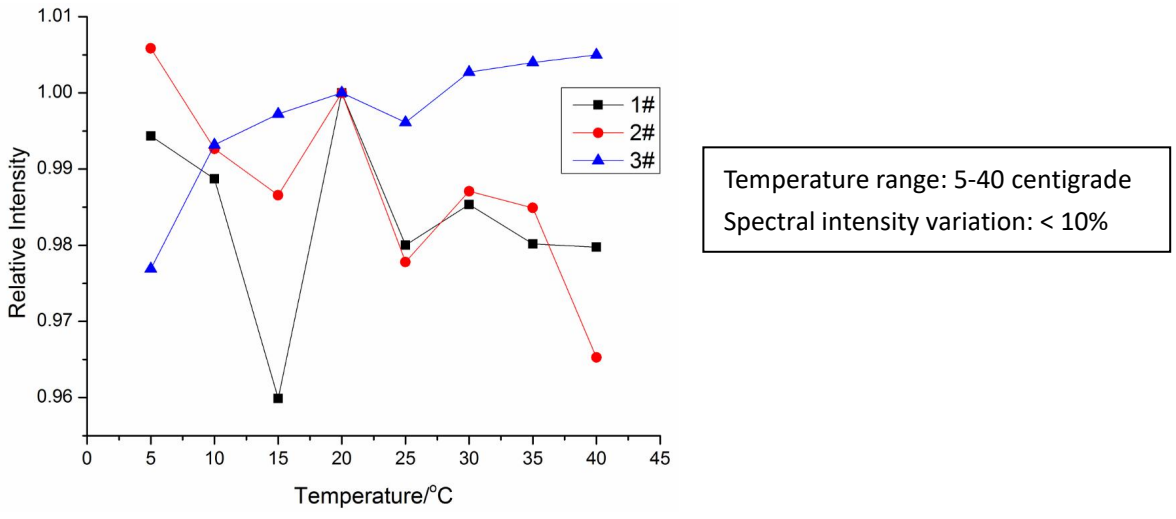

Figure 4 Intensity variation testing from 5 ºC to 40 ºC of three ATR3110portable Raman spectrometers

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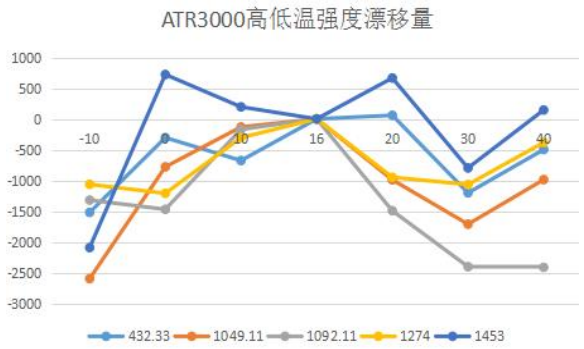

Figure 5 Intensity variation -10 ºC to 40 ºC of ATR3110portable Raman spectrometers, sample is alcohol.

4. Accessories

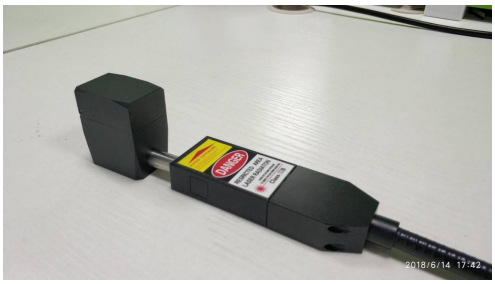

Figure 1: Liquid Sample Measurement Cell (Thermo Bottle)

Figure 2: Liquid Sample Measurement Cell
(Optional Liquid Chromatography Bottle, Microliter)

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Figure 3: ATR20107 Type Pistol-style Raman Probe (Optional)

Figure 4: Precision Adjustment Stand
(For Solid and Powder Measurements)

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5. Selection Guide

Model	Wavelength (nm)	Laser Power (mW)	Spectral Range (cm^{-1})	Resolution (cm^{-1})	Features
ATR31100-26	785	550	200~2600	4~6	Suitable for Most Applications
ATR31100-35			200~3500	6~8	
ATR31100-43			200~4300	7~10	
ATR3110-1064	1064	500	200~2600	13	No Fluorescence Interference, Especially Suitable for Dark Samples, Colored Samples, and Samples with Strong Fluorescent Properties, such as Pigments, Biological Samples, etc.
ATR3110-1064 -34	1064	500	200~3400	20	
ATR3110-830	830	550	200~3300	7	Better Penetration through Human Skin, Suitable for Measuring Biological Samples, such as Non-invasive Blood Glucose and Early Cancer Detection.
ATR3110-266	266	50	200~3000	25	Fluorescence Suppression
ATR3110-532	532	100	200~3700	11	Graphene, Coal, Biological Samples, 2D Materials, SERS, etc.
ATR3110-633	633	80	200~3200	10	Metal Oxides, New Materials

- **ATR3110PS**: Ultra-high Signal-to-Noise Ratio, Ultra-low Temperature Cooling Backside Illuminated CCD, Integration Time up to 25 minutes.
- **ATR3110LT**: Ultra-high Signal-to-Noise Ratio, -15°C Ultra-low Temperature Cooling Backside Illuminated CCD, Integration Time up to 1.3 hours.
- **ATR3200**: Dual-wavelength Raman Spectrometer, 532, 633, 785, 830, 1064 nm Excitation Light, Choose Any Two.

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