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Datasheet

Scientific Raman Spectrometer ATR3100

Features

- High sensitivity FFT-CCD
- The detector TEC is cooled to -10℃
- Ultra-low noise circuit;
- Powerful embedded software;
- Eliminate fluorescent background;
- Peak search and display;
- USB 2.0;
- Touch operation;
- Friendly human-computer interface;

Application

- Biological science
- Pharmaceutical engineering
- Forensic analysis
- Agriculture and food safety
- Gemstone
- Environmental science

Description

ATR3100 portable Raman spectrometer uses a cooled high-sensitivity Raman signal enhanced CCD, a high-efficiency Raman probe, an ultra-narrow linewidth laser with a power of up to 600mW, and combines high-reliability optical design, circuit design, structural design, and the measurement results are very stable and the signal-to-noise ratio is extremely high, making it very suitable for field operations. Remarkable reliability makes detection results accurate and reliable. Excellent low stray light conditions make spectrometers widely used, especially in biochemical analyzers, food safety, pharmaceutical engineering, etc. This versatile software facilitates the spectral analysis process in applications. Remote experiments accessed via the Internet make testing projects easier.

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1. Specifications

ATR3100 Operating System			
Interface	USB 2.0/LAN		
Operating System	Computer operation		
Battery Power Time	No battery inside		
Integration Time	4ms-120s		
Voltage	DC 5V(+/-5%)		
Operating Temperature	-25~50℃		
Working Humidity	< 95%		
Dimensions (L*W*H)	30×22.5×13.2 cm3		
weight	3.5kg		
Reliability			
Spectral stability	σ/μ < 0.5%　(COT 8 hours)		
temperature stability	spectrum shift≤ 1 cm^{-1} (10-40 ℃)		
Spectral intensity change (in 5 ~ 40 ℃)	<±5%		
Optical Parameters			
Spectral range (cm-1)	250-2700	200-3300	150-4000
Resolution(cm-1)	4	5	7
signal-to-noise ratio	>3000:1		
entrance slit	50 μm		
Optical system	f/4 C-T cross symmetric optical path		
focal length	98 mm for incidence and output		
Detector			
model	Ultra-high sensitivity and rapid cooling CCD		
Spectral range	200-1100 nm		
Effective Pixels	2048*64		
Dynamic Range	10000：1		
Pixel size	14μm×14μm		
Full well capacity	300 Ke^-		
Sensitivity	QE>40%, 6.5 μV/e-		
Excitation light			
central wavelength	785nm (±0.5nm)		

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half width	0.08 nm
Output Power	≥500 mW
Power stability	σ/μ <±0.2%
Raman probe	
working distance	6 mm
Transmission rate	OD>8
numerical aperture	0.3
Aperture	7mm

2. Optical Performance

2.1 General spectral performance

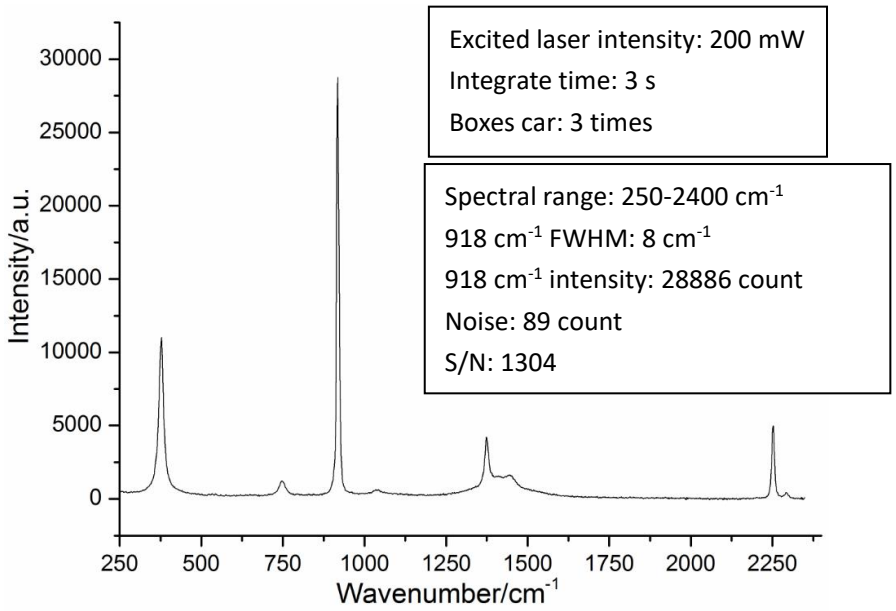

Figure 1 Raman spectra of acetonitrile

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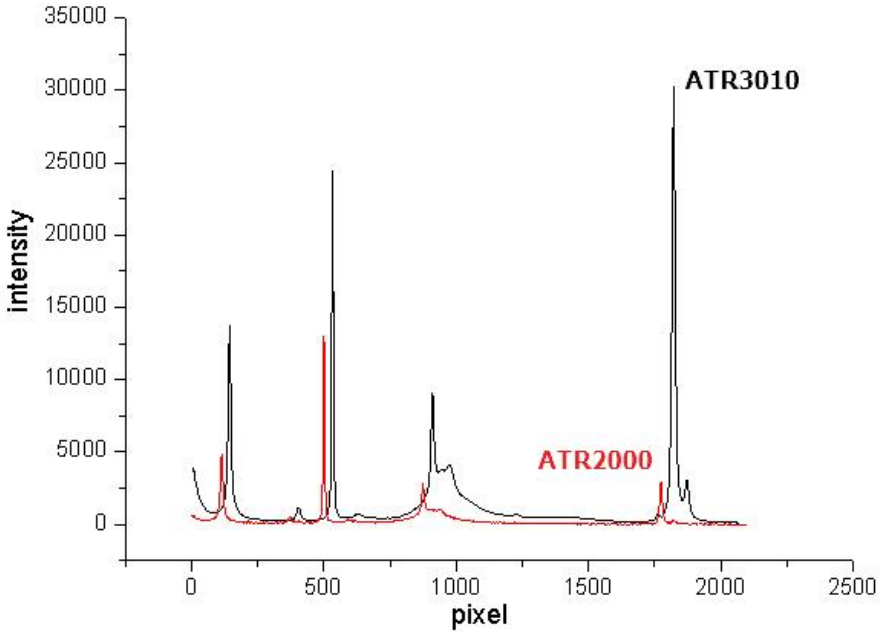

Figure 2 Sensitive of ATR3100 vs ATR2100

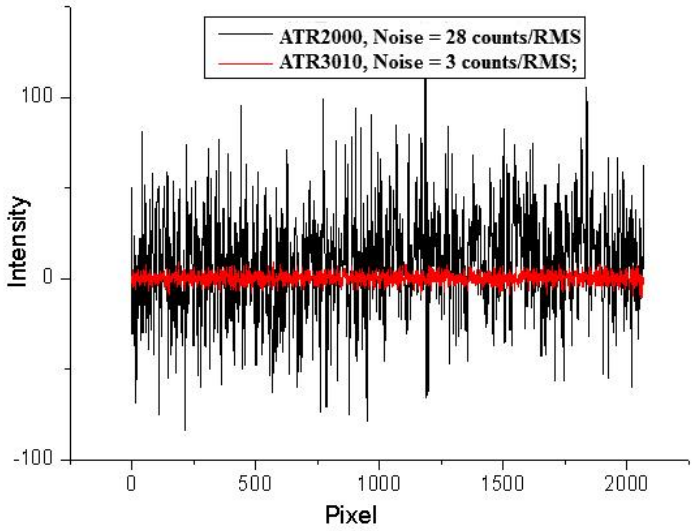

Figure 3 Noise of ATR3100 vs ATR2100

2.2 Spectral Resolution

2.2.1 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}.

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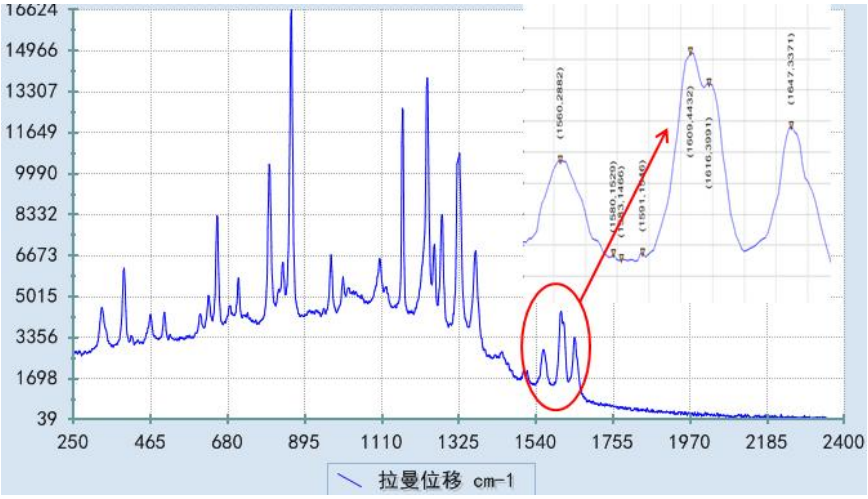

Fig.2.2 Raman spectrum of Tylenol， the vibration mode 1610/1615 cm-1 can be resolved.

2.2.2 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.

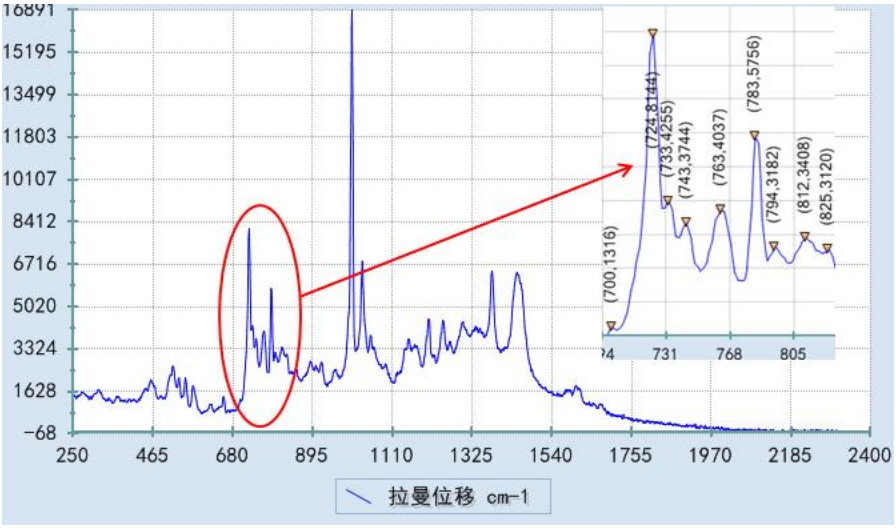

Fig.2.3 Raman spectrum of petrol 93#, the vibration mode 723/732/742cm-1 can be resolved.

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3. Reliability

Figure 3.1 and Figure 3.2 showed the temperature reliability testing results of fives ATR3010 portable 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).

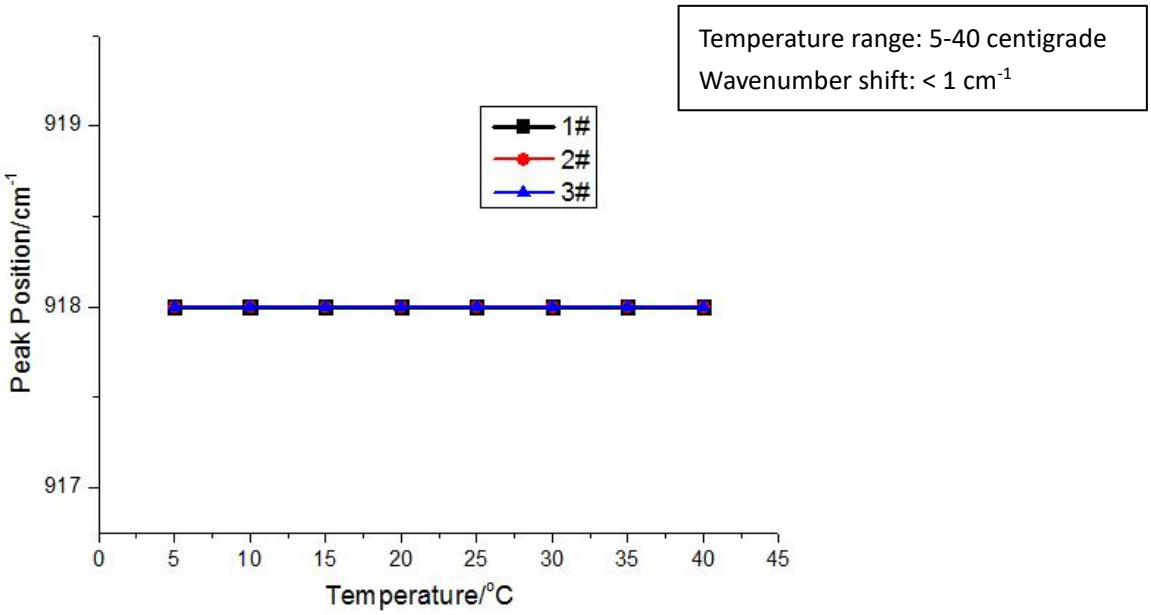

Fig. 3.1 Wavenumber shift results testing from 5 oC to 40 oC of fives ATR3010 portable Raman spectrometers

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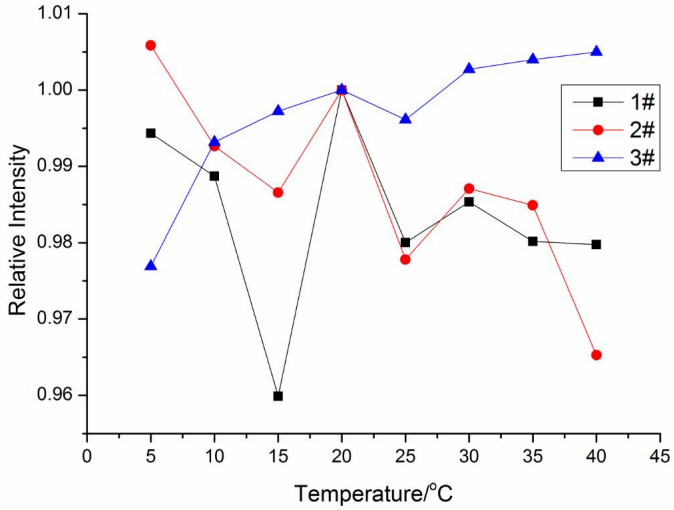

Temperature range: 5-40 centigrade
Spectral intensity variation: < 10%

Figure 3 Intensity variation testing from 5 oC to 40 oC of three ATR3010 portable Raman spectrometers

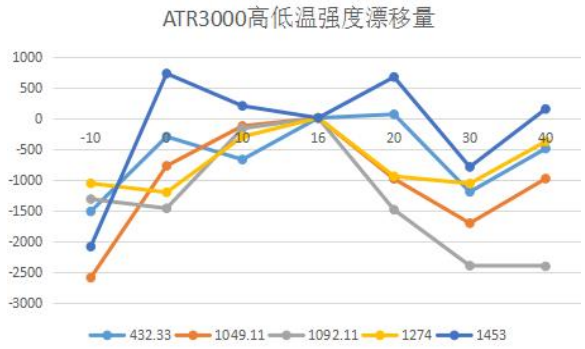

Figure 4 Intensity variation -10 °C to 40 °C of ATR3100 portable Raman spectrometers, sample is alcohol.

4 Ordering Information

Model	Wavelength/nm	Power /mW	Wavenumber Range/cm^{-1}	Resolution/cm^{-1}
ATR3100-473	473	100	150-4000	7
ATR3100-532	532	100	150-4000	7
ATR3100-785-27	785	600	250-2700	5
ATR3100-785-40			150-4000	6
ATR3100-830	830	600	150-4000	7

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ATR3100-1064	1064	600	150-4000	10
Other wavelengths can be customized				

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