

High-sensitivity High-resolution Portable Raman Spectrometer

ATR3110

Feature:

- Ultra-high sensitivity FFT-CCD TE-cooled;
- low noise circuit;
- Powerful embedded software;
- Fluorescent background eliminate;
- Peak finding and display;
- Win 10 operation system;
- USB 2.0;
- User friendly human-machine interface;
- Remote control via LAN;

Application:

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

Description:

ATR3110 Raman Spectrometer is TE-cooled, high-sensitivity, enhanced designed for broadband ranges. all of optical path, PCB, signal processing method have been made optimized processed to obtain >15times higher SNR than ATR20007, nearly 100 times higher than 2000cm-1.

ATR3110 employs low noise CCD signal process circuit, noise<3counts.

ATR3110 employs 110/220V power supply, DC supply via 5V adaptor. Easy to take and field operation.

PN	Wavelength (nm)	Wavenumber range cm-1
ATR3110-473	473	200-4000
ATR3110-532	532	200-3600
ATR3110-785-27	785	200-2700
ATR3110-785-40		200-4300
ATR3110-830	830	200-4000
ATR3110-1064	1064	200-2600
Available in custom made wavelength		



Remark:

- Measuring method is based on ASTM E2529-06;
- Available in custom design, resolution can be increased by around 1/3, resulting in lower sensitivity;

1 Specifications

ATR3110 System			
Operating system	Windows		
Integration time	1ms - 120s		
Power voltage	DC 5V(+/-5%)		
Operating Temp	-10~40 °C		
Operating humidity	< 95%		
Dimension(L*W*H)	30×22.5×13.2 cm		
Weight	5.5 Kg		
Reliability			
Spectral stability	$\sigma/\mu < 0.5\%$ (COT 8 hours)		
Temp stability	Spectral shift $\leq 1 \text{ cm}^{-1}$ (10-40 °C)		
Variation of intensity (in 5 ~ 40 °C)	<±5%		
Optical parameters			
Spectral range (cm^{-1})	200-2700	200-3500	200-4300
resolution (cm^{-1}) / 50 μm slit size	6.5nm	9nm	12nm
SNR	>3000:1 (918 cm^{-1} of Acetonitrile, 10s accumulation, 200mW)		
Sensitivity	1800:1		
Optical system	f/4 C-T crossed optical path		
focusing	98 mm for incidence and output		
Detector			
Item	Ultra-high sensitivity, quick cooling CCD		
Detector cooled down to	-5 °C		
Detecting range	200-1100 nm		
Effective pixels	2048*64		
Dynamic range	10000: 1		
Pixel size	14 μm ×200 μm		
Exciting Laser			
Central wavelength	785nm (+/-1nm)		
FWHM	0.08 nm		
Power output	$\geq 500 \text{ mW}$		
Power stability	$\sigma/\mu \leq \pm 0.2\%$		
Raman probe			

Operating distance	6 mm
Rayleigh scattering resistance	OD>8
Numerical Aperture	0.3
Aperture	7mm

2 Optical Performance

2.1 General spectral performance

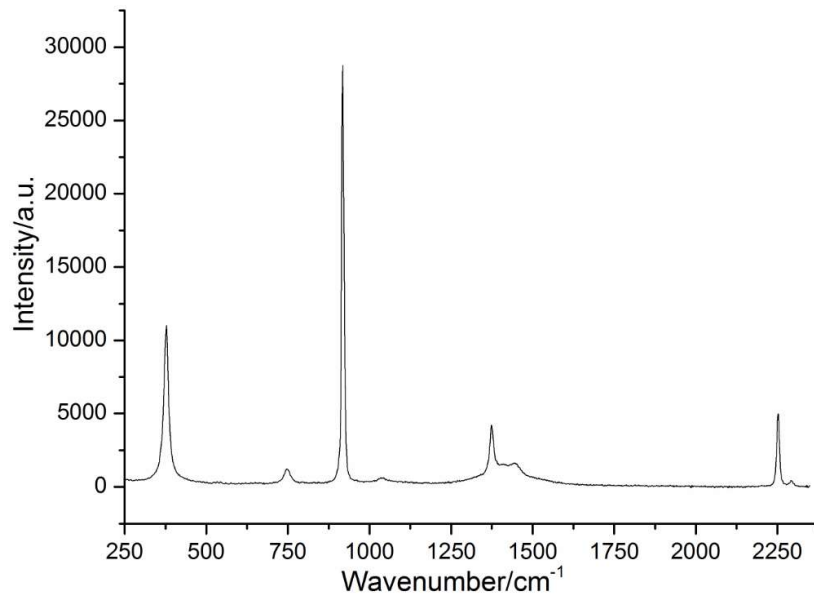


Figure 1 Raman spectra of acetonitrile

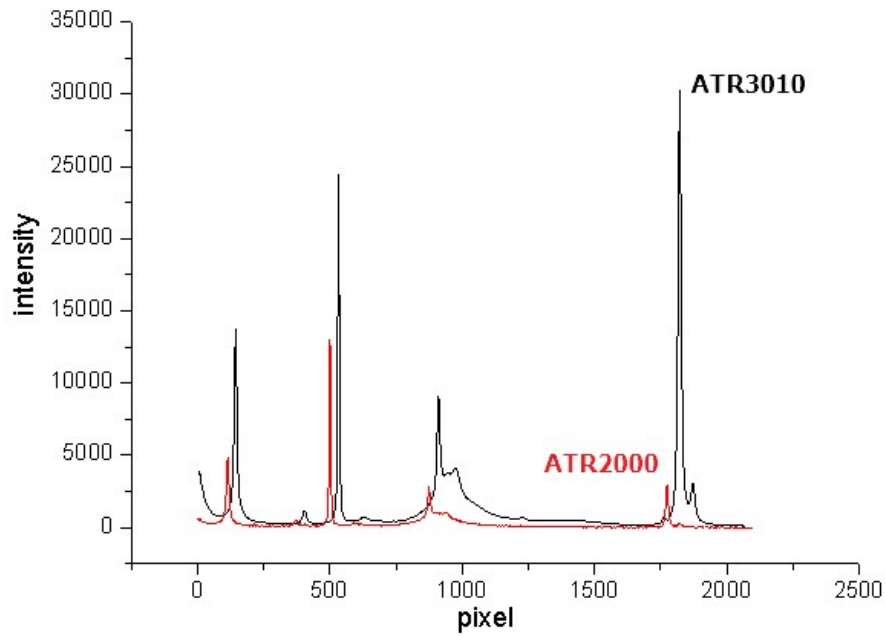


Figure 2 Sensitive of ATR3000 vs ATR2000

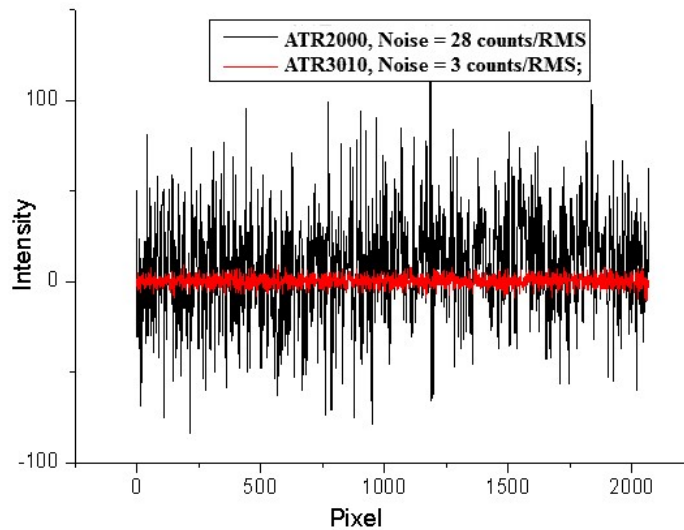


Figure 3 Noise of ATR3000 vs ATR2000

2.2 Spectral Resolution

2.2.1 Raman spectral of Tylenol

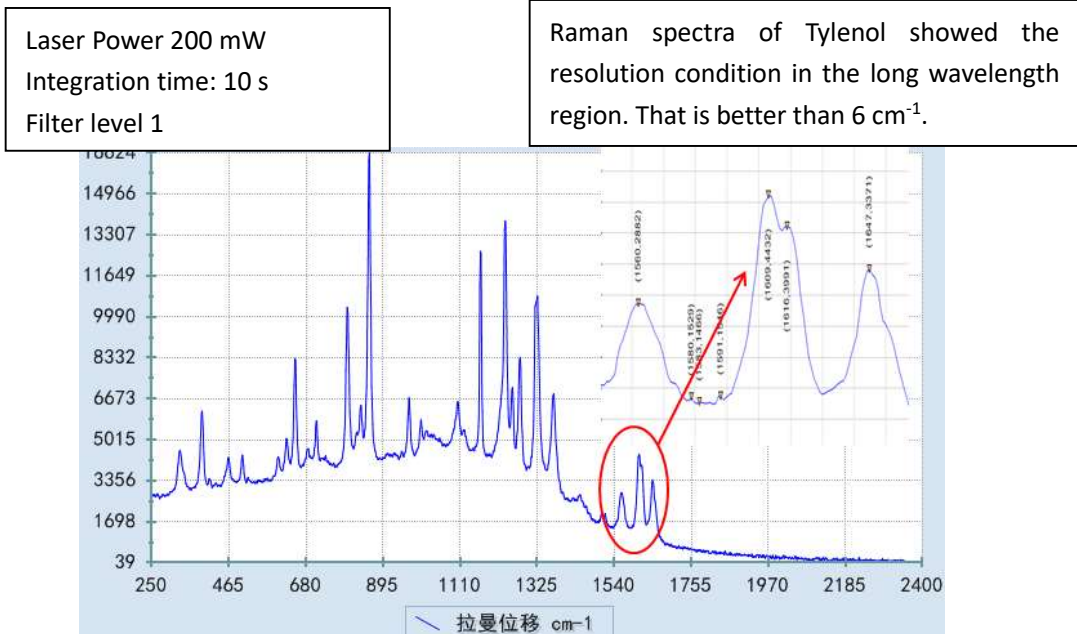
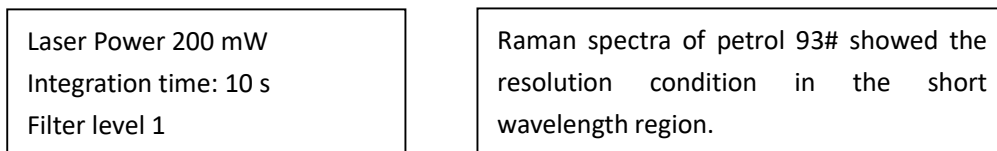


Fig.2.2 Raman spectrum of Tylenol, the vibration mode $1610/1615\text{ cm}^{-1}$ can be resolved.

2.2.2 Raman spectral of petrol



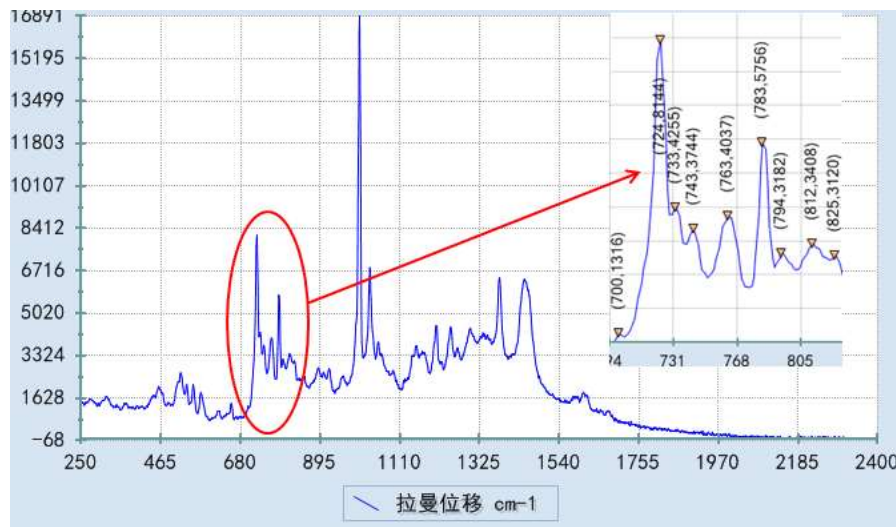


Fig.2.3 Raman spectrum of petrol 93#, the vibration mode 723/732/742cm⁻¹ can be resolved.

3 Reliability

Figure 3.1 and Figure 3.2 showed the temperature reliability testing results of five ATR3000 portable Raman spectrometers. The testing temperature range was from 5 °C to 40 °C. 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).

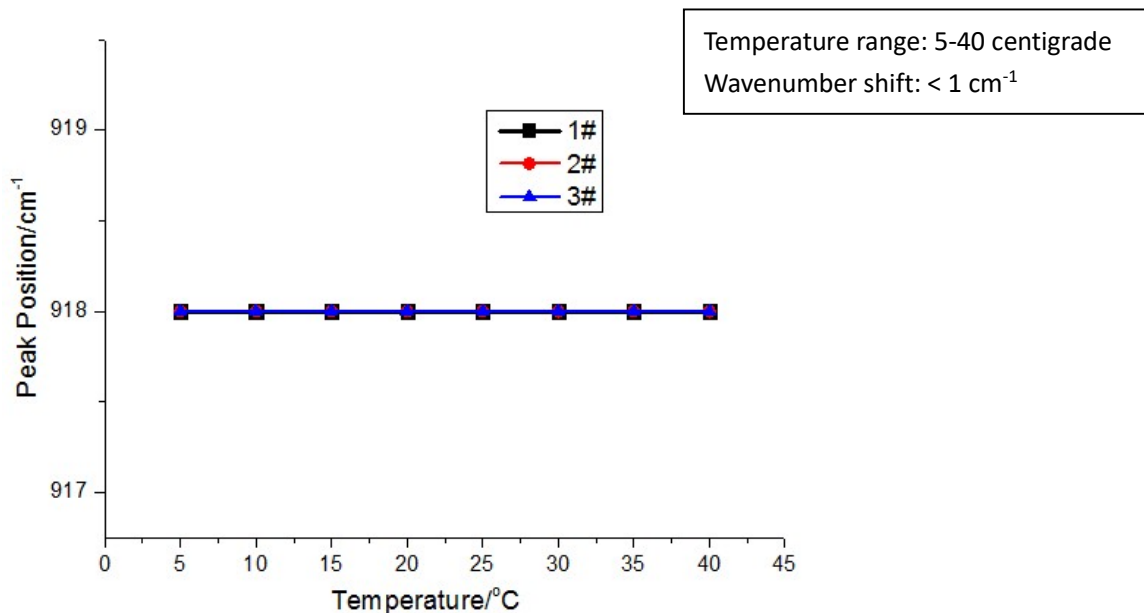


Fig. 3.1 Wavenumber shift results testing from 5 °C to 40 °C of fives ATR3000 portable Raman spectrometers

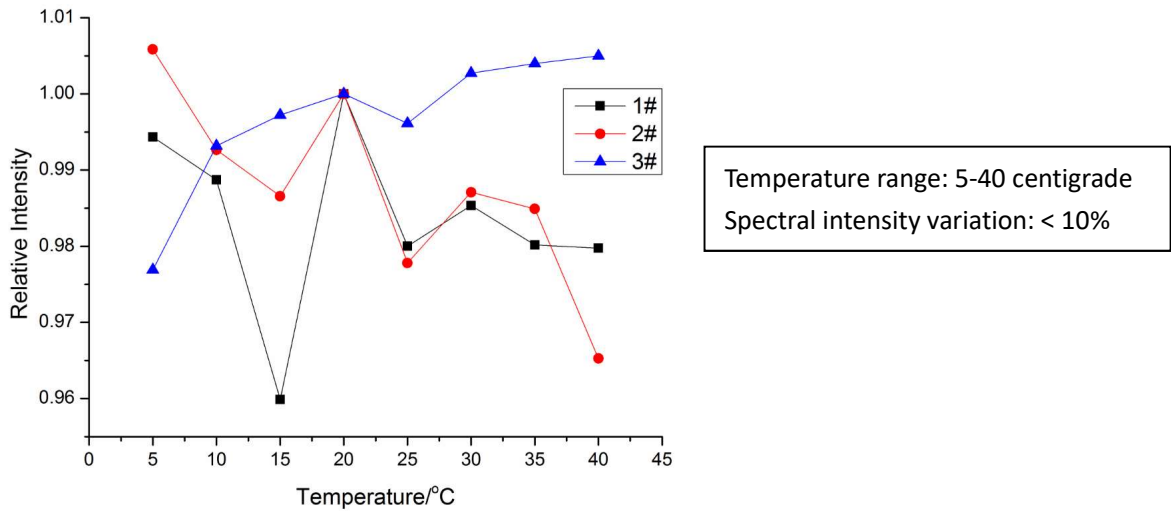


Figure 4 Intensity variation testing from 5 °C to 40 °C of three ATR3000 portable Raman spectrometers

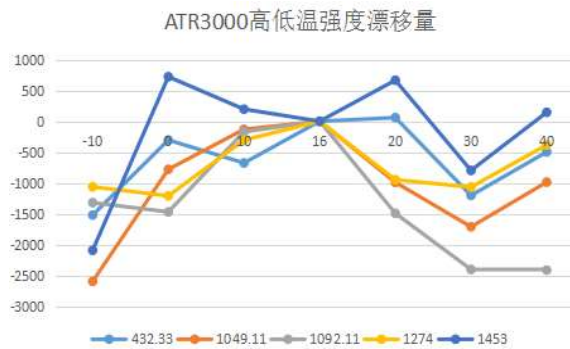


Figure 5 Intensity variation -10 °C to 40 °C of ATR3000 portable Raman spectrometers, sample is alcohol.

2. Measuring accessories



Fig 2 Solid, powder measuring probe

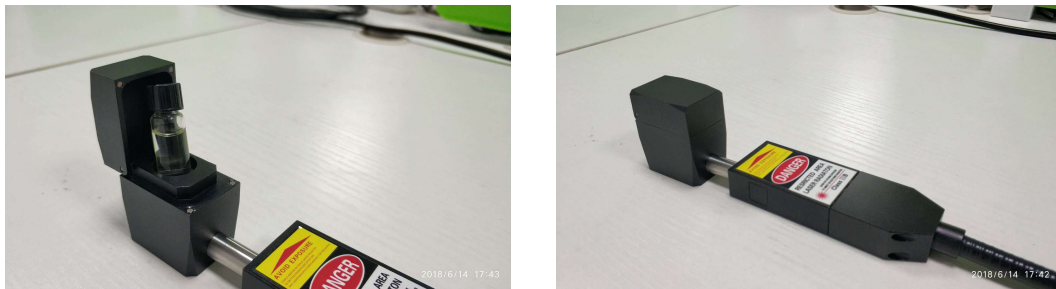


Fig 1 Fluid sample cell (Thermo bottle)



Fig 2 Fluid sample cell (Liquid chromatography bottle) (Optional)



Fig 5 Raman probe gun (optional)



Fig 6 Measuring adjustable holder (Optional)

3. Other excitation wavelength:

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

ITEM No.	Excitation Wavelength (nm)	Maximum laser power (mW)	Spectral range (cm ⁻¹)	resolution (cm ⁻¹)	Feature
ATR31100-27	785	550	250-2700	6	Available for most application
ATR31100-35			200-3500	8	
ATR31100-43			200-4300	10	
ATR3110-1064	1064	500	200-2600	13	Fluorescence-free, non-destructive ,high-sensitivity, high-SNR, Available samples: dark-color samples, fluorescence sample, biology sample, bacteria, plastic, fuel, petroleum product, vegetable oil, explosive etc.
ATR3110-830	830	550	200-3300	7	higher skin permeance suit to biological samples, eg. Non-invasive blood glucose, early cancer diagnosis
ATR3110-266	266	50	200-3000	25	
ATR3110-532	532	100	200-3600	10	
ATR3110-633	633	80	200-3200	10	