



DATASHEET
EOC-SI-R3110TE
High-sensitivity, High-resolution
Portable Raman Spectrometer

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:

EOC-SI-R3110TE Raman Spectrometer is TE-cooled, high-sensitivity, enhanced designed for broadband ranges. Optical path, PCB, signal processing method have all been optimized processed to obtain nearly 100 times higher than 2000cm⁻¹.

EOC-SI-R3110TE employs low noise CCD signal process circuit, noise <3counts.

EOC-SI-R3110TE employs 110/220V power supply, DC supply via 5V adaptor. Easy to take for field operation.

PN	Wavelength (nm)	Wavenumber range cm-1
EOC-SI-R3110TE-473	473	200-4000
EOC-SI-R3110TE-532	532	200-3600
EOC-SI-R3110TE-785-27	785	200-2700
EOC-SI-R3110TE-785-40		200-4300
EOC-SI-R3110TE-830	830	200-4000
EOC-SI-R3110TE-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

EOC-SI-R3110TE System			
Operating system	Windows		
Integration time	6ms-30mins		
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• m slit size	6.5nm	9nm	12nm
SNR	>3000:1 (918 cm^{-1} of Acetonitrile, 10s accumulation, 200mW)		
Sensitivity	3200:1		
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	50000: 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	$\sigma/\mu < \pm 0.2\%$		
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

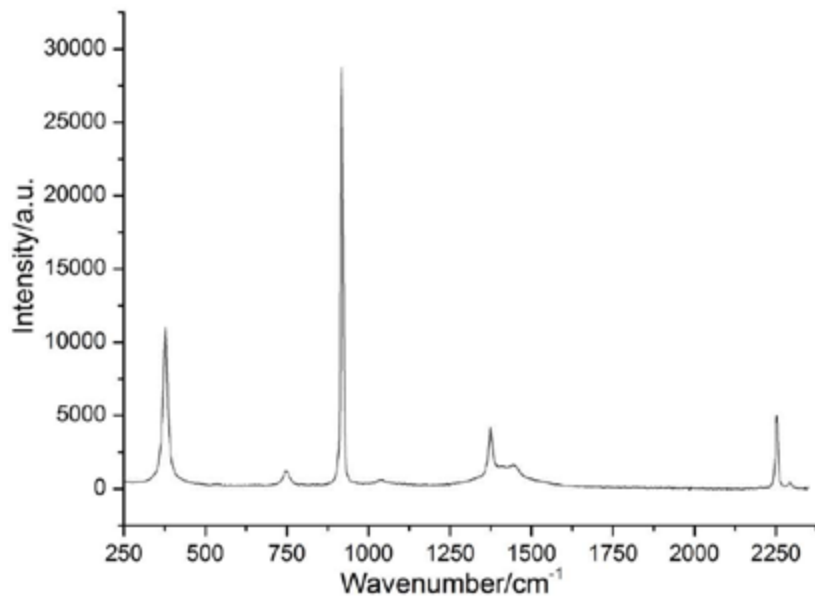


Figure 1 Raman spectra of acetonitrile

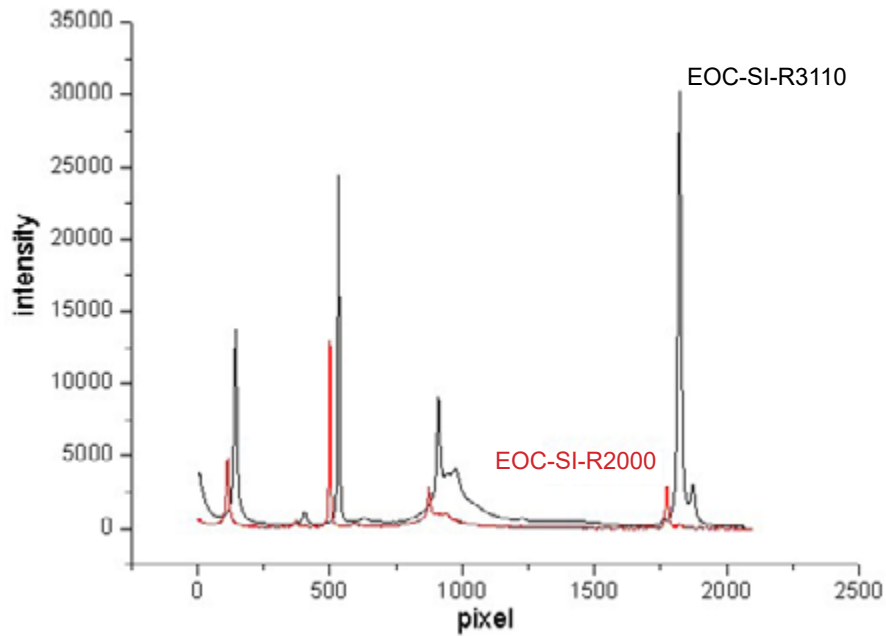


Figure 2 Sensitivity of EOC-SI-R3110 vs EOC-SI-R2000

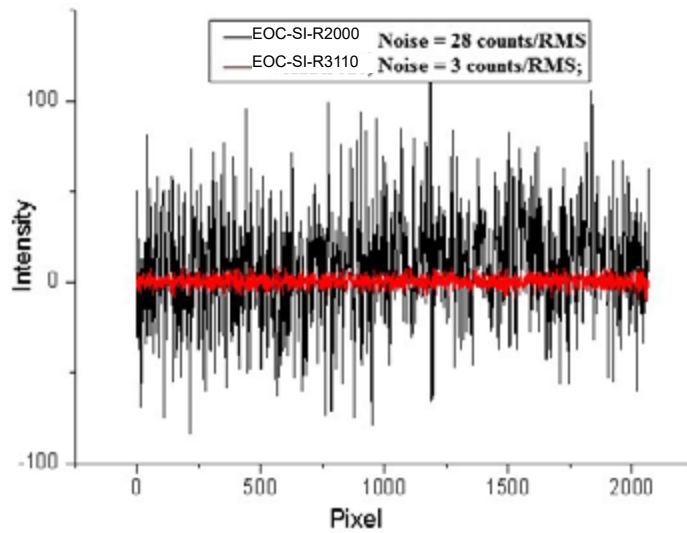


Figure 3 Noise of EOC-SI-R3110 vs EOC-SI-R2000

2.2 Spectral Resolution

2.2.1 Raman spectral of Tylenol

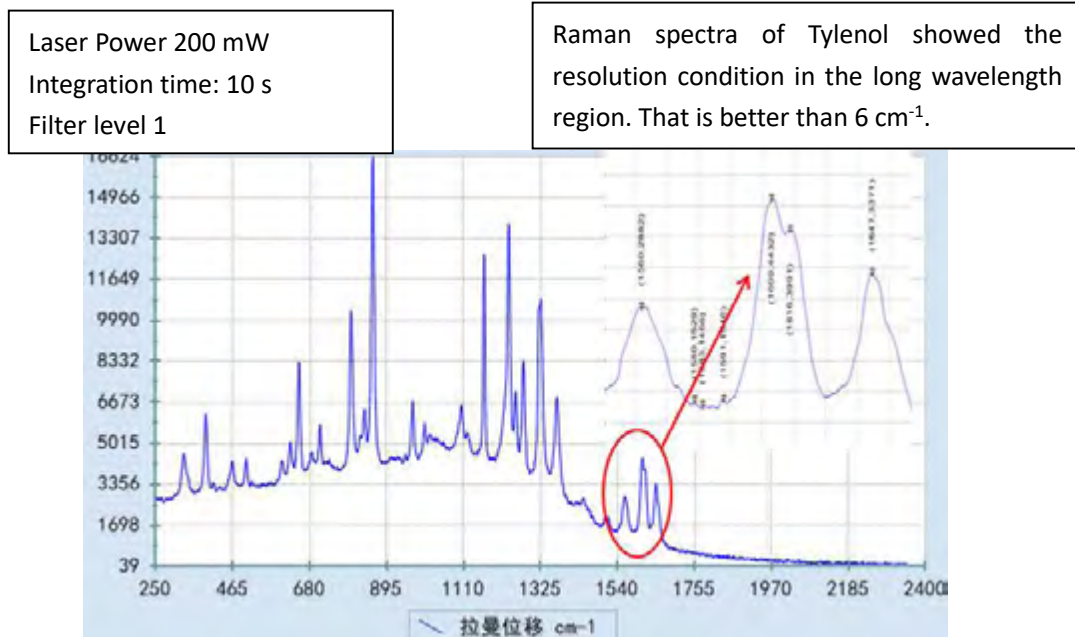
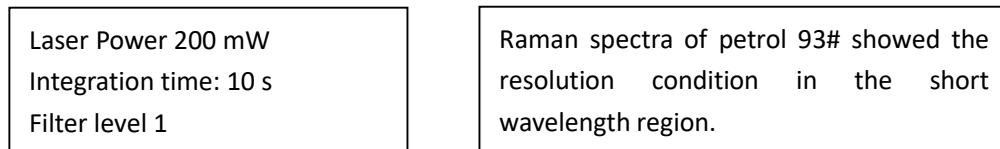


Fig.2.2 Raman spectrum of Tylenol, the vibration mode $1610/1615 \text{ cm}^{-1}$ can be resolved.

2.2.2 Raman spectral of petrol



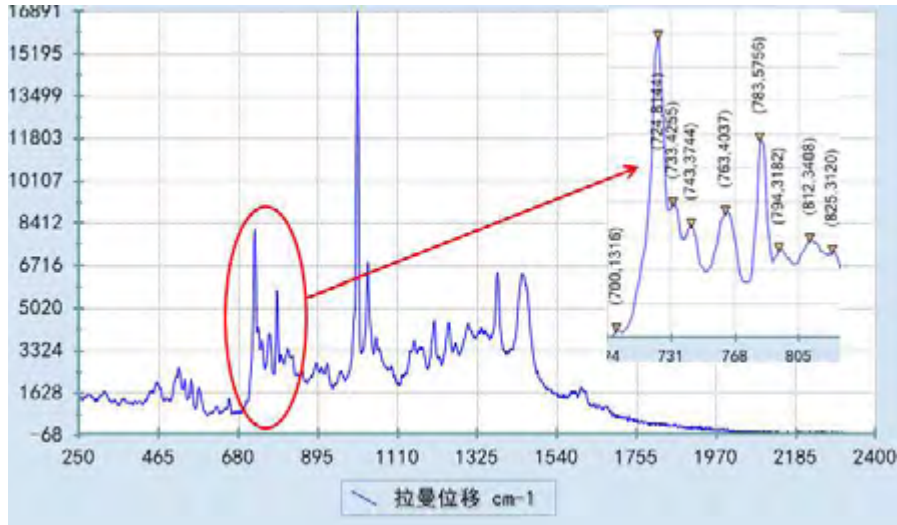


Fig.2.3 Raman spectrum of petrol 93#, the vibration mode $723/732/742\text{cm}^{-1}$ can be resolved.

3 Reliability

Figure 3.1 and Figure 3.2 showed the temperature reliability testing results of fives EOC-SI-R3110 portable Raman spectrometers. The testing temperature range was from $5\text{ }^{\circ}\text{C}$ to $40\text{ }^{\circ}\text{C}$. 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).

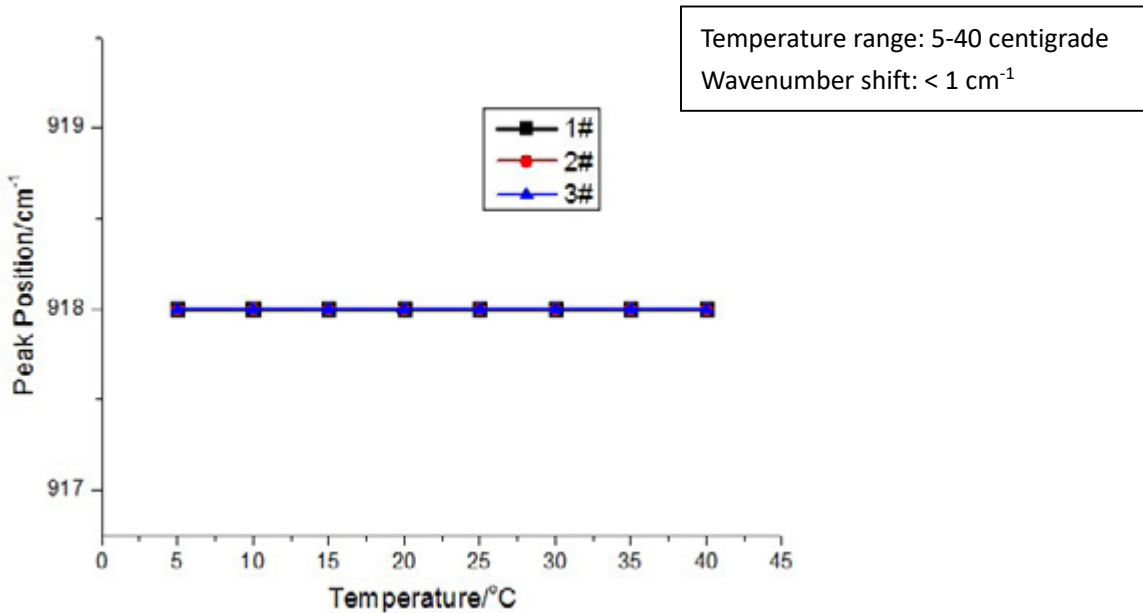


Fig. 3.1 Wavenumber shift results testing from 5 °C to 40 °C of five EOC-SI-R3110 portable Raman spectrometers

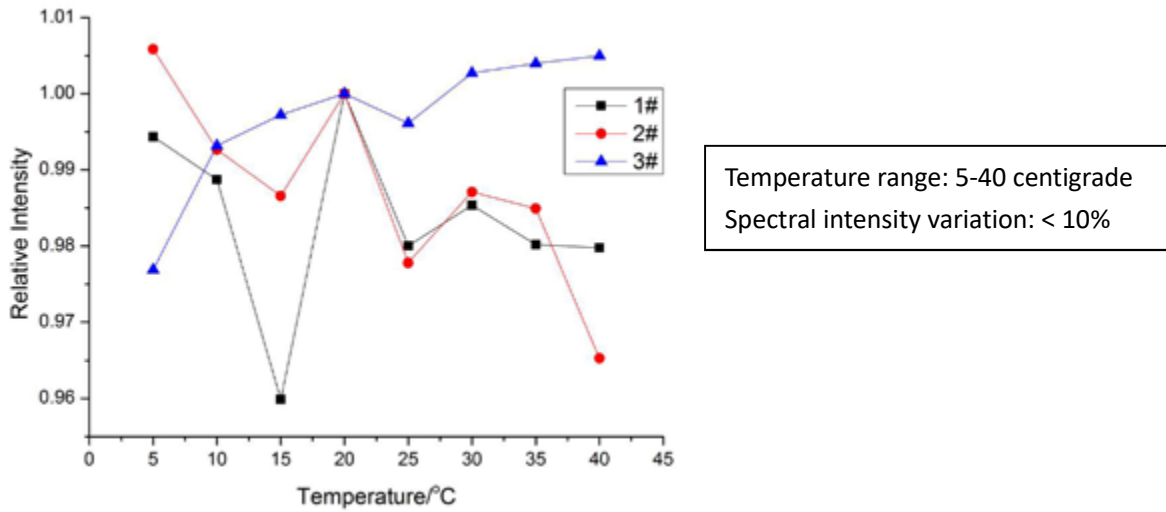


Fig 4 Intensity variation testing from 5 °C to 40 °C of three EOC-SI-R3110 portable Raman spectrometers

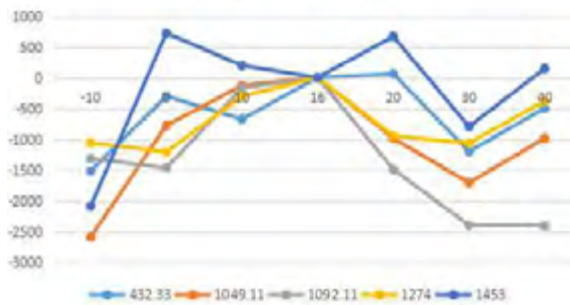


Fig 5 Intensity variation -10 °C to 40 °C of EOC-SI-R3110 portable Raman spectrometers, sample is alcohol.

2. Measuring accessories

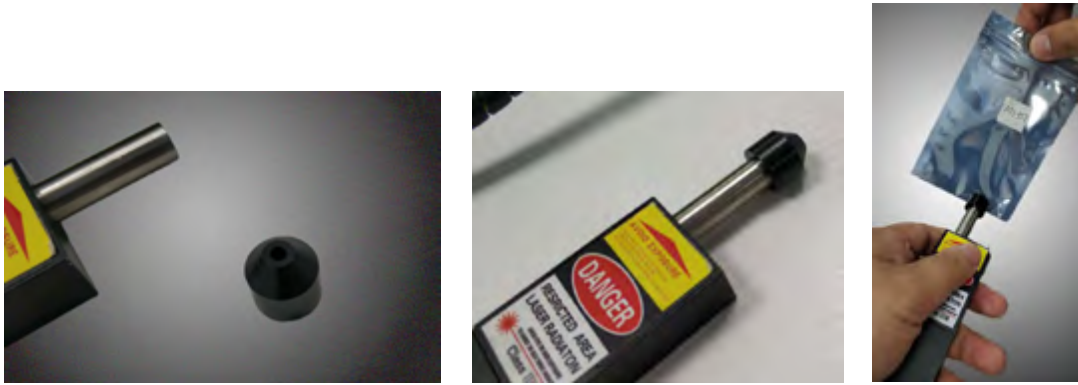


Fig 2 Solid, powder measuring probe



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:

ITEM No.	Excitation Wavelength (nm)	Maximum laser power (mW)	Spectral range (cm ⁻¹)	resolution (cm ⁻¹)	Feature
EOC-SI-R3110TE-27	785	550	200-2700	6	Available for most application
EOC-SI-R3110TE-35			200-3500	8	
EOC-SI-R3110TE-43			200-4300	10	
EOC-SI-R3110TE-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.
EOC-SI-R3110TE-830	830	550	200-3300	7	higher skin permeance suit to biological samples, eg. Non-invasive blood glucose, early cancer diagnosis
EOC-SI-R3110TE-266	266	50	200-3000	25	
EOC-SI-R3110TE-532	532	100	200-3600	10	
EOC-SI-R3110TE-633	633	80	200-3200	10	