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DATASHEET
EOC-SI-R8300P
Raman Microscope (Pro)

Description

EOC-SI-R8300P is a miniature Raman microscope integrating benefits of microscope and Raman spectrometer into one instrument. It becomes possible to see micro areas of samples on the computer screen with just a single mouse click. When the sample is visualized in an accurate position, the observer can scan Raman spectrum under various surface conditions, and synchronous Mapping can be displayed intuitively on the screen in a click. As a result, it takes great convenience to detect micro areas of samples. Combine unique patented conjugate focusing (true confocal) system with accurate image processing algorithm, and it enables a very small sample areas to be analyzed, as well as it requires minimal operator training and maintenance, yet resulting in uniform result not just spectrum.

EOC-SI-R8300P is equipped with tailor-made objective, and laser spot on the sample becomes very close to diffraction limit, then focal information can be displayed in accurate and intuitive on the screen with 3-megapixel/5-megapixel camera. This configuration improves Raman spectral quality for overcoming the limitations of Raman systems where the focal plane for Raman signal collection is slightly above or below the imaging plane.

EOC-SI-R8300P works very stable with no moving components of optical path switch, hence it avoids loss off optical path while imaging being formed, and it gains optimized signal for separating imaging formed from Raman signal collection.

Feature:

- Full-automated, auto-focusing, auto-scan
- Ultra-high resolution 1cm^{-1}.
- Ultra-high sensitivity>6000:1
- True confocal, accurate Raman mapping
- Unique software controlled to switch optical path
- Ultra-high stability
- Excellent performance
- Fast positioning, quick locate focal position
- High quality objective, micro spot
- 3-mega/5-mega pixel camera, crisp clear images
- Excitation wavelength(Optional): 532,633，785,830,1064
- High-performance spectrometer configured
- USB2.0 in direct connect with PC

Application:

- Nano particles and new materials
- Science research Institutions
- Bioscience
- Forensic identification
- Material science
- Medical immunology analysis
- Agriculture and food accreditation
- Gemstones & minerals identification

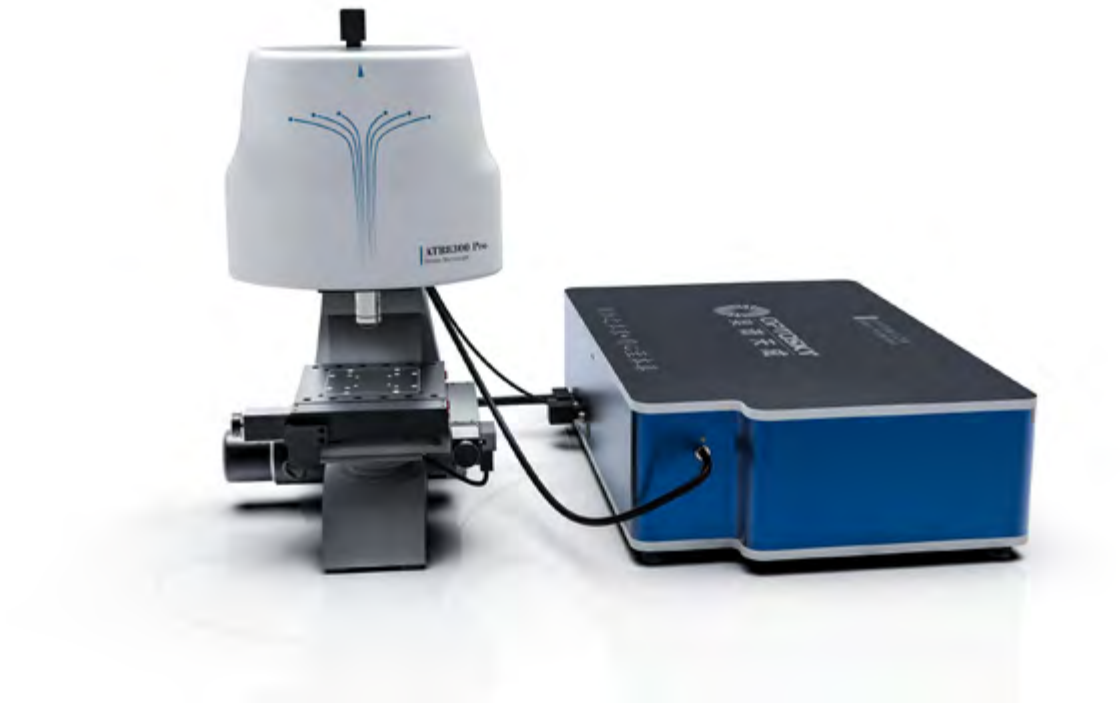


Fig. 1 EOC-SI-R8300Pro Structure indication diagram

Table 1 EOC-SI-R8300 Pro Product Selection

Models	Focus Length	Excitation Wavelength/nm	Excitation Power/mW	Max. Wavenumber Range	Min. Resolution/cm^{-1}
EOC-SI-R8300Pro -FL 210	210mm	532	100	200-3500	2.2
		633/638	80	200-3300	2.2
		785	350	200-3500	2.5
		1064	500	200-2500	6.2
EOC-SI-R8300Pro -FL 350	350mm	532	100	200-3700	1.4
		633/638	80	200-3500	1.4
		785	350	200-3500	2.1
		1064	500	200-2500	5.1
EOC-SI-R8300Pro -FL 510	510mm	532	100	200-3700	0.9
		633/638	80	200-3500	0.9
		785	350	200-3500	1.4
		1064	500	200-2500	3.6
EOC-SI-R8300Pro -FL 760	760mm	532	100	200-3700	0.5
		633/638	80	200-3500	0.5
		785	350	200-3500	1.0

		1064	500	200-2500	2.7
EOC-SI-R8300Pro-LT: Cooled down to -30℃, ultra-long integration time (Max. Time can reach 1.3h). EOC-SI-R8300Pro-SCM: Te-cooled SCMOS detector. EOC-SI-R8300Pro-BS: Basic type. EOC-SI-R8300Pro-AF: Auto-focus. EOC-SI-R8300Pro-MP: Mapping, and auto-focus.					

Naming example:
EOC-SI-R8300Pro-AF-LT-FL350-532+633: auto focus, long integration time, focus length of 350mm, dual excitation wavelength: 532nm and 633nm respectively

EOC-SI-R8300Pro-MP-SCM-FL760-532+633+1064: scanning imaging, SCMOS detector, focus length is 760mm, excitation wavelength is three wavelengths: 532nm, 633nm and 1064nm respectively

1. Specification

EOC-SI-R8300Pro	
Excitation wavelength	Refer to table 1.
Spectral resolution	Refer to table 1.
Spectral range	250-2700, 200-3500, 200-4300 cm-1 （available in customer wavelengths range down to 50 cm-1)
Maximum laser output	500mW (Max. 100mW for 532nm)
Spectral Stability	σ/μ < 0.5%　(COT 8 hours)
Thermal stability	Spectral shift ≤ 1 cm-1 (10-40 ℃)
SN ratio	>6000:1
Detector	TE cooled, semiconductor laser, 2048*64 pixel, back-thinned, IR enhanced CCD InGaAS cooled for 1064nm
wavelength range detected	200nm-1100nm
Pixel size	14 μm * 14 μm
Dynamic range	13000:1
Laser center wavelength	785nm (+/-0.5nm)
Microscope camera	3-megapixel /5-megapixel camera
focusing	True confocal
Laser output	>550mW （software adjustable）
laser spot diameter	>1μm
Laser stability	σ/μ <±0.2%
Laser linewidth	0.08 nm
Connectivity	USB2.0
Electrical controlled X,Y axis 2D platform	

moving range	5 X 5 cm
moving resolution	0.1μm
positioning accuracy	1μm
Scan speed	20mm/s
Z axis（automated focusing）	
focusing accuracy	≤±0.2μm
Max. range	20mm
focusing speed	Less than 10 s

2. Optical performance

2.1 Spectrum

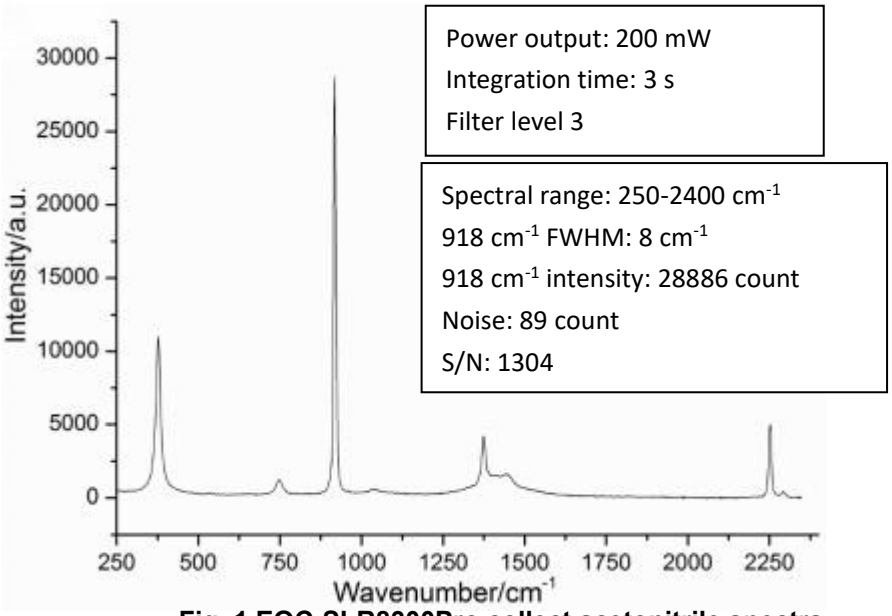
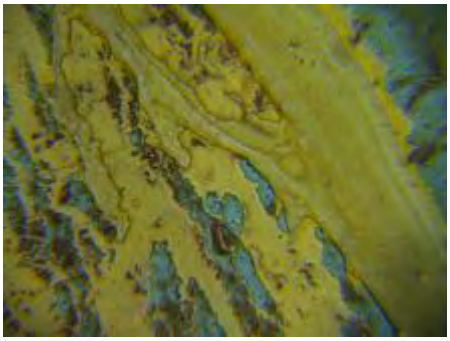
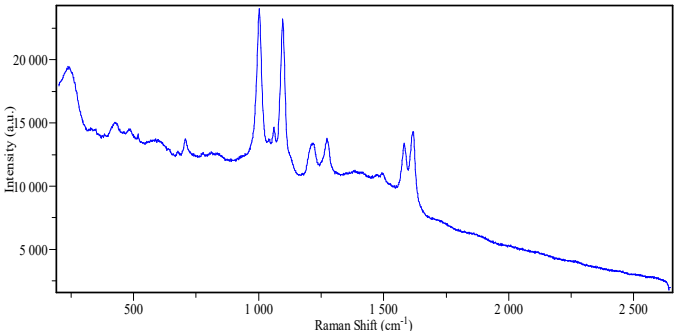


Fig. 1 EOC-SI-R8300Pro collect acetonitrile spectra





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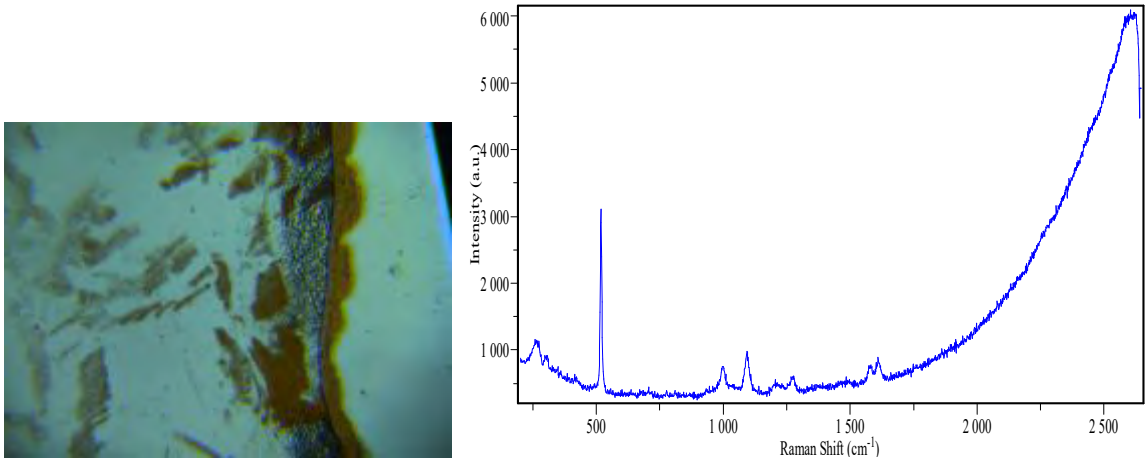

Fig.2 EOC-SI-R8300Pro experiment: Left picture is sample, and right picture is Sers Raman spectra

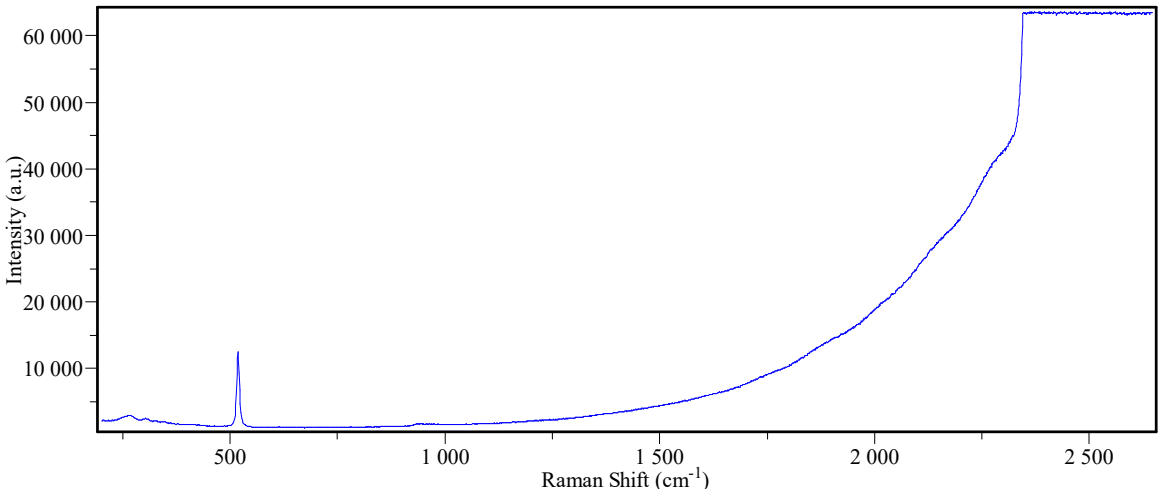

Fig 3 EOC-SI-R8300Pro Measure Si Raman spectra (500mW, integration time: 1S)

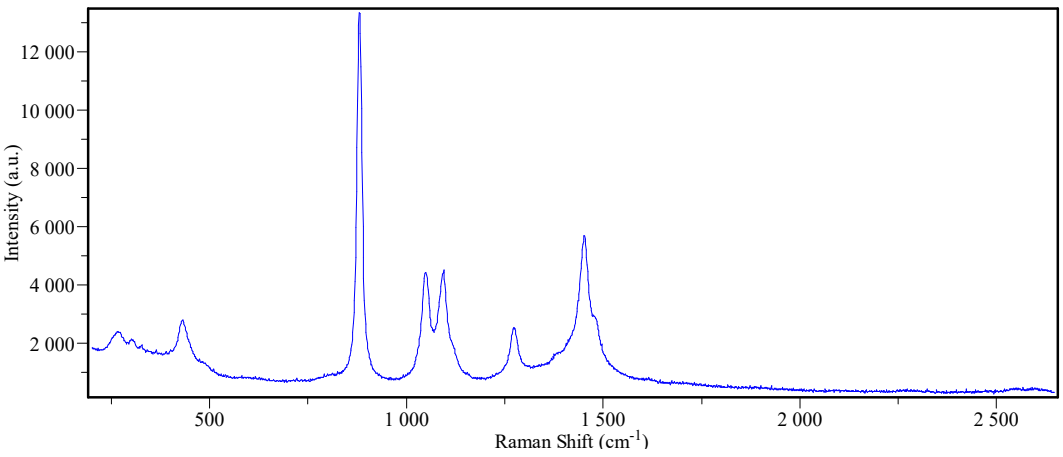

Fig 4 EOC-SI-R8300Pro measure alcohol spectra (500mW, integration time:1S)

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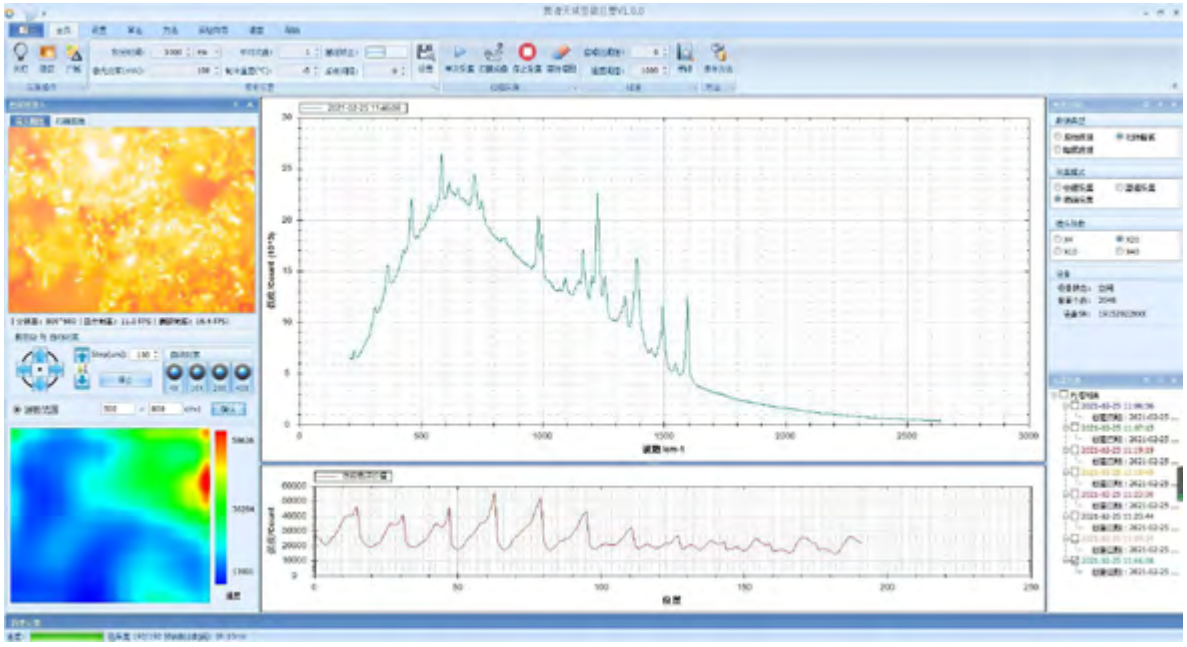

Fig 5 EOC-SI-R8300Pro operation interface

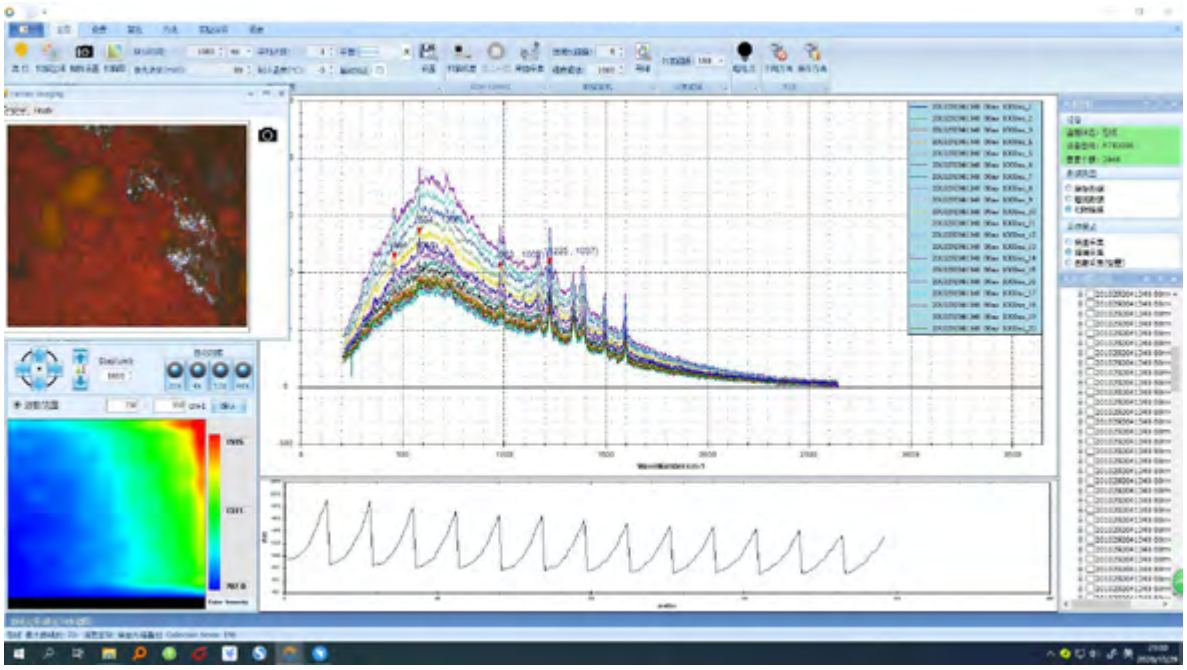

Fig 6 EOC-SI-R8300Pro operation interface

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2.2 Raman resolution

2.2.1Tylenol Raman spectra

Power output: 200 mW
Integration time: 10 s
Filter level 1

Raman spectra of Tylenol showed the resolution condition in the long wavelength region.

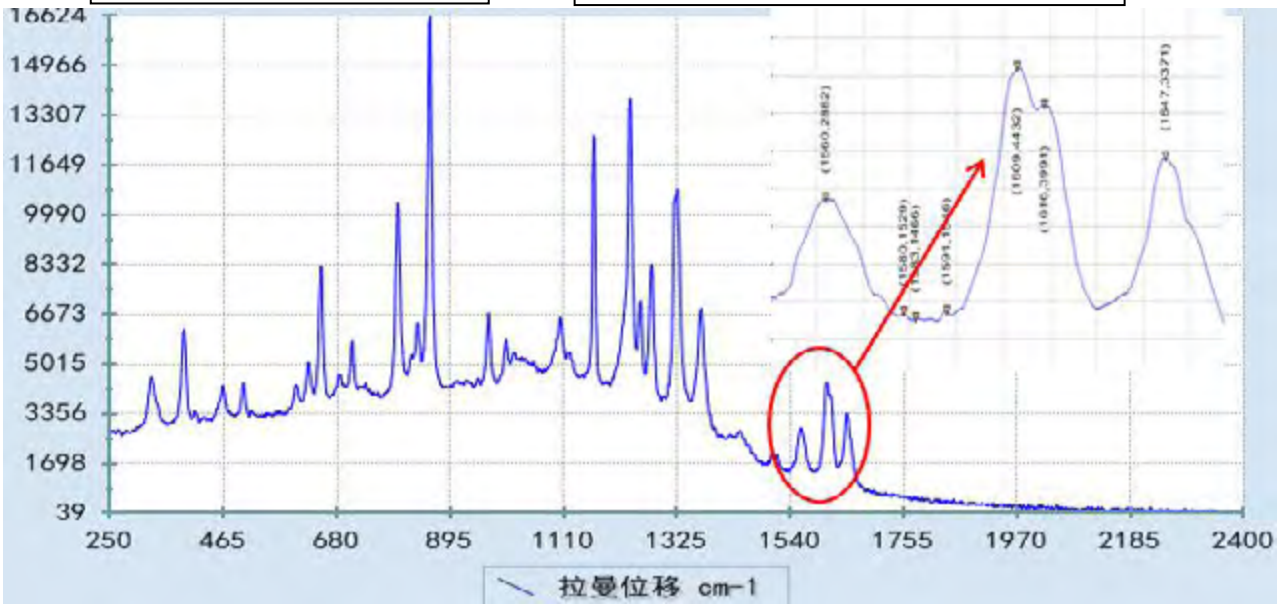

Fig 7 Tylenol spectra shows clear 1610/1615 cm^{-1}vibration peak

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2.2.2 Petrol Raman spectra

Power output: 200 mW Integration time: 10 s Filter level 1	Raman spectra of 93# petrol showed the resolution condition in the long wavelength region.

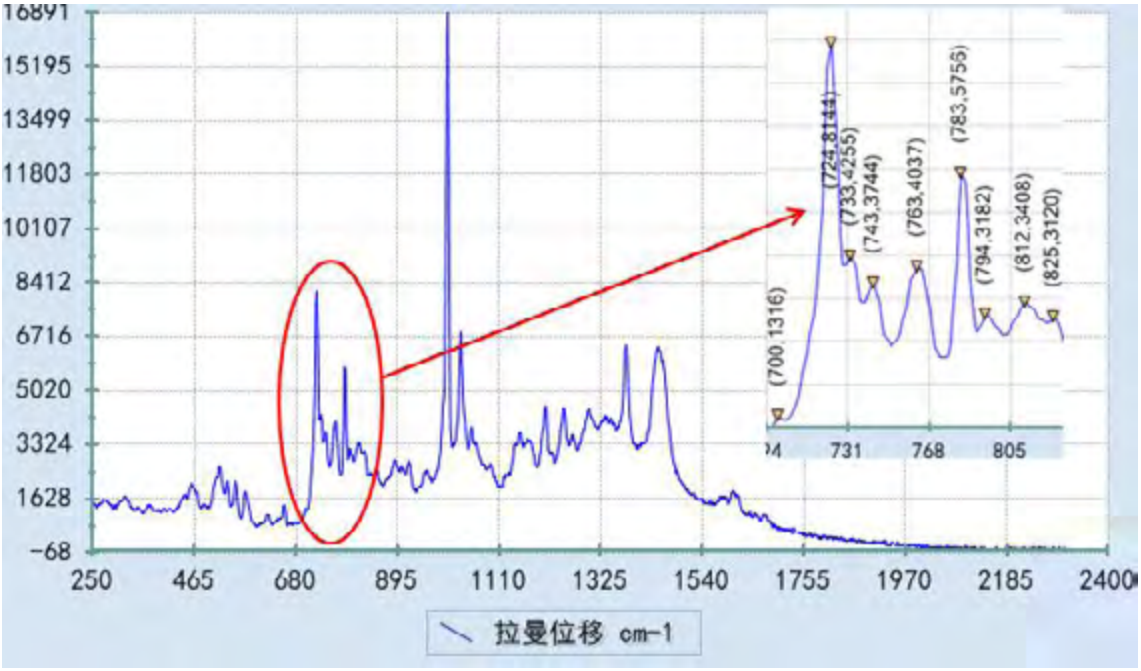

Fig 8 93# petrol Raman spectra, 723/732/742cm^{-1} spectral shift is clearly recognized

3. Reliability

Fig 3.1, Fig 3.2 temperature stability is measured by EOC-SI-R8300, kept stable above an hour for each temperature node ranging between 5-40°C. Sample measured is acetonitrile, wavenumbers shift ≤1cm^{-1}(Fig 3.1), peak top intensity change < 10% (Fig 3.2)

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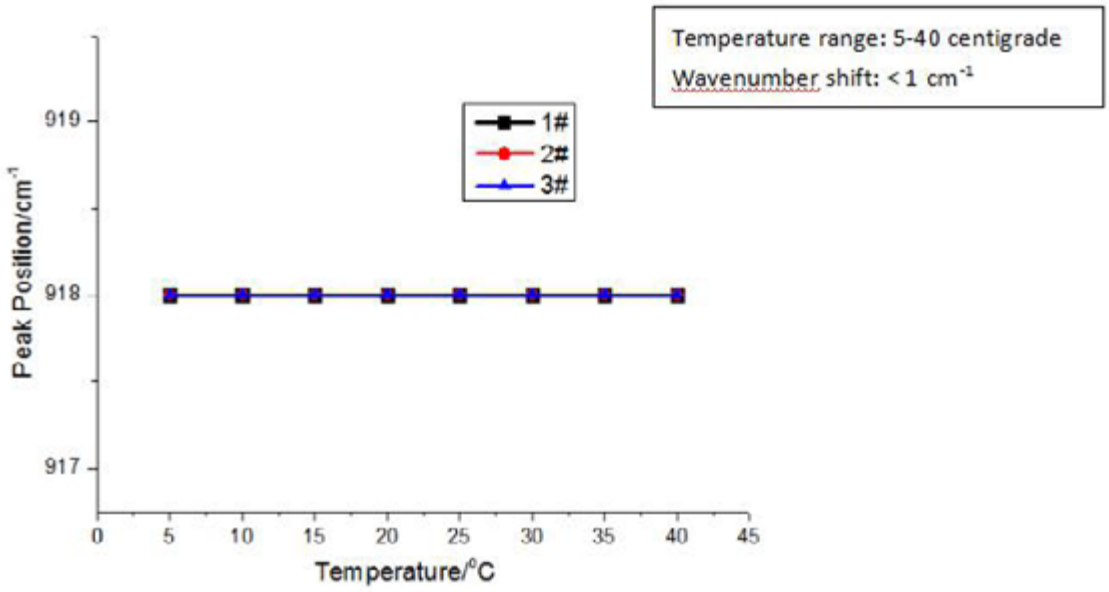

Fig. 3.1 Wavenumber shift results testing from 5 °C to 40 °C of fives ATR2000 portable Raman spectrometers

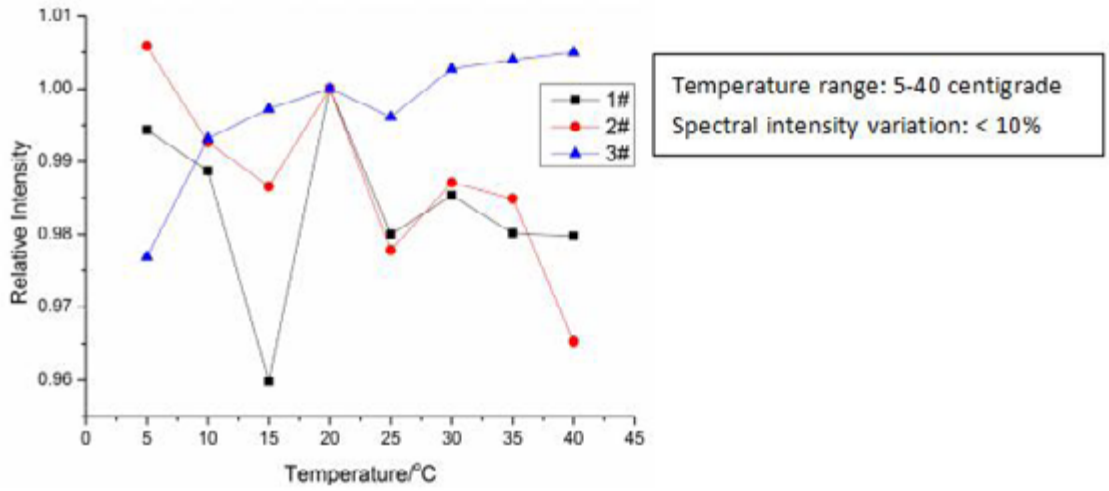

Fig. 3.2 Intensity variation testing from 5 °C to 40 °C of fives ATR2000 portable Raman spectrometers