Optical Spectrum Analyzer

◆ Fiber Optic Spectrometer

Changchun New Industries Optoelectronics Tech. co., Ltd launched fiber optic spectrometer. It includes Aurora4000 series, Sunshine series, Firefly4000 and multi-channel Rainbow series. The system of spectrometer consists of incident slit, collimating mirror, dispersion (grating), focusing optical system and detector. Light is collected through optical fiber into spectrometer slit, spectral information can be read by software. It fits for high-speed reaction monitoring, wide dynamic range and high signal to noise ratio. Fiber optic spectrometer features with compact structure, high resolution and high sensitivity. CNI can also customize the different wavelength range and resolution of the spectrometers according to different customers' demands.


Auraro4000

Sunshine


Firefly 4000


Rainbow

▽ Product Comparison

	Auraro 4000	Sunshine	Firefly 4000	Rainbow
Model	High Resolution	High Sensitivity	Compact Design	Multi-channel
Feature	14 bit A/D resolution	Detection for weak signals	14 bit A/D resolution	wide spectral range and high resolution
Advantages	Up to 0.1nm(FWHM) optical resolution	Up to 80% quantum efficienty	Small appearance, easy to carry	Up to 0.05nm(FWHM) optical resolution
Detector	Toshiba TCD1304DG lineat CCD array	Hamamatsu S 11510	Toshiba TCD1304DG lineat CCD array	/
Wavelength Range	185- 1300 nm			
Pixels	3648 pixels	2048 pixels	3648 pixels	3648 pixels
Pixel Size	8um x 200um	14um x 14um	8um x 200um	8um x 200um
Entrance aperture	5, 10, 25, 50, 100 or 200			
Optical Resolution	<0.75 nm	<0.87 nm	<1.0 nm	<0.75 nm
Dimensions	149 x 105 x 46mm	149 x 109 x 50mm	89 x 63.9 x 36.2 mm	364.1*147.1*300mm
Weight	840g	1000g	170g	/
Signal-to-noise ratio	~300:1	~450:1	~300:1	~300:1
Integration Time	4ms-10s	17ms-10s	4ms-10s	4ms-10s
Tigger mode	Internal / ecternal control			
Fiber optic connector	SMA905 TO 0.22 numerical aperture single-strand fiber			

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Product Introduction

High Resolution Spectrometer - Auraro 4000

Aurora 4000 Spectrometer with 3648 pixels CCD linear array detector is developed by Changchun New Industries Optoelectronics Tech. Co., Ltd. Its spectral range is from 200 nm to 1100 nm. It is with high spectral response and high resolution, the resolution up to 0.02 nm (FWHM) particularly. Aurora 4000 fits for high-speed reaction monitoring and high-resolution application.

The system includes incident slit, collimating mirror, dispersion (grating), focusing optical system and detector. Light is collected through optical fiber into spectrometer slit, spectral information can be read by software.

Available Model

Model	Spectral range
Aurora 4000 General Series	GE 350-1100nm
	GE 200-1100nm
	GE Raman
NEW Auraro-UV-Pro	185nm-240nm
NEW Auraro-IR-Pro	950nm-1200nm
Aurora 4000 External Triggering series	TG 350-1100nm
	TG 200-1100nm

	Wavelength	Optrical resolution (nm)				
		Entrance aperture (um)				
		10	25	50	100	200
Aurora 4000	200-1100nm	0.75	1.09	1.83	3.45	6.61
	350-1100nm	0.75	1.09	1.83	3.45	6.61
	300-515nm	0.15	1.09	1.83	3.45	6.61
	400-837nm	0.44	0.53	0.89	1.68	3.21
	785-1100nm	0.35	0.38	0.64	1.21	2.31

Wavelength Customizable Spectrometer

Model	Eentrance aperture	Spectral range	Optical resolution (nm)
Aurora 4000	10 um	200-347nm	0.14
		319-455nm	0.13
		400-480nm	0.08
		480-568nm	0.12
		568-634nm	0.09
		654-754nm	0.10
		794-876nm	0.24
		940-1100nm	0.20

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➢ High Sensitivity Spectrometer - Sunshine

Sunshine spectrometer is with 2048 pixels back-thinned 2D FFT-CCD detector, up to 80% quantized efficiency, wide dynamic range, high signal to noise ratio, low noise and other advantages for various applications.

Sunshine spectrometer is with high-sensitivity. Meanwhile, it can be used as integrated modules .Excellent optical design so that it has a high luminous flux and sensitivity. It is ideal for detection of weak signals.

✧ Available Model

Model	Spectral range
Sunshine General Series	GE 200-1100nm
	GE 350-1100nm
	GE-Raman 532-700nm
	GE-Raman 785-1100nm
NEW Sunshine-UV-Pro	185-240nm
NEW Sunshine-IR-Pro	1000-1300nm
Sunshine External Triggering series	TG 200-1100 nm
	TG-Raman 532-700nm
	TG-Raman 785-1100nm

	Wavelength	Optrical resolution (nm)				
		Entrance aperture (um)				
		10	25	50	100	200
Sunshine	200-1100nm	0.87	1.09	1.84	3.51	6.72
	350-1100nm	0.87	1.09	1.84	3.51	6.72
	300-515nm	0.20	0.26	0.44	0.83	1.60
	400-837nm	0.42	0.53	0.89	1.70	3.26
	785-1100nm	0.30	0.38	0.64	1.23	2.35

➢ Compact Spectrometer - Firefly 4000

Firefly 4000 miniature spectrometer with 3648 pixels linear CCD array detector is developed by Changchun New Industries Optoelectronics Tech. Co. ,Ltd. Its spectral range is 200-1000 nm. Its compact appearance fits for a variety of integrated systems and easy to operate.

The system includes incident slit, collimating mirror, dispersion (grating), focusing optical system and detector. Light is collected through optical fiber into spectrometer slit, spectral information can be read by software.

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✧ Available Model

Model	Spectral range
Firefly General Series	GE 350-1100nm
	GE 230-530nm
	GE 200-850nm

	Wavelength	Optrical resolution (nm)				
		Entrance aperture (um)				
		10	25	50	100	200
Firefly	200-1100nm	0.87	1.09	1.84	3.51	6.72
	350-1100nm	0.87	1.09	1.84	3.51	6.72
	300-515nm	0.20	0.26	0.44	0.83	1.60
	400-837nm	0.42	0.53	0.89	1.70	3.26
	785-1100nm	0.30	0.38	0.64	1.23	2.35

➢ Multi-channel Spectrometer

CNI developed Rainbow series Multi-channel spectrometer .The advantages of this spectrometer are wide measurement wavelength range and high resolution. It has capabilities of multi-channel synchronous control and acquisition delay control and it also supports external signal trigger and internal trigger acquisition. They are widely used in high resolution detection of wide wavelength range. CNI can also customize the different channels of the spectrometers according to different customers' demands.

✧ Available Model

2 channels (Spectral range 250-650 nm)					
Wavelength range	250-450nm			450-650nm	
Resolution (nm)	0.16			0.18	
3 channels (Spectral range 250-645 nm)					
Wavelength range	250-340nm		340-420nm		420-645nm
Resolution (nm)	0.12		0.1		0.18
4 channels (Spectral range 250-1050 nm)					
Wavelength range	250-450nm	450-650nm		650-850nm	850-1050nm
Resolution (nm)	0.16	0.18		0.2	0.2
5 channels (Spectral range 249-443 nm)					
Wavelength range	249-284nm	284-333nm	333-404nm	364-404nm	404-443nm
Resolution (nm)	0.05	0.05	0.08	0.08	0.08

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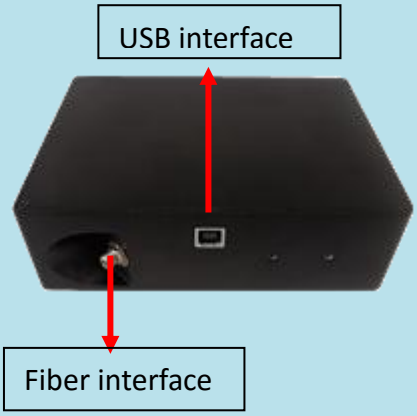
Operating Instruction

Auraro 4000/ Sunshine / Firefly 4000 series

Internal control



1. Install the spectrometer software, the spectrometer driver software (select the right driver according to the number of bits of your computer operating system) .

2.Connect the light source to the spectrometer through the optical fiber interface.

3. Connect the spectrometer to your computer via a USB cable. Active the software and then you can start to test spectrum.

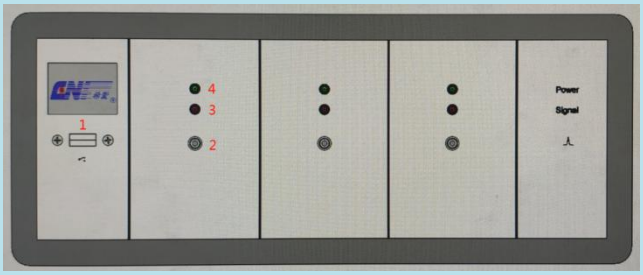
External control

1. Connect both ends of the connecting line to the spectrometer and the external trigger box. Connect both ends of the data line to the USB interface of the computer and the spectrometer, as shown in the picture.

2. Connect the power supply interface with the power cord.Next, connect the power cord to the 220VAC and turn on the power switch. The green power indicator on the external trigger box panel will light up.

3. Connect the spectrometer to your computer via a USB cable. Active the software and then you can start to test spectrum.

Multi-channel series



The front panel of the spectrometer includes:

1. USB interface
2. Optical fiber interface
3. Power indicator
4. Signal indicator

The back panel of the spectrometer includes:

1. Power cord interface
2. Main power switch of power supply
3. Input signal interface
4. Output signal interface

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Accessories

HLS-1000 Halogen TungstLight Source

TG Series External Trigger Box

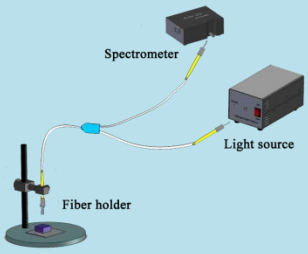
4 Way Cuvette Holder

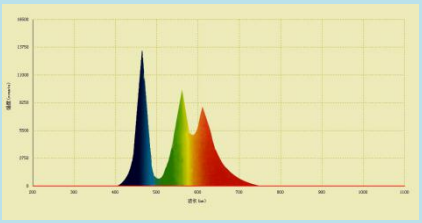
Optical Signal Collector

Fiber

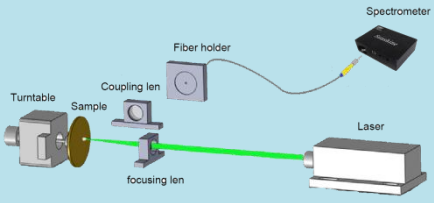
Application Device

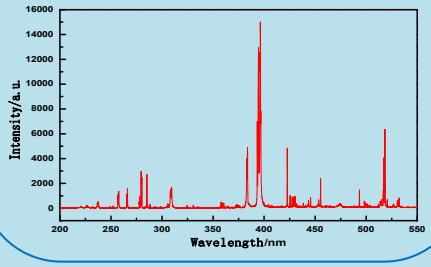
Reflectivity measurement experiment device



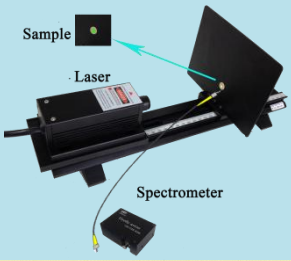


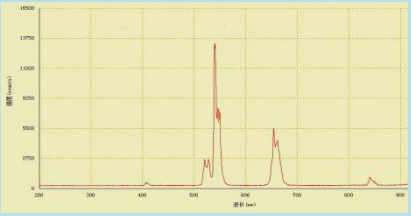
LIBS experiment device



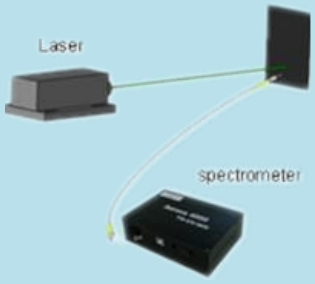


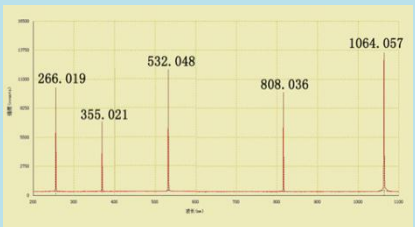
Fluorescence spectrum of rare earth elements experiment device



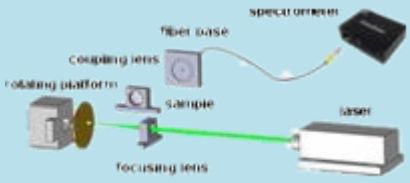


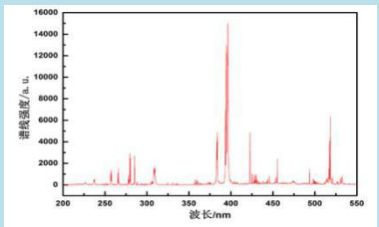
Laser Spectrum



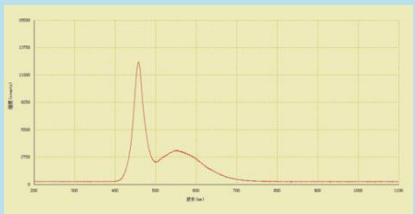


Reflection Chroma Testing





LED Spectrum



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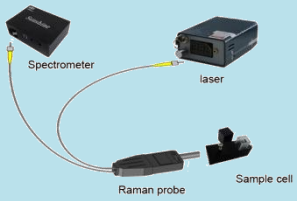
System Solution

Raman Spectral Analysis

Raman spectrometer is high-sensitivity back-thinned 2D FFT-CCD detector equipped with a excitation and stable frequency laser, and with the whole curing optical design for the Raman probe. Meanwhile, with high resolution, sensitivity and other advantages, it fits for various applications.

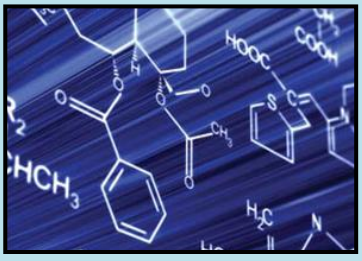
Raman spectral analysis software is developed by Changchun New Industries Optoelectronics Tech. co., Ltd. We can make qualitative analysis for sample , with collecting Raman spectrum and comparing with database via software analysis. Meanwhile, it has a strong self-built library functions, user-friendly interface and easy operation process.

Picture	Model	Features
	Combined Raman Spectrum System	Fast connection, flexible operation. Wavelength is optional according to customer's actual requirements.
	Portable Raman Spectrometer	Simple measurement and easy operation, external power supply, vehicle-mounted charger; Dustproof, waterproof, anti-vibration, anti-glare interference
	Desktop Raman Spectrum System	Build-in narrow line width laser - power adjustable, high sensitivity spectrometer - used for weak signal detection.
	Micro Raman Spectrum Measurement System	It combines micro system and Raman system which greatly facilitates the Raman micro area detection.

Application Area

- **Raman spectral analysis**
- **Environmental sciences**
- **Diamond identification**
- **Judicial identification**
- **Pharmaceutical and medical diagnosis**
- **Geological exploration**

Pharmaceutical and medical diagnosis



Chemical or biological research

Judicial identification

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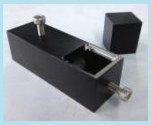
Accessories

Raman probe



Sample cell foothold

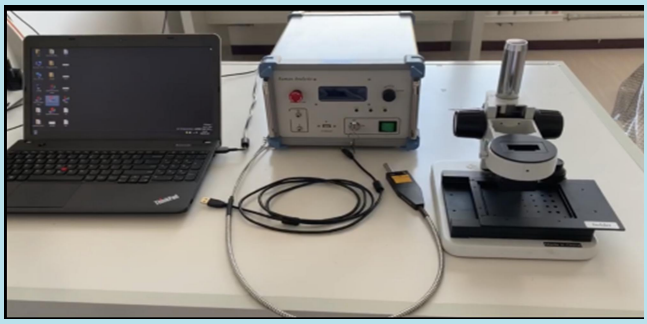
Liquid sample cell

Raman probe holder

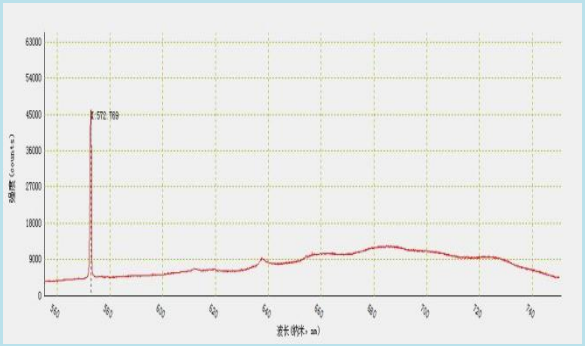
Laser goggles

Operation Demo

532nm exciting Raman spectrum to identify



Raman spectrometer device



Raman spectrum

System composition :

The whole system is composed with Ramansystem-532，associated microscopy mounts，Raman cuvette

Testing method :

1. Connect computer and Raman system, open the spectrometer software, then adjust the integral time up to 1000ms and deduct dark current of spectrometer.

2. Turn on the power supply for the Ramansystem, take out the Raman probe and turn it on, after the laser emits, then put it inside the microscopy mounts.

3. Put the diamond inside the Raman Cuvette and adjust knob to make sure the laser focus points to the diamond(please take googles under this operation). At this time, you can get diamond spectrum under normal temperature, please refer to spectrum figure.

This method can identify different kinds synthetic diamond. According to different synthetic method, different spectrum will be got.

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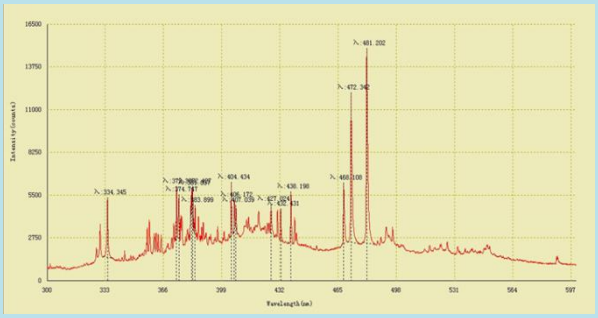
Laser Induced Plasma Spectrometer (LIBS)

Laser induced breakdown spectroscopy (LIBS), by using plasma generated by pulse laser to ablate and excite the substances (usually is solid) in samples, and using spectrometer to obtain the emission spectrum which comes from the atoms excited by the plasma, in order to identify the element components of the samples, and then conduct the element identification, the recognization, classification, qualitative and quantitative analysis of the materials.

CNI launched laser induced plasma spectrometer, assembled with stable and reliable laser, high resolution spectrometer, rapid and accurate software analysis, is the most practical analytical instrument in the use of laboratory and industrial field.

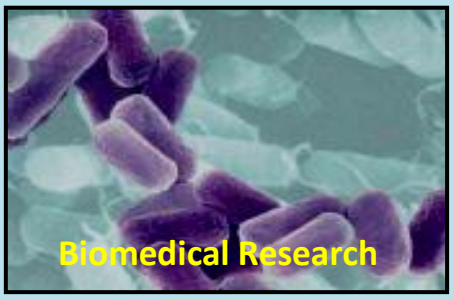
Laser induced plasma spectrometer device



laser induced plasma spectrum

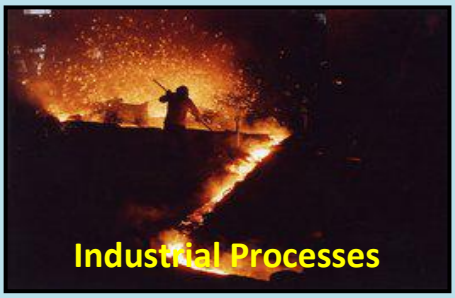
Application Area

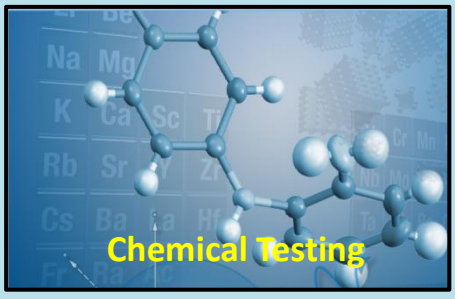
Soil
Water
Air
Heavy metal



lithiasis
Teeth, bones
The tumor
herbs

Iron and steel smelting
Molten steel
alloy



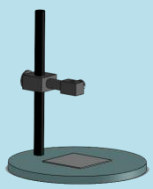


Metal
ore
plastic
glass

Accessories

Coupling system

Remote control system



Fiber holder

Fiber

Laser goggles

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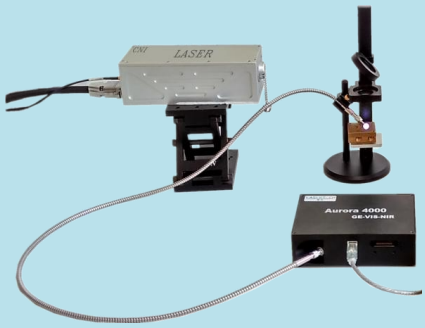
➢ Operation Demo

✧ 1064nm LIBS system excites the stainless steel sample



System composition :

The whole system is composed with pulsed laser, Auraro 4000 spectrometer, focusing lens, samples, swivel table, coupling lens, fiber holder, fiber.

Testing method :

1. Connect computer and Aurora 4000 spectrometer, open the LIBS software.

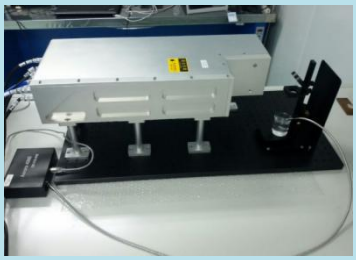
2. Connect one end of the fiber to the spectrometer and place the other end on the fiber holder.

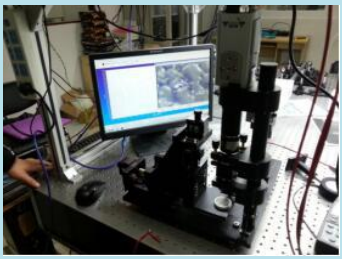
3. Turn on the power supply for the pulse laser. And put the sample on the sample table.

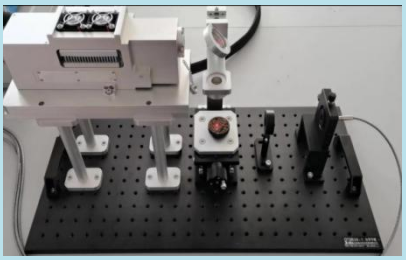
4.Adjust the position of the focusing lens so that the laser beam is irradiated on the sample steadily.

5. Adjust the position of the fiber holder to better receive the excited plasma

➢ Application cases from customers







Description：

1. CNI delivered the LIBS system to the institute's customer to measure sodium in water.
2. Jilin university uses the LIBS system built by CNI to measure the elements in solid samples.
3. The LIBS system provided by CNI to customers in Singapore is used to measure elements in the soil

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