

For Any Technical Questions, Please Contact at info@nodesus.com

Product Name: Lumina Series Atomic Fluorescence Spectrometer

Part Number:

Product Description:

Lumina Series Atomic Fluorescence Spectrometer(LUMINA3400/LUMINA3500):



LUMINA3400 Atomic fluorescence spectrometer



LUMINA3500 Atomic fluorescence spectrometer

The LUMINA 3400 and 3500 Atomic Fluorescence Spectrometers provide an all-encompassing solution for the trace detection of hydride-forming elements. The determination of mercury, arsenic, cadmium, zinc, bismuth, strontium, tellurium, antimony, tin, germanium, and lead can be detected at as low as ppt levels of concentration, enabled by instrument features that provide unprecedented sensitivity and high signal-to-noise ratios. It is an ideal choice for elemental analysis in many fields, including environmental, agricultural, geological, metallurgy, pharmaceutical and clinical, and petroleum industry samples.

Application Scope

Environment (Hg, Pb, Cd, As)

- √Waste water
- √Drinking water
- √Soil

Agriculture/Food Safety (As, Hg, Pb, Sb, Se)

- √Dairy products, meat and alcohol
- √Feed and animal by-products
- √Tobacco

Petrochemical (Hg, Pb, As, Cd, Sn, Zn)

- √Fuel, lubricant, crude oil

Metallurgy (Ge, Hg, Se, As in Sb, Te in Cu)

- √Rocks and ores
- √Steel and alloys
- √Metal scrap

Clinical Medicine (Se, Pb, Hg, As)

- √Blood, urine
- √Tissue, nails, hair

Pharmaceutical (Hg, Pb, As, Se)

- √Active Components
- √Excipients and fillers

Standards and certification

- √Compliance with RoHS and WEEE standards
- √Passed ISO 9001 and CE certification

EPA method 245.7

Determination of mercury in water

EPA method 7474

Determination of Mercury in Precipitates

EPA method 1631

Determination of Mercury in Water by Cold Atomic Fluorescence Spectrometry

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Features:

Product Features

Continous Flow or Sequential Quantitative Injection

Sample introduction is performed via continuous flow (LUMINA 3500) or sequential quantitative injection (LUMINA 3400). Continuous flow reduces signal drifting and liquid phase interference, greatly increasing signal-to-noise ratio. Sequential quantitative injection reduces the consumption of sample and reagents, eliminates signal drifting, improves detection limits, and enables online dilution.

Hydride Generator (VG)

Aurora's unique vapor hydride generator further enhances sensitivity, reduces interference, and obtains ultra low detection limits for the determination of sub-trace levels of mercury and other hydride-forming elements.

Revolutionary Gas/Liquid Separator

The high efficiency flow-through design and dual stage gas/liquid separator optimizes the separation of hydride and mercury cold vapor. Pressure fluctuations are minimized, enhancing measurement precision. XYZ

Autosampler (optional)

Aurora's extensive experience in robotics is behind the most advanced autosampler on the market. This universal XYZ autosampler can be positioned in three-dimensional space as required. Freedom of movement in all directions allows the AFS to accommodate any number of and type of sample containers.

Closed Optical Design

The shield optic design greatly reduces light interference and enhances the signal-to-noise ratio, thereby increasing the sensitivity and precision of the measurement. This short focus, non-dispersive, and closed optic system intensifies the fluorescence S/N ratio. The high quantum efficiency solar blind photomultiplier tube provides additional detection sensitivity.

Dual Channel Simultaneous Analysis

Specially designed high-intensity hollow cathode lamps with independent power supplies allows for selection between simultaneous analyses of two elements or independent analysis of a single element, greatly increasing the efficiency of measurements while decreasing sample consumption.

Integrated Exhaust System

The built-in exhaust system effectively displaces waste gas/vapor into the external environment through a ventilation pipe, eliminating the need to invest in expensive lab ventilation systems.

Software Features

The schematic software is intuitive and allows for easy operation and data acquisition. Features include:

- √ Total parameter control for timing optimization
- √ Single or dual channel selection, with real-time display of fluorescence intensity for both channels.
- √ LIMS-compatible reporting formats

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Product Specification:

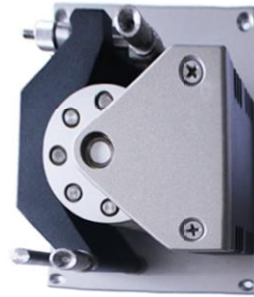
Sample Atomization	
Atomizer	Double-layer quartz tube atomization furnace, automatic ignition of argon- hydrogen flame, effectively reducing interference
Carrier/Shield Gas	argon
Sample preparation and introduction	
Hydride Generator	High Efficiency Reaction Mixer and Secondary Gas-liquid Separation Device
Peristaltic Pump	LUMINA3500:6-channel peristaltic pump with two pressure-adjustable clamps and software speed regulation
Injection Pump	LUMINA3400:Sequential injection. Two injection pumps deal with samples and reductants respectively. The experimental samples are injected quantitatively and the working curves are automatically generated by on-line dilution. The on-line dilution of high concentration samples can be realized
Exhaust System	Built-in exhaust filtration system to eliminate pollution
Optical System	
Optical Design	Short Focal Length, Non-Dispersive, Integrated Closed Optical Design
Two-channels	Simultaneous or sequential determination of 2 elements by computer-controlled pulse light
Light Source	high-intensity hollow cathode lamp , 2 independent power , sensitivity , lower detection limit.
Detector	High Quantum Efficiency, Solar Blind Photomultiplier Tube (PMT)
Linear Range	More than three orders of magnitude
General-Purpose XYZ 3D Autosampler	
Sample Introduction	High Sample Capacity, Automatic Standard Sample and Sample Import
Handling Capacity	It is suitable for all kinds of test tubes, universal test tube stand, 180 samples,
Elemental Detection Limit (ng/L, under ideal conditions)	
AS,Se,Pb,Bi,Sb,Te,Sn	10ppt
Hg,Cd	1ppt
Zn	1000ppt
Ge	50ppt

LUMINA 3400 & 3500



LUMINA 3400 sample syringe, fully automated

LUMINA 3400 flow injection sampling system features a double injection pump for sample and reducing agent addition.



LUMINA 3500 Peristaltic pump

LUMINA 3500 continuous flow injection system features a 6-channel peristaltic pump and a high-efficiency reaction mixer, with external positioning of the peristaltic pump providing ease of manual disassembly.

Instrument Features

- ✓ Continuous flow or sequential injection (depending on type)
- ✓ Continuous flow helps to reduce signal drift and liquid phase interference
- ✓ Sequential injection reduces sample consumption whilst selimiting signal drift and improving detection
- ✓ Unique multi-layer reaction mixing module to achieve multiple gas/liquid separations
- ✓ Dual-channel with 4-amp holder design, independent supply of high-strength power supply
- ✓ Fully enclosed optical system to reduce interference
- ✓ Quartz atomizer with low temperature automatic ignition



Atomizer interior



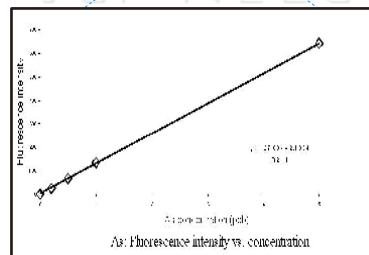
Lamp holder and closed light path

Performance Analysis

- ✓ RSD of 10 ppb As is less than 1%
- ✓ Dual-channel independent measurement reduces inter-channel interference
- ✓ Linear range greater than 3 orders of magnitude
- ✓ Element detection limit reaches ppt level
- ✓ Sampling accuracy increased by the automatic production of a standard curve from a single sample via online dilution



Dual-channel simultaneous analysis



Automatic working curve generation from a single sample

Our integrated HPLC-AFS can be applied to diverse fields like food, health, epidemic prevention, commercial inspection, agriculture, drug testing, and for scientific research. Our HPLC-AFS couples the speciation ability of HPLC with the quantifying and detection power afforded by AFS, with detection limits as low as parts-per-trillion (ppt) for certain elements.

The toxicity of arsenic (As) and mercury (Hg) depends heavily on their existing forms. For arsenic, inorganic arsenic is more toxic than organic arsenic; for mercury (Hg), inorganic mercury is less toxic than organic mercury. Traditional methods only check the total amount of arsenic or mercury. In food detection, this method can not fully explain the degree of food contamination. By utilizing HPLC-AFS, different morphological compounds containing the same elements can be separated and digestions before introduction into the AFS. Finally, the content of various morphological compounds can be detected by atomic fluorescence spectrometry, providing deeper insights than total element content alone.



Qualitative and Quantitative Detection

- √ Inorganic mercury (Hg₂₊)
- √ Methylmercury (MetHg)
- √ Ethylmercury (EtHg)
- √ Phenylmercury (PhHg)

Selenium Speciation

Qualitative and quantitative detection:

- √ Selenocystine (SeCys)
- √ Selenium methyl selenocysteine (SeMeCys)
- √ Selenomethionine (SeMet)

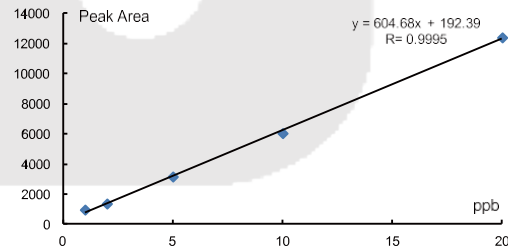
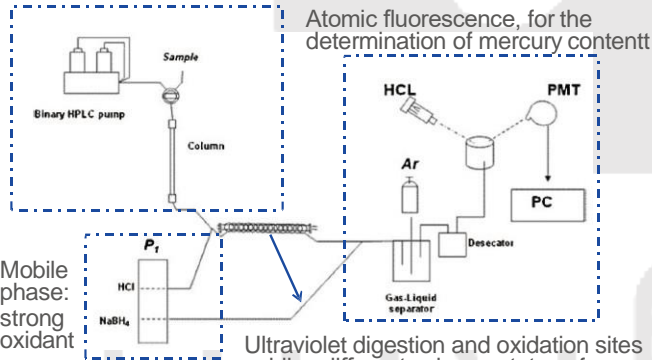
Arsenic speciation

Qualitative and quantitative detection:

- √ Arsenate [As(V)]
- √ Arsenite [As(III)]
- √ Monomethyl arsenic acid [MMA(A)]
- √ Dimethyl arsenic acid [DMA(V)]

HPLC-AFS Design & Performance

Within the HPLC liquid phase, mercury-containing compounds are separated

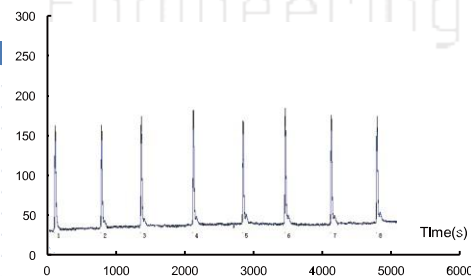


Hg solution standard curve

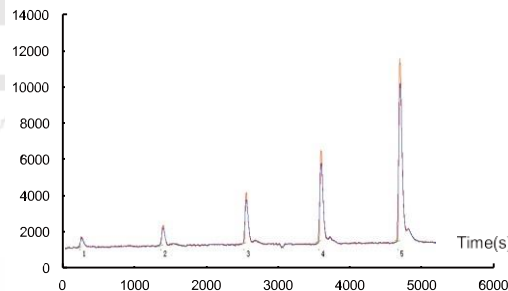
Repeated results of 5 ppb Hg

sample	PeakArea
1	998
2	1011
3	1056
4	1082
5	1062
6	1078
7	1068
8	1059

Standard deviation: 30.69
Ave. peak area: 1052
RSD(%): 2.92%



Repeatability test spectra of 5 ppb Hg solution



Test spectra of standard sequence concentration of Hg solution

Standard curve of Hg solution, standard sequence concentration: 1 ppb, 2 ppb, 5 ppb, 10 ppb, 20 ppb. The results of curve fitting for each peak area are as follows: $y = 604.68x + 192.39$, $R = 0.9995$.

Testing the repeatability of 5 ppb Hg solution: 8 independent injections, calculating the peak area of each sample. The resulting RSD is 2.9%, which is lower than the required standard RSD of < 5%.