

AAS-210, Atomic Absorption Spectrophotometer



Features:

Innovated rich oxygen air-acetylene flame analysis technique:

The patented flame analysis technique adopting rich oxygen air-acetylene flame as the substitution for nitrous oxide-acetylene flame for high temperature element analyses, such as Ca, Al, Ba, W, Mo, Ti, V, etc. Flame temperature is continuously adjustable between 2300–2950°C, which makes it possible to choose the best atomization temperature for different elements. It features easy operation, low analysis cost and wide flame AAS analytical range. Rich oxygen flame will not pollute the environment and is not harmful to human bodies. It's a breakthrough in flame AAS analysis.

Integrated flame/graphite furnace atomization system, changeable with flame emission burner:

- Automatically controlled changeover of the integrated flame and graphite furnace atomizer featuring easy operation and time saving eliminates human labor.
- A flame emission burner head can be installed to perform flame emission analysis to alkali metals as K, Na etc.

Accurate fully automated control system:

- Automatic 6-lamp turret, automatic adjustment of lamp current and optimization of light beam position.
- Automatic wavelength scanning and peak picking.
- Automatic spectral bandwidth changing.
- Automatic changeover between flame and graphite furnace operation, automatic optimization of position parameters, automatic ignition and automatic gas flow setting.

Reliable fully automatic graphite furnace analysis:

- Adopting FUZZY-PID and dual curve mode light-controlled temperature control technique, temperature auto-correction technique, ensures fast heating, good temp. reproducibility & high analytical sensitivity. The temperature control accuracy is less than 1%.
- Graphite furnace with pneumatic control and pressure lock ensures constant pressure and reliable contact.

- Multi-function autosampler features automatic standard sample preparation, automatic correction of sampling probe depth, automatic tracing and correction of liquid surface height in the sample vessel, with the sampling accuracy of 1% and reproducibility of 0.3%, realizing fully automation of graphite furnace analysis.

Perfect safety protection measures:

- Alarm and automatic protection to fuel gas leakage, abnormal flow, insufficient air pressure and abnormal flame extinction in flame system.
- Alarm and protection function to insufficient carrier gas and protective gas pressure, insufficient cooling water supply and over-heating in graphite furnace system.

Advanced and reliable electronic design:

- Adopting large-scale programmable logic array and Inter I2C bus technology.
- European type sockets and AMP adapters with high reliability to ensure long term reliability of the whole electronic system.

Easy and practical analysis software:

- Easy-to-use MS analysis software is made under Windows operating system, realizing fast parameter setting and optimization.
- Automatic sample dilution, automatic curve fitting, automatic sensitivity correction.
- Automatic calculation of sample concentration (content), mean value, standard deviation and relative standard deviation calculation.
- Multi-elements determination in sequence to the same sample.
- Measured data and final results can be printed out and edited in Excel format.

Comparison:

Characteristic Mass of Some Elements using rich oxygen air-C₂H₂ flame and other flame methods

Element	Wavelength (nm)	Rich oxygen air-C ₂ H ₂ flame	N ₂ O-C ₂ H ₂ flame	Air-C ₂ H ₂ flame
Ca	422.7	0.009	0.05	0.07
Yb	378.8	0.037	0.08	7.6
Eu	459.4	0.137	0.3	3.0
Al	309.3	0.4	0.7	
Sr	460.7	0.016	0.1	0.15
Sa	553.5	0.1	0.4	10.0
Mo	313.3	0.15	0.4	0.8
W	255.1	3.2	5.0	
Ga	287.4	0.4	1.0	1.3
Sm	429.7	2.92	8.5	
La	550.1	37.2	35.0	
Sn	224.6	0.8	3.0	50

SPECIFICATIONS		
Main Specification	Wavelength range	190–900nm
	Wavelength accuracy	Better than $\pm 0.25\text{nm}$
	Resolution	Two spectral lines of Mn at 279.5nm and 279.8nm can be separated with the spectral bandwidth of 0.2nm and valley-peak energy ratio less than 30%.
	Baseline stability	0.004A/30min
	Background correction	The D2 lamp background correction capability at 1A is better than 30 times. The S-H background correction capability at 1.8A is better than 30 times.
Light Source System	Lamp turret	Motorized 6-lamp turret (Two high performance HCLs can be mounted on the turret to increase the sensitivity in flame analysis.)
	Lamp current adjustment	Wide pulse current: 0~25mA, Narrow pulse current: 0~10mA.
	Lamp power supply mode	400Hz square wave pulse; 100Hz narrow square wave pulse + 400Hz wide square wave pulse.
Optical System	Monochromator	Single beam, Czerny-Turner design grating monochromator
	Grating	1800 l/mm
	Focal length	277mm
	Blazed wavelength	250nm
	Spectral bandwidth	0.1 nm, 0.2nm, 0.4nm, 1.2nm, auto switch over
Flame Atomizer	Burner	10cm single slot all-titanium burner
	Spray chamber	Corrosion resistant all-plastic spray chamber.
	Nebulizer	High efficiency glass nebulizer with metal sleeve. sucking up rate: 6–7mL/min
	Emission burner provided	
Graphite Furnace	Temperature range	Room temperature–3000°C
	Heating rate	2000°C/s
	Graphite tube dimensions	28mm (L) x 8mm (OD)
	Characteristic mass	$\text{Cd} \leq 0.8 \times 10^{-12}\text{g}$, $\text{Cu} \leq 5 \times 10^{-12}\text{g}$, $\text{Mo} \leq 1 \times 10^{-11}\text{g}$
	Precision	$\text{Cd} \leq 3\%$, $\text{Cu} \leq 3\%$, $\text{Mo} \leq 4\%$
Detection and Data Processing System	Detector	R928 photomultiplier with high sensitivity and wide spectral range.
	Software	Under Windows operating system
	Analytical method	Working curve auto-fitting; standard addition method; automatic sensitivity correction; automatic calculation of concentration and content.
	Repeat times	1~99 times. automatic calculation of mean value, standard deviation and relative standard deviation
	Multi-task function	Sequential determination of multi-elements in the same sample.
	Condition reading	With model function
	Result printing	Measurement data and final analytical report printout, editing with Excel.
	Standard RS-232 serial port communication	
Graphite Furnace Autosampler	Sample tray capacity	55 sample vessels and 5 reagent vessels
	Vessel material	Polypropylene
	Vessel volume	3ml for sample vessel. 20ml for reagent vessel
	Minimum sampling volume	1 μl
	Repeatable sampling times	1~99 times
	Sampling system	Accurate dual pump system. with 100 μl and 1 ml injectors.
Characteristic Concentration and Detection Limit	Air-C ₂ H ₂ flame Rich oxygen Air-C ₂ H ₂ flame	Cu: Characteristic concentration $\leq 0.025 \text{ mg/L}$, Detection limit $\leq 0.006 \text{ mg/L}$; Ba: Characteristic concentration $\leq 0.22 \text{ mg/L}$ Al: Characteristic concentration $\leq 0.4 \text{ mg/L}$
Function Expansion	Hydridee vapor generator can be connected for Hydridee analysis.	
Dimensions and Weight	Main unit	107X49X58cm, 140kg
	Graphite furnace	42X42X46cm, 65kg
	Autosampler	40X29X29cm, 15kg

How to choose yours AAS configuration:

Model	O2-enriched flame*1	Flame emission	The number of HCL*2	Auto Alignment	HP-HCL*3	Background correction	Auto sampler	PC control	Flow rate control	Atomizer
AAS-210	Yes	Yes	6	Yes	Yes	S-H, D2	Yes	Yes	Automatic	Air-C2H2 Flame*4
										O2-enriched Flame*1
										Graphite Furnace*4
										Hydride Generation*5
AAS-110A	Yes	Yes	6	Yes	Yes	S-H, D2	No	Yes	Manual	Air-C2H2 Flame
										O2-enriched Flame
										Graphite Furnace
										Hydride Generation
AAS-120A	No	Yes	6	Yes	Yes	S-H, D2	No	Yes	Manual	Air-C2H2 Flame
										Graphite Furnace
										Hydride Generation
AAS-130A	No	No	4	Yes	No	D2	No	Yes	Manual	Air-C2H2 Flame
										Graphite Furnace
										Hydride Generation
AAS-110B	Yes	Yes	6	Yes	Yes	S-H, D2	No	Yes	Manual	Air-C2H2 Flame
										O2-enriched Flame
										Hydride Generation
AAS-120B	No	Yes	6	Yes	Yes	S-H, D2	No	Yes	Manual	Air-C2H2 Flame
										Hydride Generation
AAS-130B	No	No	4	Yes	No	D2	No	Yes	Manual	Air-C2H2 Flame
										Hydride Generation
AAS-320	No	No	4	No	No	D2	No	No	Manual	Air-C2H2 Flame
										Hydride Generation

Note:

O2-enriched flame*1 Our patented air-C2H02-2 flame (Substitution for N-20C2H2 flame)

The number of HCL*3 The number of HCLs could be loaded on the Turret

High performance HCL*3 Two high performance HCLs can be mounted on the turret to increase the sensitivity in flame analysis

Model	Atomizer	Elements
AAS-210	Air-C2H2 Flame*4	Ag, Au, Ba, Bi, Ca, Cd, Co, Cr, Cs, Cu, Fe, Ga, In, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Pd, Pt, Rb, Rh, Sb, Sn, Sr, Te, Tl, Zn
	O2-enriched Flame*1	Be, Ca, Sr, Ba, Al, Ga, Si, Ge, Sn, Y, La, Sm, Eu, Yb, Ti, Zr, V, Cr, Mo, W
	Graphite Furnace*4	Ag, Al, Au, Be, Bi, Cd, Co, Cr, In, Mn, Mo, Ni, Pb, Pd, Sb, Se, Sn, Sr, Te, Tl, V
	Hydride Generation*5	As, Se, Sb, Bi, Pb, Sn, Te, Ge, Hg
AAS-110A	Air-C2H2 Flame	Ag, Au, Ba, Bi, Ca, Cd, Co, Cr, Cs, Cu, Fe, Ga, In, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Pd, Pt, Rb, Rh, Sb, Sn, Sr, Te, Tl, Zn
	O2-enriched Flame	Be, Ca, Sr, Ba, Al, Ga, Si, Ge, Sn, Y, La, Sm, Eu, Yb, Ti, Zr, V, Cr, Mo, W
	Graphite Furnace	Ag, Al, Au, Be, Bi, Cd, Co, Cr, In, Mn, Mo, Ni, Pb, Pd, Sb, Se, Sn, Sr, Te, Tl, V
	Hydride Generation	As, Se, Sb, Bi, Pb, Sn, Te, Ge, Hg
AAS-120A	Air-C2H2 Flame	Ag, Au, Ba, Bi, Ca, Cd, Co, Cr, Cs, Cu, Fe, Ga, In, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Pd, Pt, Rb, Rh, Sb, Sn, Sr, Te, Tl, Zn
	Graphite Furnace	Ag, Al, Au, Be, Bi, Cd, Co, Cr, In, Mn, Mo, Ni, Pb, Pd, Sb, Se, Sn, Sr, Te, Tl, V
	Hydride Generation	As, Se, Sb, Bi, Pb, Sn, Te, Ge, Hg
AAS-130A	Air-C2H2 Flame	Ag, Au, Ba, Bi, Ca, Cd, Co, Cr, Cs, Cu, Fe, Ga, In, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Pd, Pt, Rb, Rh, Sb, Sn, Sr, Te, Tl, Zn
	Graphite Furnace	Ag, Al, Au, Be, Bi, Cd, Co, Cr, In, Mn, Mo, Ni, Pb, Pd, Sb, Se, Sn, Sr, Te, Tl, V
	Hydride Generation	As, Se, Sb, Bi, Pb, Sn, Te, Ge, Hg
AAS-110B	Air-C2H2 Flame	Ag, Au, Ba, Bi, Ca, Cd, Co, Cr, Cs, Cu, Fe, Ga, In, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Pd, Pt, Rb, Rh, Sb, Sn, Sr, Te, Tl, Zn
	O2-enriched Flame	Be, Ca, Sr, Ba, Al, Ga, Si, Ge, Sn, Y, La, Sm, Eu, Yb, Ti, Zr, V, Cr, Mo, W
	Hydride Generation	As, Se, Sb, Bi, Pb, Sn, Te, Ge, Hg
AAS-120B	Air-C2H2 Flame	Ag, Au, Ba, Bi, Ca, Cd, Co, Cr, Cs, Cu, Fe, Ga, In, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Pd, Pt, Rb, Rh, Sb, Sn, Sr, Te, Tl, Zn
	Hydride Generation	As, Se, Sb, Bi, Pb, Sn, Te, Ge, Hg
AAS-130B	Air-C2H2 Flame	Ag, Au, Ba, Bi, Ca, Cd, Co, Cr, Cs, Cu, Fe, Ga, In, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Pd, Pt, Rb, Rh, Sb, Sn, Sr, Te, Tl, Zn
	Hydride Generation	As, Se, Sb, Bi, Pb, Sn, Te, Ge, Hg
AAS-320	Air-C2H2 Flame	Ag, Au, Ba, Bi, Ca, Cd, Co, Cr, Cs, Cu, Fe, Ga, In, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Pd, Pt, Rb, Rh, Sb, Sn, Sr, Te, Tl, Zn
	Hydride Generation	As, Se, Sb, Bi, Pb, Sn, Te, Ge, Hg

Note:

Air-C2H2 Flame & Graphite Furnace *4 This is integrative. automatically controlled changover of flame and graphite furnace atomizer.

Hydridee Generation*5 This is a optional accessory