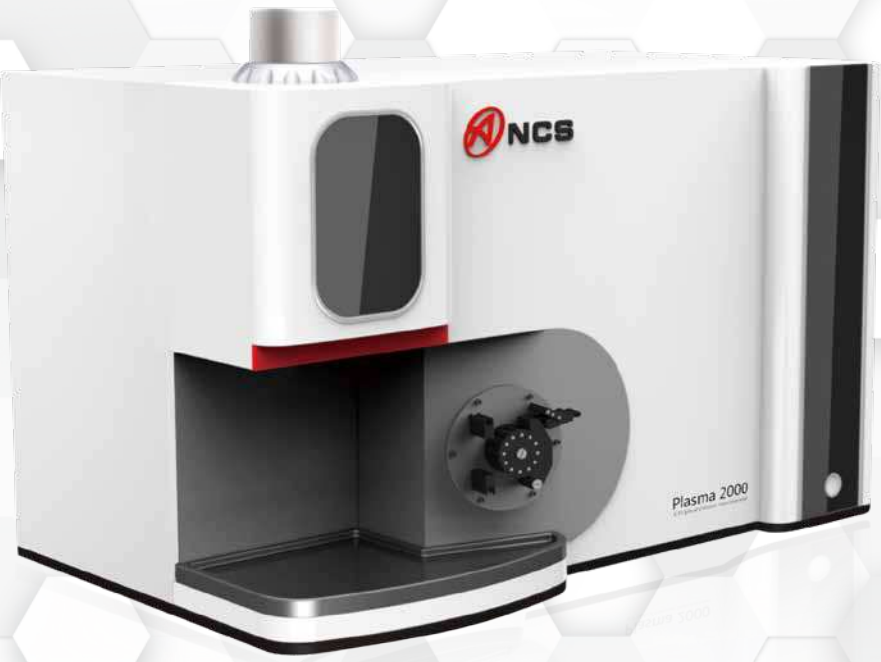
Full-spectrum ICP spectrometer

Plasma 2000 ICP-OES



NCS TESTING TECHNOLOGY

Plasma 2000

Full-spectrum ICP spectrometer

Plasma2000 has rich spectral lines, lower detection limit and more stable performance, capable of quick quantitative analysis for all metal elements and some nonmetal elements. It is widely used for element analysis in such fields as metallurgy, geology, material, environment, food, medicine, petroleum, chemical industry, biology and water quality.

01 The echelle grating and crossed prism dispersion structure in combination with large-area CCDs for simultaneous display of all spectral lines of single exposure and “full-spectrum transient direct reading”.

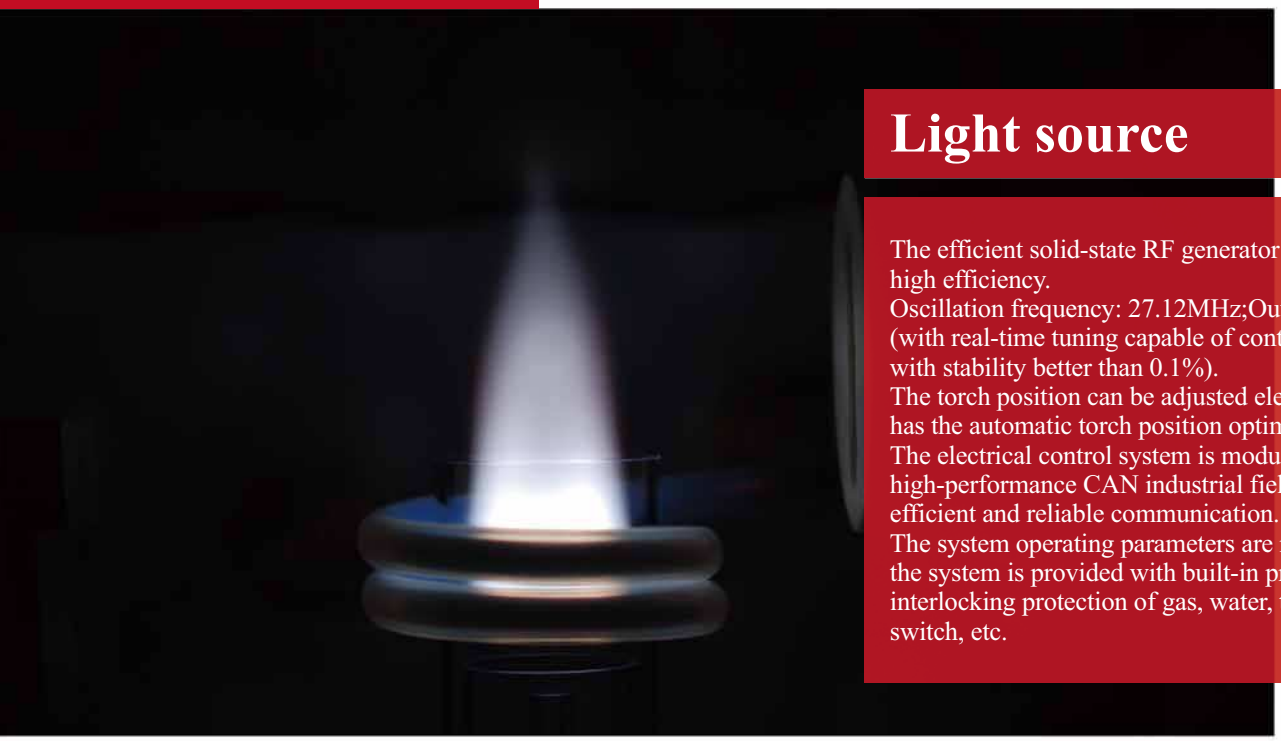
02 The programmable output power program has an automatic real-time tuning function for continuous 1W adjustment within 800-1600W, with a stability of above 0.1%.

03 Application engineers jointed in the software design team to provide tailored operational software for users.

The Principle of Instrument

Operating Principle

The test sample is first changed into aerosol in a nebulizer and then enters the central plasma passage of the quartz torch, etc. The light excited by heating from the light source is split by a prism and echelle grating to form characteristic spectral lines of elements on the CCD detector. A spectrogram is generated after processed in the circuit. The element concentrations are determined by means of computer data processing.

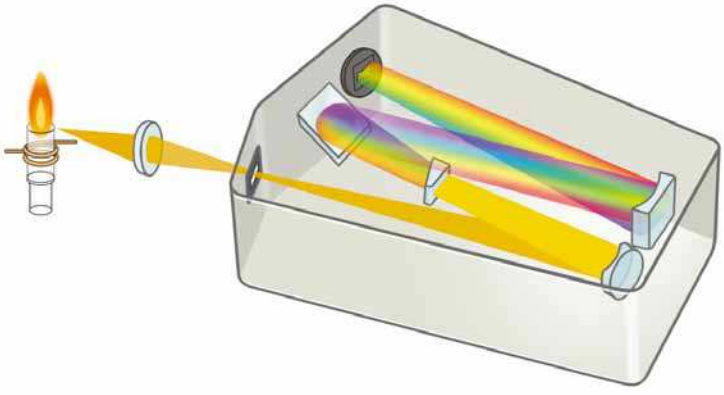


Light source

The efficient solid-state RF generator is compact in size and has high efficiency.
Oscillation frequency: 27.12MHz;Output power: 800-1600W (with real-time tuning capable of continuous adjustment by 1W, with stability better than 0.1%).
The torch position can be adjusted electrically, and the software has the automatic torch position optimization function.
The electrical control system is modularized and can provide high-performance CAN industrial field interfaces to ensure efficient and reliable communication.
The system operating parameters are monitored in real time; and the system is provided with built-in protection logic for interlocking protection of gas, water, temperature, and door switch, etc.

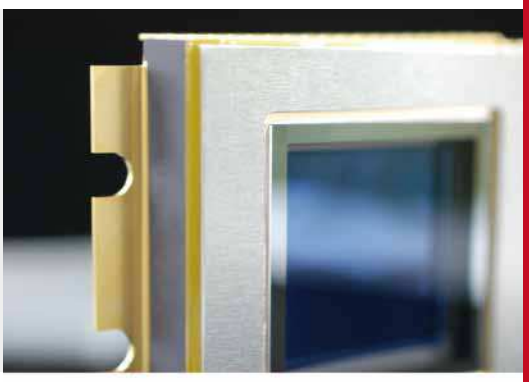
Beam splitting system

The echelle grating and cross prism dispersion structure in combination with large-area CCDs for simultaneous display of all spectral lines of single exposure and “full-spectrum transient direct reading”.
The optimized optical design and aspherical optical elements prevents astigmation, guarantees the best image quality, and increases luminous flux and spectrum acquisition efficiency.
The intelligent multi-point charge system improves the ultraviolet sensitivity; the independent gas circuit in the light chamber can be filled with argon or nitrogen, and the dehydration device is arranged in the gas circuit.
The three-dimensional temperature control system has a control precision of 0.1℃.



Detector

■ Large-area backside CCD chip, high ultraviolet spectrum and quantum efficiency, and wide dynamic range
■ The largest chart among similar products, with millions of pixels, single pixel area of 24umx24um, low noise and excellent stability
■ the high-speed acquisition system provides for simultaneous full-spectrum reading and real-time single pixel, subarray monitoring and quick analysis.



Sampling system

■ Multichannel 12-roller peristaltic pump, with less data fluctuation caused by different physical properties of samples;
■ Optional Meinhard quartz nebulizer, hydrofluoric acid resistant nebulizer with double platinum meshes and V-groove nebulizer for analysis of high salt content samples;
■ Quartz torch, and optional quartz torch with ceramic central tube for analysis of samples containing hydrofluoric acid
■ Double-cylinder fog chamber, vortex fog chamber or hydrofluoric acid resistant fog chamber;
■ Abundant system accessories not only guarantees stable and quick sampling, but also caters for analysis with different media and solutions of varying salinity.
■ Mass flowrate controller for carrier gas flow control. It can be regulated by 0.01L continuously.
■ Optional mass flowrate controller for cooling gas and auxiliary gas flow control. It can be regulated by 0.1L continuously.

Safety protection system

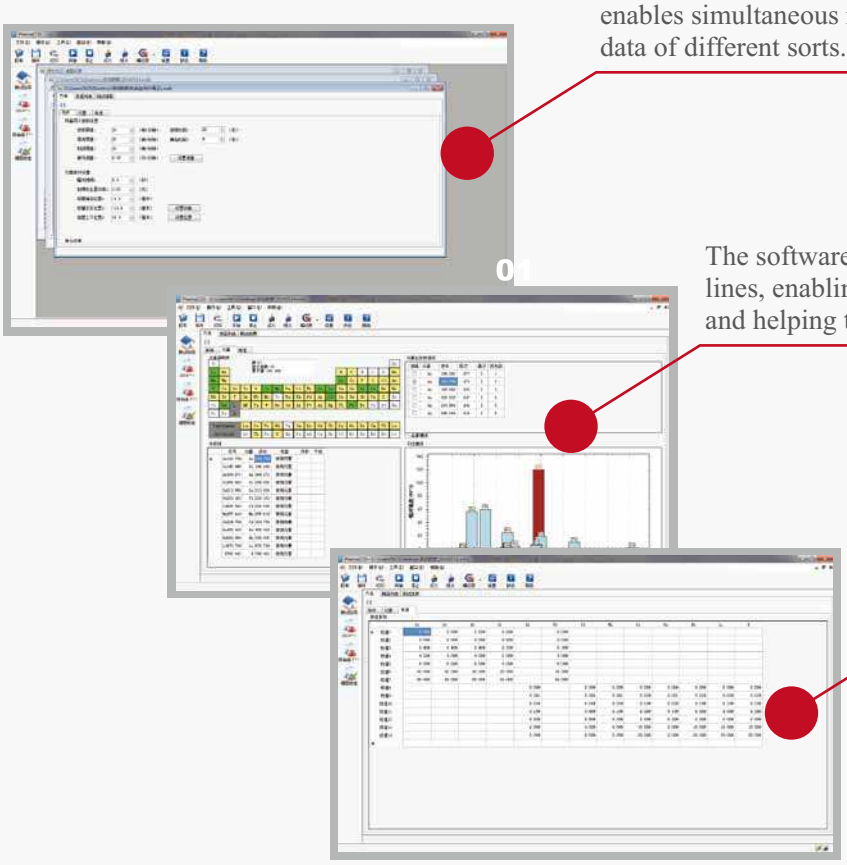
■ All-round electromagnetic shielding to reduce electromagnetic radiation;
■ Interlocking door protection to prevent loss caused by misoperation;
■ UV-proof observation window

Analysis Software

Analysis software
of
Plasma 2000

Multi-window and multi-method

Rich spectral lines



The multi-window and multi-method analysis program enables simultaneous measurement, edition and view of data of different sorts.

The software library includes more than 70,000 spectral lines, enabling display of potential interfering elements and helping the user to select reasonable spectral lines.

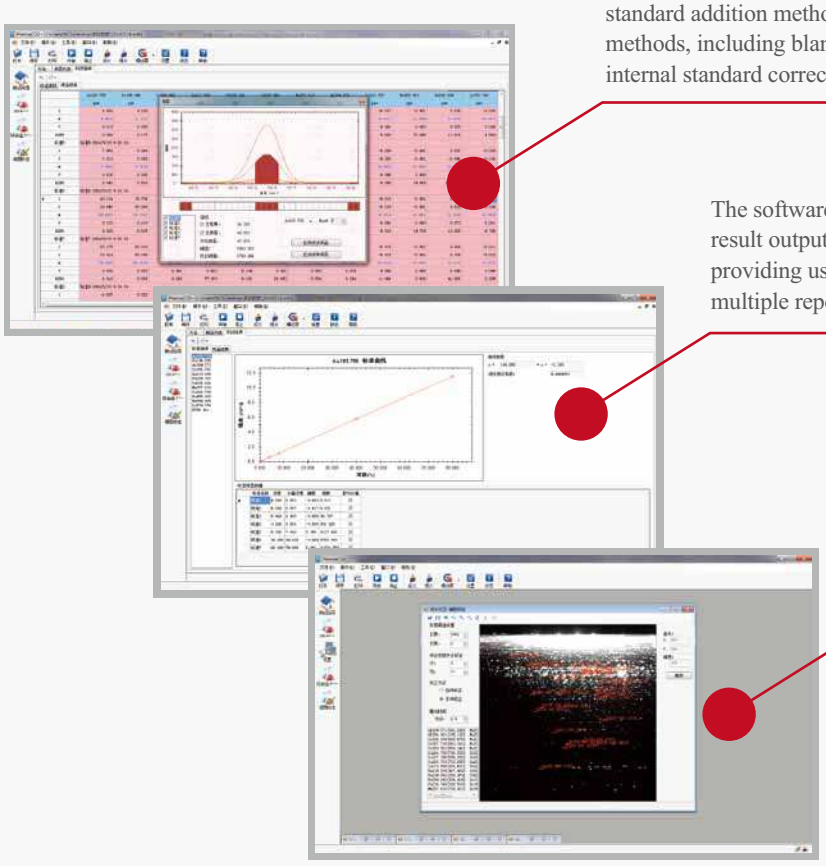
Diversified standard edition methods are available to support various curve calibration, including testing before setting, and “sandwich" sample testing.

Intelligent interference correction

Intelligent spectrogram calibration

Powerful edit functions

Clear and abundant information



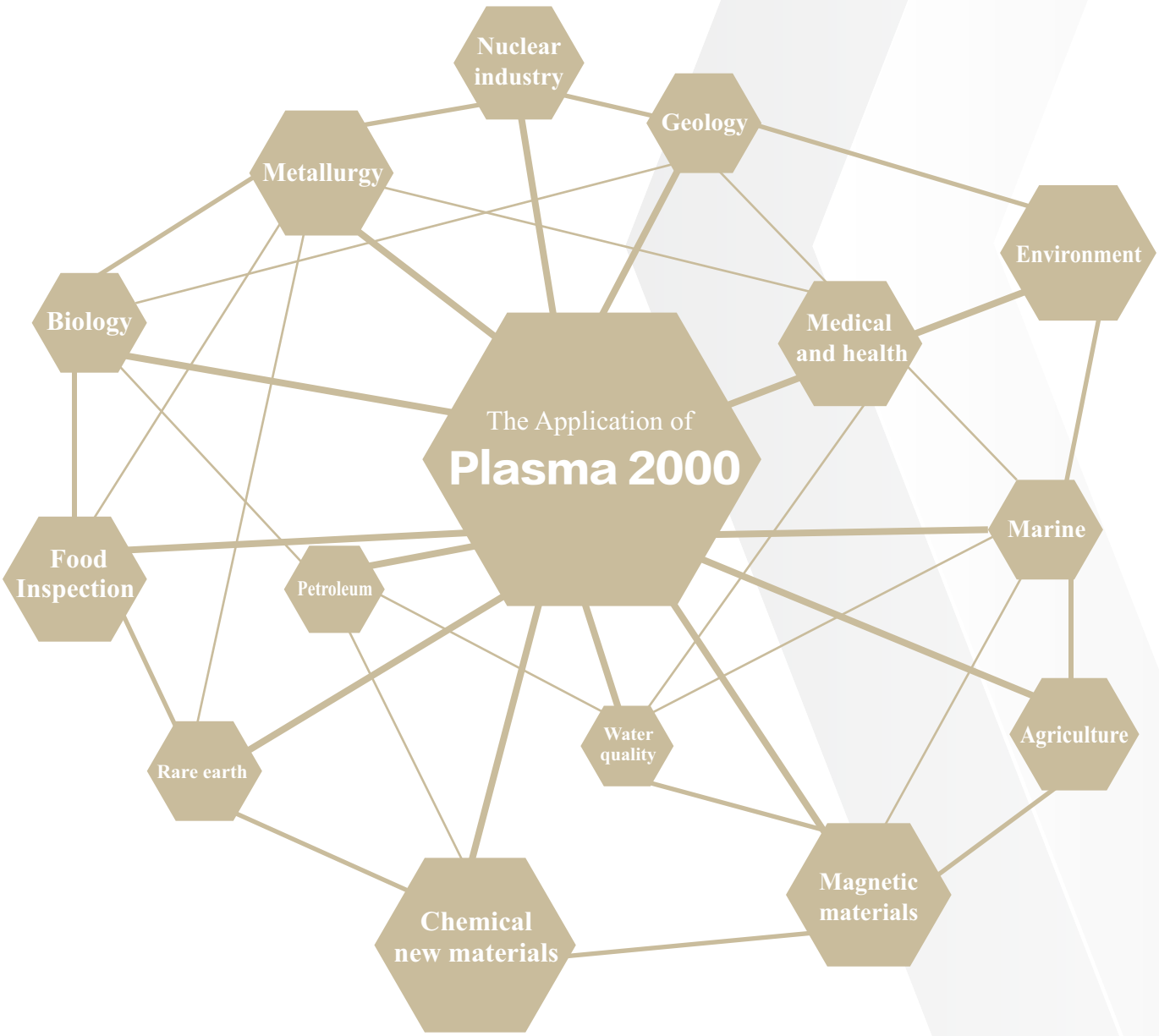
The software supports analysis using the standard curve method and standard addition method, and provides multiple data processing methods, including blank deduction, sample blank deduction, internal standard correction and interference correction.

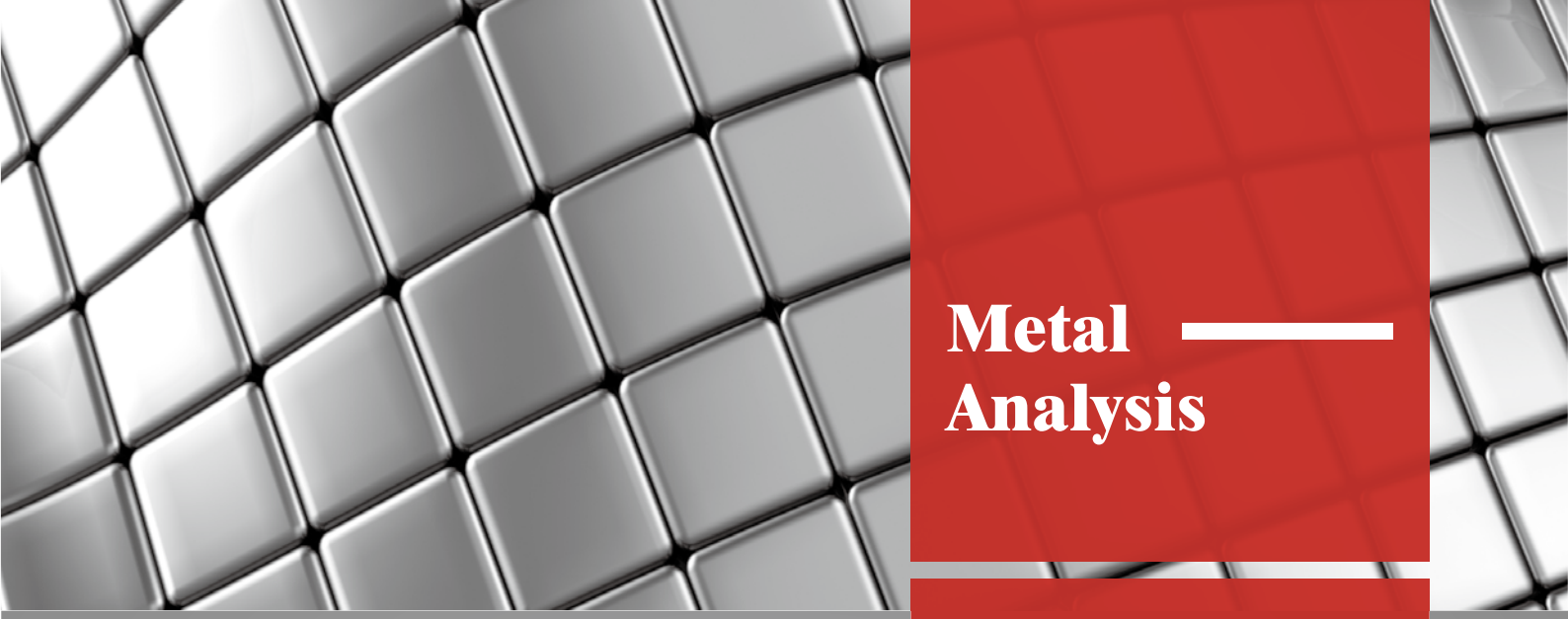
The software has three modules, i.e. method selection, sampling and result output, which are available throughout the testing process, providing user-friendly interfaces with clear data display and multiple report formats.

The intelligent spectrogram calibration function provides for drifting of automatically and manually calibrated spectral lines.

Field of Application

It is suitable for sample analysis in fields and sectors such as geology, metallurgy, rare-earth and magnetic materials, environment, medicine and health, biology, marine, petroleum, chemical new materials, nuclear industry, agriculture, food inspection, water quality, etc. It can test approximate 70 elements from trace to normal amounts, quickly and accurately.





Metal Analysis

Plasma2000

Plasma2000 is a product of NCS, which reflects the strength of NCS as a leader in the field of steel testing in China.

High-carbon ferrochrome slag	Al_2O_3	CaO	MgO	SiO_2	Cr_2O_3
Average value(%)	16.43	1.89	42.47	35.30	2.18
Standard deviation(%)	0.061	0.023	0.096	0.064	0.024
Relative standard deviation(RSD)	0.37	1.21	0.23	0.18	1.12
Chemical value (%)	16.37	1.84	42.40	35.37	2.18

Plasma2000

Plasma2000 not only has excellent performance in steel analysis, but also is suitable for non-ferrous metal analysis, even analysis of pure substances.

Elements analyzed	Amount adding standard%	Amount detected%	RSD%	Elements analyzed	Amount adding standard%	Amount detected%	RSD%
Ag	0.0010	0.00100	1.91	Bi	0.0010	0.00120	5.05
Mn	0.0010	0.00099	1.78	Ni	0.0010	0.00102	3.02
Si	0.0010	0.00083	5.56	Cd	0.0010	0.00105	3.72
Al	0.0010	0.00096	3.21	La	0.0010	0.00106	1.21
Fe	0.0010	0.00104	1.22	Zn	0.0010	0.00105	1.06
Pb	0.0010	0.00102	2.54	Cr	0.0010	0.00096	2.06
Sn	0.0010	0.00114	4.45	Sb	0.0010	0.00095	3.01
Co	0.0010	0.00104	1.78	Zr	0.0010	0.00099	1.99
As	0.0010	0.00120	5.09				

Ore Analysis

Plasma2000 The test solution of Plasma2000 is suitable for ore analysis. Plasma2000 exhibits excellent performance in ore analysis.

Lead concentrate	Zn	Fe
Measured value (%)	3.31	12.13
Specified value (%)	3.30	12.00

Nickel concentrate	Ni	Co	Al_2O_3	MgO	CaO
Measured value (%)	9.00	0.201	1.040	6.22	1.18
Specified value (%)	9.01	0.200	1.041	6.30	1.16

Manganese concentrate	TMn	TFe	Al_2O_3	MgO	CaO	BaO
Measured value (%)	26.69	10.93	7.08	0.780	2.36	0.810
Specified value (%)	26.53	11.01	6.99	0.774	2.31	0.800

Environmental Analysis

ICP-OES is especially good at environmental analysis. **Plasma2000** also has reliable performance in this field.

Technical Parameters

Light source

Oscillation frequency: 27.12MHz

Output power range: 800-1600W

Optical system

Spectral range: 165-900nm

Resolution: 0.008nm at 200nm

CCD: 1024x1024 pixels

Single pixel area: 24umx24um

Specifications

Dimensions: W X L X H (121cmX74cmX80cm)

Weight: 200kg

Operating environment

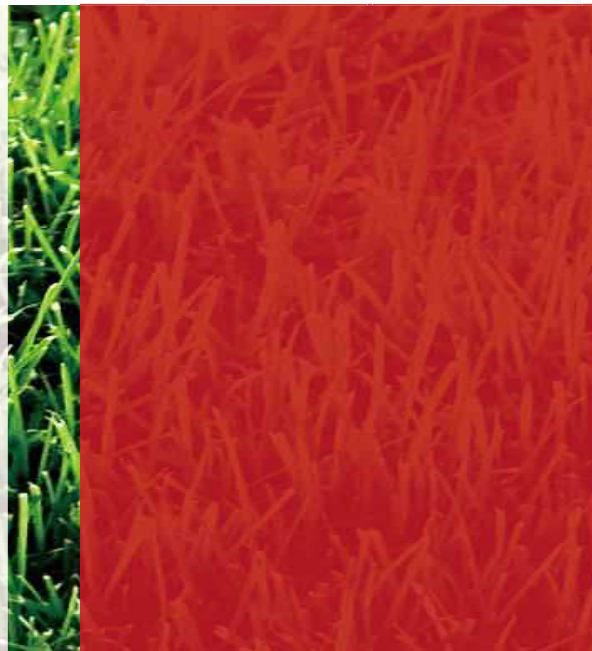
Room humidity: relative humidity: 20-70%

Argon purity: not less than 99.9997

Air exhaust: not less than 400m3/hr

Power supply: 220-240V, single phase, 50-60Hz; 10KVA

Sample No.	Elements	Measurement results(%)	Reference values(%)
Plastics 1#	Pb	0. 0018	0. 0017
	Hg	0. 0010	0. 0012
	Cd	0. 0012	0. 0011
	Cr	0. 0030	0. 0032
Plastics 2#	Pb	0. 0031	0. 0030
	Hg	0. 0015	0. 0014
	Cd	0. 0030	0. 0031
	Cr	0. 0018	0. 0017



High-quality Creates Better Life

NCS TESTING TECHNOLOGY