Plasma

Providing reliable analysis solutions for samples with complex bases

The PlasmaMS 400 applies to elemental analysis across diverse fields including soils, ferrous materials, pure metals, aquatic samples, solid waste, food, and pharmaceuticals.

High-Efficiency Stable All-Solid-State RF Generator

■ 27.12MHz all solid state RF generator, powerful and stable plasma, one-touch plasma ignition

■ Tight ion energy spread,Shielded Torch eliminates interference from secondary discharge

■ Exceptional base versatility with rapid tuning, delivering superior performance for complex and organic samples.

■ Wide power range with stable operation throughout, featuring Cold Plasma, Standard, and High-Power modes for multi-element analysis.
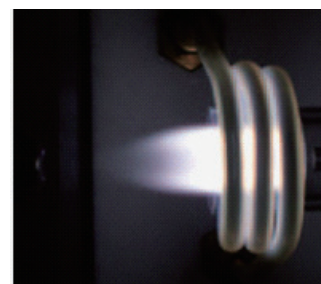
Versatile and Easy-Maintenance Sample Introduction System

■ Streamlined torch mounting with XYZ auto-alignment

■ Integrated torch tube,tool-free disassembly for cleaning & maintenance,low operating costs

■ Peltier-Based semiconductor chilling system,suppresses oxide ion formation,enhances sensitivity,minimum -10 ℃ refrigeration temperature enables direct organic sample injection and analysis

■ Online gas dilution system enhances instrument salt resistance performance

NCS
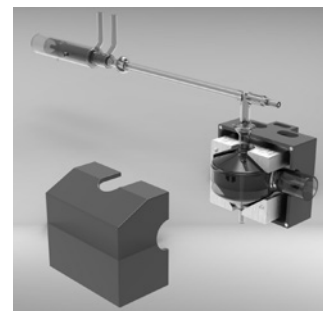
PlasmaMS 400

MS 400 Inductively Coupled Plasma Mass Spectrometer

Proprietary High-Salt-Tolerance Lens System

- Patented dual-extraction lens design for salt resistance

- Enhances instrument stability with high-salt/high-base samples

- Significantly higher reliability for challenging bases(soils, metals, seawater)
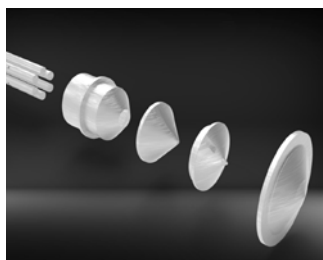
Exceptionally low memory effect

- Small spray chamber design minimizes memory effect

- Integrated with high-salt-resistant sampling cones to enable rapid high-base washout

Simplified Maintenance Design

- Vacuum chamber: Lifetime maintenance-free internals

- Sampling and skimmer cones can be maintained under vacuum without removal

- Dedicated tool kit allows for easy disassembly
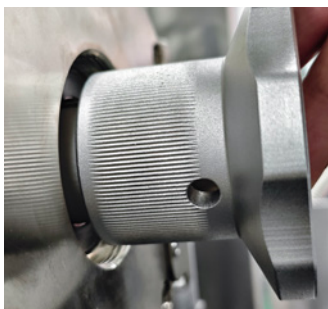
High-Performance Quadrupole Mass Analyzer

- Extended-length quadrupole enable higher ion oscillations for enhanced resolution

- DDS frequency conversion technology automates rapid frequency matching/tuning ,eliminates manual capacitor adjustment, prevents mass axis drift

- Zero mechanical capacitors ensure exceptional stability and lower maintenance costs


Accurate and Real-Time Instrument Status Feedback

Software features comprehensive operational guidance, complete status monitoring (vacuum, cooling water, plasma state), real-time PlasmaTV monitoring of plasma, and proactive error alerts for efficient troubleshooting.
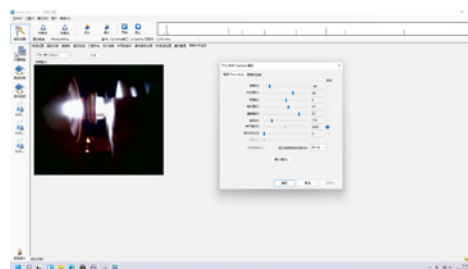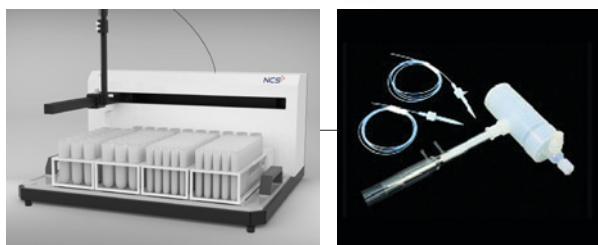
Extensive expansion configurations adapt to diverse application scenarios

Plasma

Inductively Coupled Plasma Mass Spectrometry
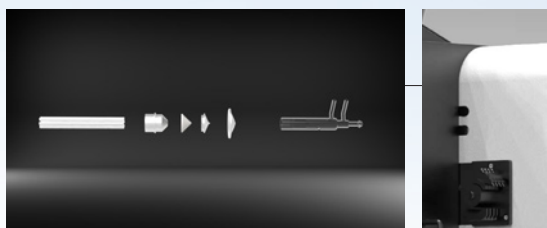
Excellent Salt Tolerance: Proprietary High-Salt Lens System Combined with Online Gas Dilution (OGD) significantly enhances testing stability for high-salt and high-base samples.

Multiple sampling systems available: Flexibly select quartz, HF-resistant, or other systems based on application needs, with auto sampler (AS) support to enhance analytical efficiency

PlasmaMS 400

HPLC/IC universal interface board with built-in software chromatography interface
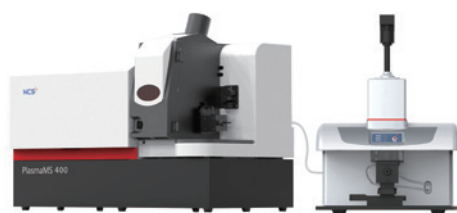
Laser Ablation (LA) solid sampling system: proprietary LA system enables direct solid sample analysis, minimizing sample preparation and facilitating elemental qualitative/ quantitative and in-situ distribution analysis

MS 400
Inductively Coupled Plasma Mass Spectrometer

Integrated Software for Streamlined Scientific Instrument Control and Data Processing
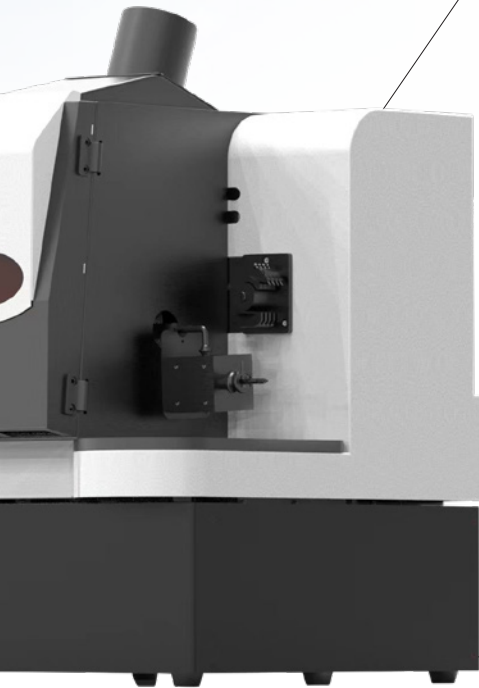
One-Touch Initiation: Automated ignition and tuning for immediate operational readiness, with intelligent calibration delivering a user-centric experience
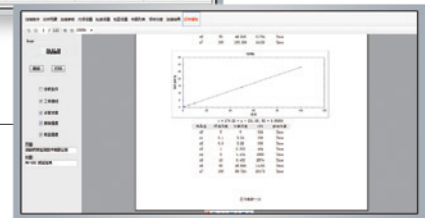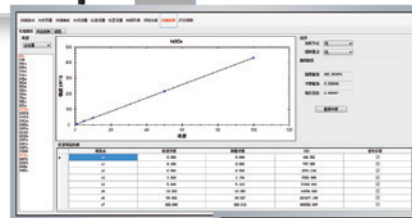
Intuitive analysis process: The interface conforms to user operating habits and allows for quick method creation; Powerful reporting function, customized reports, users can adjust the report format according to their own needs for convenient output
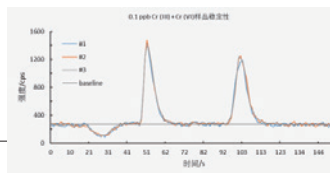
Time-resolved quantification function: Easily coupled with Laser Ablation (LA) and Chromatography (LC/IC) for sample introduction

NCS TESTING TECHNOLOGY CO.,LTD.

Soil Analysis

Relevant Standards

• HJ 803-2016 Soil and Sediment - Determination of 12 Metal Elements - Aqua Regia Extraction-Inductively Coupled Plasma Mass Spectrometry

• HJ 1315-2023 Soil and Sediment - Determination of Total Contents of 19 Metal Elements - Inductively Coupled Plasma Mass Spectrometry

Application Example

Analysis of minor/trace elements in soil using PlasmaMS Series

Element	Mass Number	GSS-4		GSS-5	
		Certified Value	Measured Value	Certified Value	Measured Value
Be	9	1.85±0.34	1.64	2.0±0.4	1.9
V	51	247±14	260	166±9	168
Cr	52	370±16	379	118±7	120
Co	59	22±2	24	12±2	12.67
Ni	61	64±5	67	40±4	37
Cu	63	40±3	42	144±6	145
Zn	66	210±13	208	494±25	469
As	75	58±6	55	412±16	397
Cd	111	0.35±0.06	0.32	0.45±0.06	0.47
Pb	208	58±5	54	552±29	561

Water Quality Analysis

Relevant Standards

• HJ 700-2014 Water Quality - Determination of 65 Elements - Inductively Coupled Plasma Mass Spectrometry

• GB/T 5750.6-2023 Standard Examination Methods for Drinking Water - Part 6: Metal and Metalloid Indices

Application Example

Analysis of trace elements in drinking water using PlasmaMS 400

Element	Mass Number	Sample Measured Value /(ug/L)	Spike Added 1 /(ug/L)	Spiked Sample Value 1/(ug/L)	Spike Recovery/%
V	51	0.54	5	5.63	101.70%
Cr	52	0.13	5	5.26	102.70%
Mn	55	0.14	5	5.31	103.40%
Fe	56	1.59	5	6.62	100.60%
Co	59	11.36	5	16.37	100.30%
Ni	60	0.05	5	5.0455	99.90%
Cu	63	1.87	5	6.55	93.60%
Zn	66	0.55	5	5.3	95.00%
As	75	2.35	5	7.55	104.00%
Se	78	0.66	5	5.92	105.30%
Sr	88	0.23	5	5.44	104.20%
Mo	95	16.38	5	21.43	101.00%
Ag	107	1.74	5	6.95	104.30%
Cd	111	0.002	5	5.06	101.20%
Sn	118	0.03	5	5.12	101.90%
Sb	121	0.01	5	5.14	102.50%
Ba	137	0.84	5	5.9	101.20%
Hg	202	0.42	5	5.1	93.90%
Tl	205	0.02	5	4.94	98.40%
Pb	208	0.05	5	4.97	98.40%
Th	232	0.001	5	5.03	100.50%
U	238	0.001	5	5.02	100.50%

Application Example

Analysis of trace elements in rice using PlasmaMS series

Element	Mass Number	Certified Value/(μg/g)	Measured Value /(μg/g)	Spike Level /(μg/L)	Spike Result/ (μg/L)	Spike Recovery/%
Mn	55	10.6±0.6	10.5	10	20.4	99.0
Cu	63	1.7±0.1	1.5	2	3.3	90.0
Zn	66	13.6±0.6	14.2	10	24.6	104.0
Rb	87	2.4±0.2	2.5	2	4.5	100.0
Sr	88	0.30±0.05	0.25	0.3	0.53	93.3
Cd	111	0.012±0.003	0.013	0.01	0.024	110.0
Pb	208	-	0.005	0.3	0.331	108.7

Application Example

Analysis of heavy metal elements in traditional chinese medicines

Element	Mass Number	Mugwort	Tangerine Peel	Mistletoe	Acanthopanax Bark	Ginkgo Seed	Pinellia Tuber
Cr	52	10.33	2.35	0.89	1.04	0.04	0.24
Fe	54	429.51	75.72	82.79	48.83	12.79	16.75
Mn	55	157.98	11.36	78.28	218.12	5.95	10.11
Cu	63	13.78	2.55	6.20	3.88	5.11	3.61
Zn	66	29.65	5.73	14.58	44.56	9.56	11.23
As	75	0.95	0.12	0.07	0.03	0.03	0.03
Se	78	1.17	1.12	0.31	0.31	0.33	0.23
Cd	114	0.40	0.01	0.06	0.70	0.01	0.06
Hg	202	0.03	0.03	0.02	0.02	0.01	0.01
Pb	208	3.47	1.13	0.45	0.82	0.00	0.02

Food Analysis

Relevant Standards

• GB 5009.268-2016 National Food Safety Standard - Determination of Multi-elements in Foods - Method 1: Inductively Coupled Plasma Mass Spectrometry

• GB 31604.49-2016 National Food Safety Standard - Determination of Arsenic, Cadmium, Chromium and Lead in Food Contact Materials and Products, and Migration of Arsenic, Cadmium, Chromium, Nickel, Lead, Antimony and Zinc

Traditional Chinese Medicine Analysis

Relevant Standards

• Pharmacopoeia of the People's Republic of China (Edition 2020)

Metal Material Analysis

Advantages of PlasmaMS 400

- Professional application method development team
- Ultra-high sensitivity
- Self-developed high-salt tolerance lens system
- High-salt tolerance sample introduction system
- Ultra-low memory effect

High-Purity Metal Testing

Relevant Standards

- GB/T 8647.11-2019 Methods for chemical analysis of nickel - Part 11: Determination of magnesium, aluminium, manganese, cobalt, copper, zinc, cadmium, tin, antimony, lead and bismuth contents - Inductively coupled plasma mass spectrometry.
- GB/T 32548-2016 Steel - Determination of tin, antimony, cerium, lead and bismuth - Inductively coupled plasma mass spectrometry.
- YS/T 281.17-2011 Methods for chemical analysis of cobalt - Part 17: Determination of aluminium, manganese, nickel, copper, zinc, cadmium, tin, antimony, lead and bismuth contents - Inductively coupled plasma mass spectrometry.

Application Example

Analysis of minor/trace elements in high-temperature alloy samples using PlasmaMS 400

Element	Mass Number	GBW01636 /(µg/g)		GBW01637 /(µg/g)		GBW01639 /(µg/g)	
		Measured Value	Certified Value	Measured Value	Certified Value	Measured Value	Certified Value
B	11	92.6	90±4	48.3	47±3	26.4	24±4
Cu	63	578.1	571±22	353.3	363±18	89	94±4
Ga	71	32.4	31±7	32.8	34±4	51.6	52±9
Ge	70	16	13±3	25.3	24±3	71	75±8
As	75	6.8	6.7±1.5	14.9	14±2	47	44±3
Ag	107	0.65	0.78±0.15	0.66	1.0±0.4	4	4.4±0.5
In	115	0.94	0.88±0.23	7.1	7.2±0.8	31.4	31±5
Sn	118	3.8	3.2±1.1	8.8	8.3±2.5	44.2	45±3
Sb	123	1.4	1.4±0.4	3.2	3.3±0.6	46.7	49±4
Te	125	29.5	28±3	29.6	31±4	5.3	2.3±0.4
Ce	140	0.34	0.37±0.09	1.6	1.8±0.7	0.27	0.28±0.08
Hf	178	3.7	3.5±0.2	8.1	7.4±1	36.5	33±3
Tl	205	0.13	0.13±0.5	0.16	0.16±0.06	3.7	3.9±0.6
Pb	208	4	3.4±1.0	3.8	3.7±0.6	8.5	8.02±0.9
Bi	209	0.16	0.14±0.04	0.17	0.19±0.06	2	2.0±0.3

## Application Example

Analysis of trace elements in high-purity metals using PlasmaMS 400

|	Ni/99.99%	Fe/99.98%	Co/99.98%
Ti	0.15	0.25	1.04
V	0.11	0.00	0.02
Cr	0.00	0.00	1.69
Mn	0.20	0.45	2.12
Ga	0.00	0.00	0.14
As	0.19	31.32	14.88
Cd	0.08	0.01	0.00
In	0.03	0.00	0.00
Sn	0.00	0.01	0.03
Sb	0.01	0.05	0.01
La	0.00	0.00	0.02
Ce	0.00	0.00	0.02
Tl	0.12	0.21	0.04
Pb	3.84	0.42	1.41
Bi	0.00	0.01	0.01

Application Example

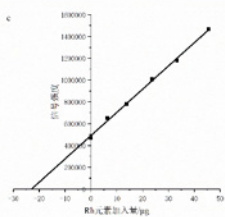Quantitative Analysis of Platinum, Palladium, and Rhodium in automotive exhaust catalysts via LA-ICP-MS
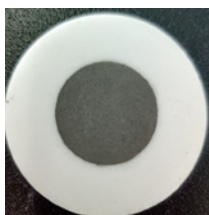
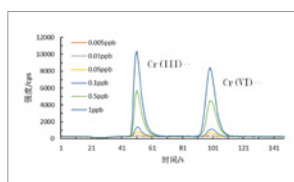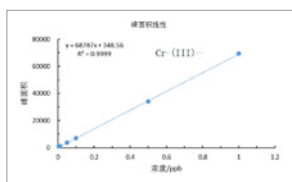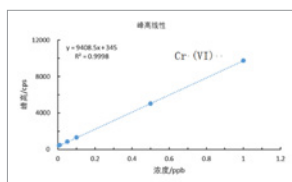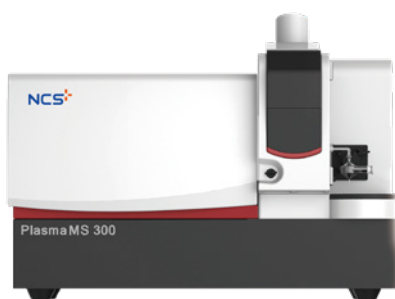Preparation of automotive exhaust catalyst powder sample
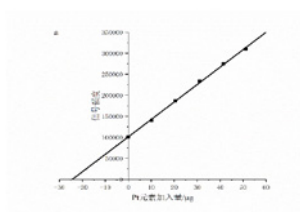
Platinum content in automotive exhaust catalyst powder
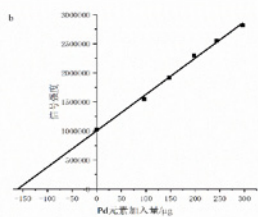
Palladium content in automotive exhaust catalyst powder

Rhodium content in automotive exhaust catalyst powder

0.005-1.000 μg/L
Cr(III) Calibration Curve

0.005-1.000μg/L
Cr(VI) Calibration Curve

Solid Sample Analysis

NCS proprietary Laser Ablation (LA) sampling system, when coupled with the PlasmaMS 400, enables quantitative determination and surface elemental distribution mapping of minor/trace elements in solid samples.
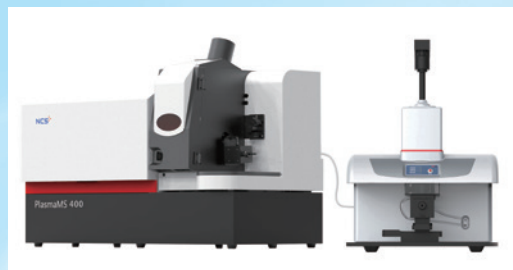
Speciation Analysis

NCS PlasmaMS series ICP-MS coupled with HPLC/IC enables separation and detection of Cr(III) vs Cr(VI) in toys, fully compliant with EU EN71-3:2019 standards.