Multiplelabs™
Turnkey Laboratories Solutions

Analytical®
Technologies Limited

Dual Combustion Furnace Infrared Carbon&Sulphur Analyzer

CSA-3000

EPC / PRODUCTS / APPLICATION / SOFTWARE / ACCESSORIES / CONSUMABLES / SERVICES

Analytical Technologies Limited

An ISO 9001 Certified Company

www.analyticalgroup.net

Principle of the Instrument:

Depending on the requirements of specimen detection, the resistance furnace or an induction furnace will be chosen as the specimen's treatment unit. After purification, the carrier gas (oxygen) is imported into the combustion furnace and the specimen in the high-temperature combustion furnace will be oxidized by the oxygen to CO2, CO and SO2. After de-dusting and dehydration, the generated oxidation products are first loaded into the sulfur detection cell by the oxygen for the determination of sulfur content. Then the oxygen together with gas mixture comes into the heated catalytic furnace, in which catalytic oxidation happens and turns CO into CO2 and SO2 into SO3. After sulfur removal, the gas mixture is channeled to high-carbon detection cell and low-carbon detection cell in sequence by the oxygen for the determination of carbon content. The residual gas is finally discharged out. The analytical results of carbon and sulfur content will be displayed on the analysis software of the computer in the form of % C and % S, and automatically stored for later retrieval. The analysis software may generate, upon need, analysis reports which can be printed via an external printer.

CSA-3000 Dual Combustion Furnace Infrared Carbon and Sulfur Analyzer which is able to detect the content of carbon and sulfur in various materials fast and accurately, is easy to operate and connient for maintenance.

Formation of the Instrument:

Structure of the Instrument:

Modular structure composed of the electronic scale, computer, printer, high-frequency induction combustion host, tubular resistance furnace host, vacuum cleaner and other modules.

Infrared Detection System:

1) Upon the needs of users, the carbon and sulfur analyzer with standard configuration is equipped with three separate infrared absorption cells (i.e. three physical channels: two carbon channels and one sulfur channel); according to the requirements of users, CS3000G series of instruments can also be equipped with four independent infrared absorption cells (i.e. four physical channels: two carbon channels and two sulfur channels).
2) Detector: The pyroelectric solid-state infrared detector produced in is applied.
3) Dynamo: The synchronous dynamo produced in Switzerland is applied.
4) Light Source: The stable anti-oxidation infrared light source produced in the US is applied.
5) Constant Temperature: The entire chamber is thermostatically controlled to ensure constant analysis temperature for the accuracy of detection.
6) Shielding Gas: Oxygen is used for the protection and purification of infrared light source and the detector by isolating them from the ambient atmosphere to improve the stability of analysis and the accuracy of detection.

Flow control:

High-precision electronic flow control technology with the Anti-Overshoot System is adopted for flow control of analysis gas.

Catalytic Oxidation in the Copper Furnace:

1) Before channeled to Carbon detection cell, the analysis gas goes through catalytic oxidation in the copper furnace to turn CO in the analysis gas to CO2 to ensure all CO and CO2 generated in thecombustion process can be detected.
2) Change the analyzed SO2 into SO3 and then absorb SO3 to avoid air pollution.

Dust Filtration:

A special dust filter made of powder metallurgy materials is applied; during each analysis, the dust filter is automatically cleaned twice.

Self-checking Function of the Instrument:

1) Automatic monitoring and alarm of the overall oxygen pressure at the entrance furnace, the analysis pressure at the rear of the furnace and the dynamic pressure.
2) Automatic monitoring and alarm at the time when the high-frequency furnace is switched on or off.
3) Automatic monitoring and alarm for the resetting of the cleaning device within the high-frequency furnace.
4) The software provides step-by-step self-checking function (the monitoring and adjustment of infrared signals, the examination of the movement of valves on gas channels).
5) The instrument can be checked part by part with the assistance of the software.

Weighting:

The electronic balance is connected to the computer for the accurate weighting of specimens. The weight data is automatically sent to the analysis software and if necessary, the weight of the sample can be entered manually as well

Time for Analysis:

The typical analysis time for high frequency induction furnace is 40-60 seconds. The typical analysis time for tubular resistance furnace is 150-300 seconds.

Crucible:

The high frequency induction furnace uses the ceramic crucible with a diameter of 25mm. The tubular resistance furnace uses the porcelain combustion boat with a length of 57mm, width of 22mm and height of 13mm.

Combustion Furnace:

High frequency induction furnace: 18MHz, Max 2.7KVA. Tubular resistance furnace: a highest temperature of 1550 °C; Max 4.4KW . The resistance furnace uses carborundum heating elements for heating. By controlling the power of heating, the life of the elements can be extended. It takes about 20 minutes for the case temperature of the furnace (which is automatically controlled) to reach the operating temperature

Pre-treatment of the Crucible:

The ceramic crucible used by the high frequency induction furnace can be pretreated in the tubular resistance furnace. The double use of the tubular resistance furnace improves the work efficiency and the reliability of analysis.

Instrument specification:

Measuring Range:

High Frequency Induction Furnace	LC	0.0001% - 0.2%
	HC	0.2%~6%
	LS	LS: 0.0001% - 0.3%
	HS	HS: 0.3%~30%
Tubular Resistance Furnace	C	0.01% ~100%
	S	0.005% ~100%*

- The number of detection cells and sizes can be determined in accordance with the content of carbon and sulfur in specimens of users.

Sensitivity:

Carbon and Sulfur	0.01ppm

Accuracy:

High Frequency Induction Furnace	LC	1ppm or RSD≤1%
	HC	RSD≤0.5%
	LS	1.5ppm or RSD≤1.5%
	HS	RSD≤1.5%
Tubular Resistance Furnace	LC	1.5ppm or RSD≤1.5%
	HC	RSD≤1.5%
	LS	±4ppm or 1.5%

Analysis Time:

High Frequency Induction Furnace	40-60 seconds
Tubular Resistance Furnace	150-300 seconds

Specimen Weighting:

High Frequency Induction Furnace	0.1g-0.5g
Tubular Resistance Furnace:	400mg/coal (typical value)

Combustion Furnace:

High Frequency Induction Furnace	18MHz 2.7KVA
Tubular Resistance Furnace	Max.20A,Max.1550°C, the temperature can be adjusted continuously

Dust Sweeping	The dust in the combustion tube of the high frequency induction furnace is wiped off automatically.
Carrier Gas	Oxygen 99.5%, 3L/min
Power Gas	Nitrogen or Compressed Air
Chemical Reagent	Magnesium perchlorate,CO2 absorbent
Power Supply	Power Supply of the Analyzer: 230VAC ±10%,50/60Hz,16A Power Supply of the Resistance Furnace: 230VAC ±10% ,50/60Hz, 20A
Weight	High Frequency Induction Furnace ~100kg, Tubular Resistance Furnace ~30kg
Size	The Analyzer: 55x77x76cm(W×H×D) Resistance Furnace: 33×52×60cm(W×H×D) Resolution of the Electronic Balance: 0.1mgt

Instrument specification:

- produced solid-state infrared detector components
- Flexible control of the heating power
- Support for full manual mode
- Advanced infrared thermostatic technology
- Advanced flow control technology
- Unique computer software
- First-class linear treatment effect
- High testing precision
- Highly reliable circuit components; rich self-diagnostic functions
- Multiple circuit protections against meltdown
- Full close-down gas channel with zero death volume

The application of infrared absorption following high frequency combustion or following tube furnace combustionenables quick analysis of the content of carbon and sulfur in solid inorganics. Software Functions

1) Detection of the movement of solenoid valves on gas channels
2) Detection and adjustment of infrared signals
3) Fast display of analytical results and analytic curves
4) Automatic store of analytical results
5) Drawing and store of dynamic release curves
6) Specimen weight value entry: the software can automatically read weight values of specimens
7) Channel Switch: automatic switch among high-carbon channel, low-carbon channel and sulfur channel

Instrument specification:

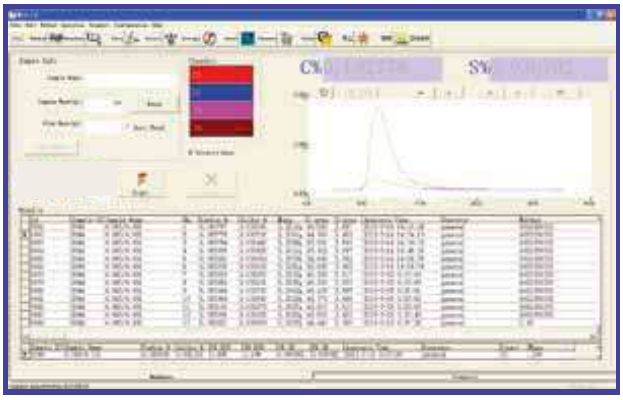
1) Data stored can be referred in multiple ways, such as by date or specimen ID
2) Screening of data
3) The statistic treatment of data (mean, standard deviation, relative deviation)
4) Signal comparison to the release curves of the analytical results

Typical Data (tube furnace)

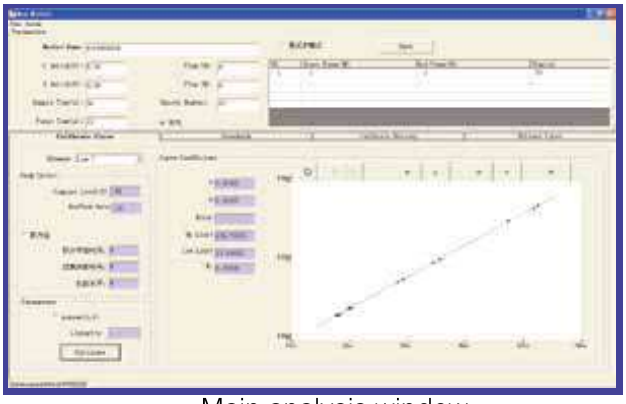
Name of the Specimen and Content of Carbon and Sulfur: C61.46; S4.34

Specimen ID	Carbon Mass Fraction	Sulfur Mass Fraction
1	61.486	4.410
2	61.286	4.385
3	61.506	4.435
4	61.218	4.293
5	61.471	4.354

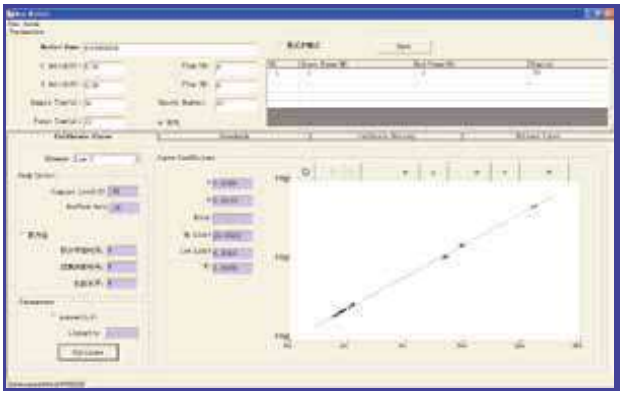
Software Interface



Main analysis window



Main analysis window



Method window

Servicing, Validation, Trainings and Preventive Maintenance :

Servicing	:We have team of service engineers who can attend to any make of instrument promptly @the most affordable cost.
Trainings	:We also take up preventive maintenance to reduce downtime of instrument's Trainings.
AMC's/CMC	: We offer user training both in-House and at customer sites on instrument principles, operations, troubleshooting.
Validations	: We have protocols for carrying out periodic Validations as per GLP/ GMP/USFDA norms.
Instruments	: We offer instruments/Renting Services Modules like pumps, detector etc. on Rent.

About Analytical Technologies

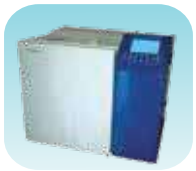
Analytical Technologies is synonymous for offering technologies for doing analysis and is the Fastest Growing Global Brand having presence in at least 96 countries across the globe. Analytical Technologies Limited is an ISO :9001 Certified Company engaged in Designing, Manufaturing, Marketing & providing Services for the Analytical, Chromatography, Spectroscopy, Bio Technology, Bio Medical, Clinical Diagnostics, Material Science & General Laboratory Instrumentation. Analytical Technologies, India has across the Country operations with at least 4 Regional Offices, 6 Branch Offices & Service Centers. Distributors & Channel partners worldwide.

Our Products & Technologies

UV/VIS Spectro 2080+ Double Beam

Infra FTIR

Optima Gas Chromatograph 3007



Optima Gas Chromatograph 2979 Plus

Flash Chromatograph

Atomic Absorption Spectrophotometer

Liquid Partical Counter

Optical Emission Spectrophotometer

DSC/TGA

Semi Auto Bio Chemistry Analyzer

HEMA 2062 Hematology Analyzer

Micro Plate Reader/Washer

URINOVA 2800 Urine Analyzer

Total Organic Carbon 3800

Fully Automated CLIA

NOVA-2100 Chemistry Analyzer

PCR/Gradient PCR/ RTPCR

TOC Analyzer

Laser Particle Size Analyzer

Ion Chromatograph

Water purification system

Regulatory compliances

Corporate Social Responsibility

Analytical Foundation

Analytical Foundation is a Nonprofit Organization (NGO) found for the purpose of:

1.Research & Innovation Scientist's awards / QC Professional Award : Quality life is possible by innovation only and the innovation is possible by research only, hence ANALYTICAL FOUNDATION is committed to identify such personallities for their contributions across various field of Science and Technology and awarding them yearly. To participate for award, send us your details of research / testing / publication at info@analyticalfoundation.org

2. Improving quality of life by offering YOGA Training courses, Work shops / Seminars etc.

3. ANALYTICAL FOUNDATION aims to DETOXIFY human minds, souls and body by means of Yoga, Meditation, Ayurveda, Health Care, Awards, Media, Events, Camps etc.

Reach us @

Analytical®
Technologies Limited

HPLC Solutions | MultipleLabs | Analytical Bio-Med | Analytical Distributors | Analytical Foundation (Trust)

Corporate & Regd. Office:
Analytical House, # E67 & E68,
Ravi Park, Vasna Road, Baroda,
Gujarat 390 015. INDIA

T: +91 265 2253620
+91 265 2252839
+91 265 2252370
F: +91 265 2254395

E: info@hplctechnologies.com
info@multiplelabs.com
info@analyticalbiomed.com

W. www.ais-india.com
www.analycalgroup.net
www.hplctechnologies.com
www.multiplelabs.com

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