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SPECTRO**LAB S**

Stationary Metal Analyzer

New software suite and more: leading the revolution in high-end metal analysis



SPECTRO**LAB S**

HIGH-PERFORMANCE ARC/SPARK OPTICAL EMISSION SPECTROMETER (OES)



The latest revolution in metal analysis for process control and research

SPECTRO, the arc/spark innovation leader, has spent 40-plus years developing superlative OES instruments. Recently it's perfected solid-state detectors using proprietary CMOS+T technology to revolutionize high-end arc/spark OES analysis — with SPECTRO**LAB S.**

This instrument's efficiency and economy are continuously improved by systematic voice-of-customer inputs and rigorous usability testing. So now a fully reimagined software suite brings even more functional, customizable ease of use. Argon consumption is reduced by up to 50 % in standby mode and by 13 % when measuring samples. A fast analysis program enables 12-second measurement of main alloying elements in some key metals. And trace limits of detection (LODs) for high-purity copper are improved by 30%.

SPECTRO**LAB S** is designed to supply the fastest possible measurements; greatest throughput; lowest limits of detection; longest uptime; and most future-proof flexibility available. It's the instrument of choice for primary and secondary metal producers, automotive and aerospace manufacturers, and makers of finished and semifinished goods.

SPECTRO**LAB S**

The best performance for unbeatable benefits

Users of high-end stationary metal analyzers face some challenging tasks. They must identify and measure — with especially high accuracy and precision — all the elements in their incoming, in-production, and outgoing materials. This may include research on new materials as well.

Groundbreaking CMOS+T capabilities
The SPECTRO**LAB S** has the world's first CMOS-based detector system that's perfected for high-end metal analysis — thanks to SPECTRO's proprietary CMOS+T technology. (See next page.) From trace elements to multi-matrix applications, it provides extremely fast, highly accurate, exceptionally flexible analysis.

Ultra-high measurement speed
When it comes to sample through-put, SPECTRO**LAB S** meets the metal market's need for speed. Examples: it can deliver highly accurate trace element measurements of low-alloy steel in less than 20 seconds — or of main alloying elements in materials like iron, aluminum, or copper in under 12 seconds!

Outstanding uptime
With SPECTRO**LAB S**, regular maintenance intervention requirements (spark stand cleaning) have been reduced by a factor of 8. Additionally, the system eliminates most standardization delays. So analysis (and thus production) continues uninterruptedly: sample after sample, day after day.

Fantastic flexibility
Forget needing substantial hardware modifications: new elements or matrices can be added easily — via a simple software update! To fulfill almost any analytical requirement, configure any combination of 10 standard matrices: iron (Fe), aluminum (Al), copper (Cu), nickel (Ni), cobalt (Co), magnesium (Mg), titanium (Ti), tin (Sn), lead (Pb), or zinc (Zn).

Easy, cost-saving setup
Many testing periods require only a single-sample, 5-minute standardization. Unique iCAL 2.0 diagnostics can usually ensure stable performance from then on — regardless of most shifts in ambient temperature or pressure! Most users save at least 30 minutes daily.

Compact, convenient layout
To fit packed laboratory spaces, the SPECTRO**LAB S** analyzer features a 27% footprint reduction from previous models. Conveniences include an easy-reach start/stop button and fixed function keys; a spark indicator light; noise minimization construction; and quick access for spark stand cleaning or tool-free air filter changes without opening the main instrument housing.

Beyond PMT: introducing CMOS detectors

Key to any metal analyzer: its detectors, which register the wavelength and intensity of the light emitted by each element in a sample. SPECTRO**LAB S** uses today's most advanced linear CMOS detectors.

These solid-state *complementary metal oxide semiconductor* devices are manufactured via proven integrated circuit detector technology. With CMOS, readout electronics perform analog-to-digital conversion and noise reduction on the chip itself. This results in exceptional dynamic range and higher data throughput.

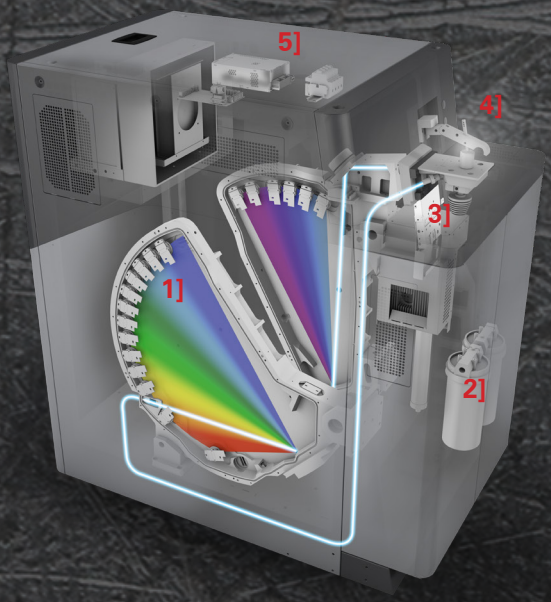
Until now, many users performing metal analysis have preferred that their high-end analyzers employ *photomultiplier tube (PMT)* detectors. But this legacy vacuum tube technology comes with both advantages — and significant disadvantages. Most other spectrometer types long ago switched to semiconductors. And now, the optimized CMOS+T technology in SPECTRO**LAB S** can meet or exceed every important PMT advantage in a metal analyzer system:



	PMT-based system	CMOS-based SPECTROLAB S
Flexibility	Takes significant hardware changes/down-time to add new elements, if even possible; limited number of wavelengths	Configures method for any new elements/matrices via simple software updates; no relevant wavelength limit
Sensitivity/LODs	Excellent low limits of detection; high sensitivity, precision; aided by techniques such as TRS, SSE	Comparable or better than PMT LODs, sensitivity, precision; first non-PMT-detector SPECTROLAB with TRS, SSE
Stability	Must sometimes use suboptimal wavelengths; stability may vary with room temperature	Designed for optimum correlation analytical/ reference lines; resistant to temperature changes; added stability software
Durability	With a fixed selection of wavelengths, the failure of a single PMT can cripple the entire system	Ultra-reliable; industrial-proven semiconductor technology
Quality consistency	Variable due to "one-off" nature of each PMT vacuum tube detector	Excellent reproducibility and consistency due to regularity of semiconductor manufacturing

Continuing innovations

1] Two dedicated optics
To ensure optimum resolution of challenging analytical lines, SPECTRO**LAB S** employs two complete, dedicated optical systems. One precisely measures wavelengths from 120 to 240 nanometers (nm); the other, from 210 to 770 nm. Both feature advanced CMOS detectors, plus temperature stabilization and pressure compensation.



2] Powerful plasma generator and ignition board
The exceptionally robust new high-energy LDMOS plasma generator developed for SPECTRO**LAB S** produces an ultra-stable spark, with frequencies up to 1000 Hz. Result: the shortest possible measurement times (example: less than 20 seconds for low-alloy steel). This system also allows application-specific spark parameter settings for optimized analytical performance.

3] Tunable argon system for unique flow savings
Innovative volumetric flow controllers let the instrument configure/reconfigure argon flows for accurate results, plus reduced consumption. It now uses up to 50% less argon than previous models on auto standby flow (after customizable interval), and 13% less during full-flow operation! Plus the no-tubing argon distribution block mounts directly to the spark stand, eliminating leaks.

4] Low-maintenance spark stand
Rugged ceramic inserts minimize breakability and eliminate coating. Together with controlled argon flows, the system ensures the longest possible uptime between cleanings (regular maintenance intervention requirements are reduced by a factor of 8): key especially for high-throughput automation systems.

5] Rapid readout system
SPECTRO's innovative GigE readout system enables the highest processing speeds for maximum data throughput and support of the instrument's superlative analytical performance. Its unique full-spectrum coverage also allows the instrument to achieve optimal optical configuration for every application.

Functional advantages



Ultra-low limits of detection

Users get LODs previously attainable only with PMT detectors. And on some key elements, SPECTRO**LAB S** CMOS+T technology even surpasses PMT performance! One new enhancement lets the latest version outperform previous models with 30% lower LODs for trace elements like antimony, tellurium, and lead in high-purity copper. Analytical functionality is maximized by configuring the best possible relationship between given analytical and reference lines. Depending on the application, it can easily determine trace values for critical elements in single parts per million (ppm).

Spectacular stability

SPECTRO**LAB S** provides both short-term and long-term stability without compromise. Unlike conventional models, its sealed, no-purge UV optic maximizes light transmission stability, even in the far UV. Its software utilizes sophisticated measures such as online drift correction and iCAL 2.0 pressure compensation for reproducible readings, even over successive shifts or maintenance intervals.

Excellent ease of use

A redesigned software suite offers state-of-the-art efficiency, extended functionality, and ensured usability. This intuitive, fully customizable new platform takes effortless operation to new levels. Users choose exactly what information they need, when they need it. And tailored workbooks can eliminate complicated method development.

Affordable cost of ownership

Besides iCAL 2.0 standardization savings, the system's UV-PLUS purification uses a long-lasting filter cartridge to eliminate argon purges or vacuum pumps. New flow controls cut argon consumption 13% at full flow — and up to 50% during standby. Component access, advanced diagnostics, and other improvements make maintenance easier, and prevent expensive unplanned downtime.

Superior analytical software

SPECTRO**LAB S** provides powerful software capabilities to improve analytical performance. Many features are possible only with the instrument's advanced, proprietary CMOS+T technology.

Online drift correction. Compensates for measurement variation trends over time, helping to ensure ongoing measurement stability.

Dynamic preburn. Shortens measurement time on better-quality samples.

Plasma control. Observes and stores plasma characterization, indicating potential issues such as argon quality changes to increase instrument uptime.

Background correction. On matrices such as aluminum (Al), "calculates out" high background to improve signal-to-noise ratio for more accurate reading on selected analytical lines.



Full spectrum scan. Captures full coverage of entire relevant analytical spectrum simultaneously, from 120 to 770 nm. So allows comparison of encountered spectra to investigate elements not installed or expected.

Time-resolved spectroscopy (TRS). Measuring discrete segments within a single spark discharge, reduces background noise and interference to minimize LODs. (Previously available only on PMT detectors.)

Single spark evaluation (SSE). Records and analyzes successive sparks, so system can alert users to inclusions in otherwise "clean" materials, such as manganese sulfide (MnS) in steel. (Previously available only on PMT detectors.)

Superb operating software

Its redesigned, state-of-the-art Spark Analyzer Pro software is available with a new SPECTRO**LAB S**.

- *NEW "flat" design*. All relevant functions are directly accessible from the measurement screen; uniform navigation ensures ease of use.
- *NEW customized modules.* Users can view only the information they need: from measurement, results, or method development to configuration or service.
- *NEW dashboard.* A customizable focal point keeps critical data in one place: measurement controls, instrument status, maintenance reminders, etc.
- *NEW object customization.* Users can assign familiar labels/shortcuts to screen buttons.
- *NEW runtime counter.* Countdowns of measurements in progress let operators optimize their workflows.
- *Extended SSE reporting*. Users view vital information for inclusion analysis.
- *NEW extended service functionality.* Managers and operators access Internet of Things (IoT) instrument checks, email maintenance flags, and more.
- *NEW traceability.* All past software data is always accessible, via optional method versions, configurable audit trails, and recalculations-with-history.

Other key features:

- *Extended result distribution.* Exports data to almost any popular archive system for full reporting and documentation.
- *Multisample type standardization.* Permits combining several samples into a new standard as a type correction.
- *Backup/restore tool.* Safeguards against data loss.





The leading line: SPECTRO metal spectrometers

The flagship SPECTRO**LAB S** leads today's most comprehensive suite of advanced arc/spark metal analyzers. These include the midrange SPECTROMAXx stationary metal analyzer, the entry-level SPECTROCHECK stationary metal analyzer, the SPECTROTEST mobile metal analyzer, and the SPECTROPORT portable metal analyzer. Whatever the product, SPECTRO's more than 40 years of experience in elemental analysis and unparalleled record of technological innovation ensure the best results in the business.

Excellent support with comprehensive AMECARE services

AMECARE Performance Services maximize uptime for all the world-class elemental analyzer products and services from SPECTRO Analytical and associated companies. The program is staffed by hundreds of experienced service engineers in 50 countries. They provide high-value, customized support designed to ensure optimum performance plus the longest possible equipment life. Ask about AMECARE virtual or on-site demos, SPECTRO PROTEKT secure global remote monitoring, proactive performance maintenance, performance upgrades, applications solutions, consultation, targeted training, and ongoing support.

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