

SPECTROLAB S: Revolutionary Results for Steel Analysis at Voestalpine Stahl

SPECTROLAB S Advantages for Voestalpine Stahl

- ▶ Breakthrough high-end arc/spark OES analyzer for primary & secondary metals & more
- ▶ Exclusive full-spectrum coverage; analysis of new elements/matrices is easily software-activated
- ▶ Stored spectra let results be reloaded/ recalculated anytime
- ▶ iCAL 2.0 ensures highest stability versus most temperature/ pressure shifts
- ▶ iCAL 2.0 reduces maintenance times/ costs — usually single-sample, 5-minute standardization
- ▶ Improved spark stand design lengthens time between maintenance cleanings
- ▶ Proprietary CMOS +T technology empowers previously PMT-only capabilities
- ▶ Ultra-low detection limits
- ▶ Ensured ease of use



Voestalpine Stahl is one of Europe's largest metals manufacturers. Its facilities in Linz, Austria, turn out immense quantities of high-grade steels — to exacting specifications.

Meeting those specifications precisely demands high-grade analysis as well. Senior Technical Expert Dr. Andreas Pissenberger and his colleagues at the plant's process laboratory evaluate 400,000 samples a year, primarily via automated spectrometric analysis of incoming, in-production, and outgoing materials, plus new-material research. Dr. Pissenberger conducts extensive evaluations of new analyzers and technologies as well. For good reason: "One melt costs 50,000 euros. We make 100 melts per day. If we can improve our laboratory results, we can improve the process in the steel plant. That can quickly save millions of euros."

However, improving spectrometric metals analysis has faced various roadblocks. One significant example: reliance on PMTs.

The Challenges

Almost every high-end stationary metal analyzer still utilizes photomultiplier tube (PMT) detectors. This legacy vacuum tube technology provides

desirably low limits of detection, plus high sensitivity and precision. But it also demands significant hardware changes (and downtime) to add analysis capability for any new element. It can't handle some relevant elements. Its stability varies with temperature. And its fixed wavelengths selection means the failure of one PMT can cripple the whole system.

Steel industry experts like Dr. Pissenberger have long urged spectrometer makers to undertake a daunting challenge. Could they develop an analyzer that used semiconductor-based detectors to avoid all those PMT drawbacks — yet delivered PMTs' performance?

Dr. Pissenberger started using the SPECTROLAB S in 2019 for the analysis of slab samples, plate samples, and samples for research and development. After testing it extensively against other leading spectrometers, he concluded that the answer to the above question is yes.

The Solution

The SPECTROLAB S high-performance arc/spark optical emission spectrometer (OES) represents



a real breakthrough in metal analysis for process control and research. Its proprietary CMOS+T detector technology empowers previously PMT-only capabilities such as single spark evaluation (SSE).

SPECTROLAB S is designed to supply the fastest possible measurements; lowest limits of detection; longest uptime; and most future-proof flexibility. By every metric, it's built to be the best-performing spectrometer available for primary metal makers — plus secondary metal producers and other manufacturers.

The Results

"I wasn't sure it would be as good as a PMT-based system," says Dr. Pissenberger. "Especially for nitrogen, carbon, other special elements, and very low concentrations. But as we conducted our tests, I saw that this new system is not equal. I have the numbers, I have the calculated values: It is better.

"Does SPECTROLAB S meet the requirements of the primary metal producing industry? Yes. To begin with, there's just about no element where it can be beat by a photomultiplier system. You can add elements just by software. And the stability of this instrument is the best we have now in our laboratory. My dream is:

when we measure today exactly 1.0000 m-%, we can reproduce exactly 1.0000 m-% on the same sample in three months. That is perfect stability."

The iCAL 2.0 technology that helps deliver that stability also revolutionizes calibration: "With iCAL, you usually need only one standardization sample, instead of seven or eight. That's a big difference in time and effort," says Dr. Pissenberger. He reports detection limits down to 1-2 parts per million (ppm) for sulfur (S), 1 ppm for boron (B), and 5 ppm for carbon (C) and nitrogen (N). In addition, "Having the full stored spectrum for the first time is a big analytical step forward as well. You can do baseline corrections and work with mathematical models.

"The software is very clear and easy to use," he adds. "Service is easy; we don't even have to do spark stand cleaning very often. The whole system: I would say it's a sensational thing."

"Photomultiplier-based systems are what they are," Dr. Pissenberger concludes. "But as we work together to improve these new, already very good semiconductor-based technologies for analyzing metals, I see that SPECTROLAB S is the spectrometer for the future."

About Voestalpine Stahl

Voestalpine Stahl GmbH is one of Europe's leading producers of primary steel. It serves customers in the automotive, construction, mechanical engineering, household appliances, tube, section, and energy industries. The company's facilities in Linz, Austria, contain a fully integrated metallurgical plant as well as processing and wet chemistry laboratories.

About SPECTRO

SPECTRO is one of the world's leading suppliers of analytical instruments. Its analyzers use optical emission spectrometry (arc/spark OES, ICP-OES), X-ray fluorescence spectrometry (XRF), and inductively coupled plasma mass spectrometry (ICP-MS) technologies in the elemental analysis of materials for industry, research, and academia.

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