Quick guide

Spark-Optical Emission Spectrometry (OES)

In brief

- Easy elemental analysis of metals and alloys in less than one minute
- Quantitative determination of numerous elements from Ag to Zr and from trace level to percents of more than 40 elements
- Robust, accurate, precise, stable and reliable
- Ideal for process control in metal production
- Ultra-fast analysis of non-metallic inclusions
- Cost-effective determination of C, N, O, P and S in steel

Applications

Spark-OES is used in all types of metal industries or laboratories:

- Metals producers
- Foundries
- Metals processors
- Metals recyclers
- Central, service and contract laboratories
- Universities, research centers and governmental institutes

Spark-OES instruments are used for:

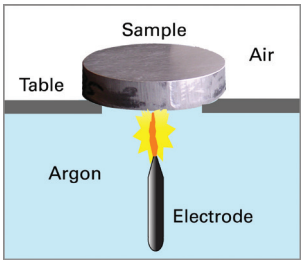
- Process control
- Finished and semi-finished products quality control
- Incoming materials inspection
- Metals sorting
- Research and certification

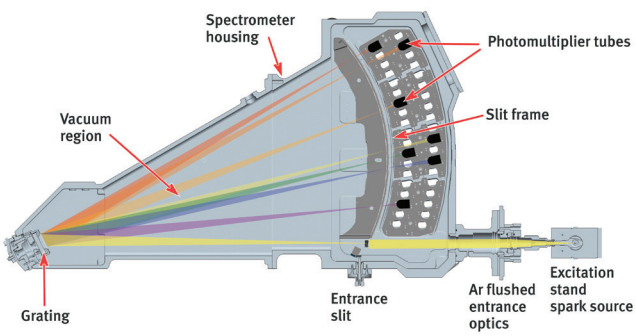
Basic theory

The analysis is based on the ablation of material of the metal sample by electrical sparks. The material ablated is excited in the argon plasma generated by the sparks and emits light in the VUV-visible range, which depends on the elements present in the sample and on their concentration.

The light emitted towards the optical system is dispersed into its components by the diffraction grating over a certain wavelength range.

The photons with the wavelengths of the elements of interest are traditionally detected and transformed into electrical signals with PMT's (Photomultiplier Tubes) and the signals converted into concentrations via calibration curves. Alternatively the signals from the wavelengths of interest can be obtained from a spectrum or spectra collected with one or several CCD detectors. Modern spectrometers can also include both technologies.





Technology

Well established for the analysis of metals and alloys (iron and steel, Al, Cu, Ni, Co, Zn, Pb, Sn, Mg, Ti, and fine precious metals), Spark-OES is the most widely used technique in all the metallurgical industries and laboratories performing metals analysis because the OES spectrometers are easy to use and to maintain, and provide the fastest determination of all the elements with high accuracy and precision. Sample preparation is fast and simple, often performed with a paper or stone grinder, or with a milling machine. In addition, high throughput is routinely achieved (> 400 samples analyzable per day).

Each of these aspects contributes to making the spark OES spectrometer one of the instruments having the highest reliability and the lowest overall cost of ownership.

- ARL easySpark benchtop metal analyzer
- ARL iSpark Plus metal analyzer
- ARL iSpark Plus Inclusion Analyzer
- ARL iSpark Plus Fire Assay Analyzer
- ARL SMS 2300, ARL SMS 3300/3500 automation systems with robots and sample preparation machines

Find out more at **www.thermofisher.com/oes**

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