Glow Discharge Optical Spectroscopy (GD-OES)

SCIENCE ET SURFACE
Filiale de SERMA TECHNOLOGIES

SPECIFICATIONS

- **Elemental analysis**: all elements from H to U (sensitivity around 50 ppm or better)
- **Quantitative analysis** of metallic samples and alloys thanks to CRM, with accuracy ~ 5 %
- Depth profiling from a few nm to several 10 of µm
  - Qualitative
  - Quantitative with preliminary calibration
- Analysed area: 4 mm diameter (2 mm possible)
- For **solid materials** including conductive and insulating samples

PRINCIPLE

Argon is admitted in the analysis chamber under low pressure. A **plasma** is generated by creating a discharge between the anode and the sample, which plays the role of the cathode*. Atoms are extracted from the sample surface and then projected into the plasma, where they are excited. When an atom comes back to its fundamental state, a radiation is emitted whose wave-length is characteristic of the atom. The total radiation emitted is focused onto the entrance slit of a **wave-length dispersive system** (polychromator).

- *in case of insulating samples, use of a radio-frequency source.*
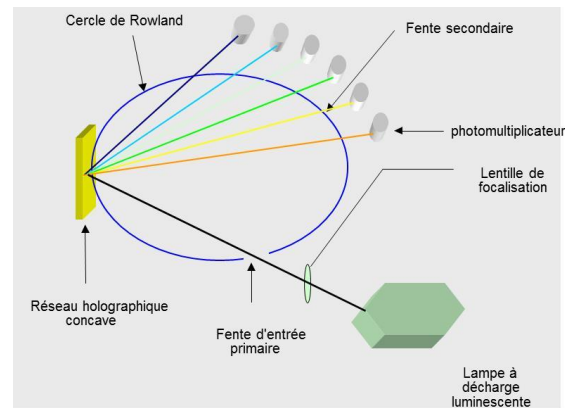
This technique involves erosion during the analysis, so it is adapted for distribution depth profiling (evolution of the intensity of the characteristic lines of the followed elements, as a function of erosion time). As the erosion speed depends on the element and on the matrix, Science et Surface develops multi-elements and multi-materials calibration methods so that most of profiles will be quantitative.

The application fields are: surface treatments (galvanization, nitriding, carbonitriding, carburization, diffusion, chemical and thermochemical treatments, thermal treatments...), PVD and CVD coatings, electrodeposition coatings, paintings, semiconductors (multilayers...), etc...