

ON-LINE XRF ELEMENTAL ANALYSIS IN LIQUIDS

The C-QUAND is the latest Hobré on-line XRF analyzer. The C-QUAND is an ideal on-line solution for elemental analysis in liquids. The C-QUAND is capable of measuring multiple elements, from silicon (Z=14) to uranium (Z=92), and from ppm to percentage levels. It is a continuous, non-destructive, low-maintenance analyzer without the need for additional reagents. C-QUAND also offers considerable savings in analysis time and operational costs compared to alternative analytical techniques.

X-Ray Fluorescence principle

The C-QUAND has a powerful 15 watt, 0-50 kV X-ray source, with a silver (Ag) anode. The X-rays knock an electron out of the K or L orbit of the atom, a void. The now unstable atom will fill the void with an electron from the outer orbits. The difference in energy is emitted as a photon with a distinct energy level, unique to the element. The fluorescence is collected by the silicon drift detector (SDD). The detector collects these events as counts, which are directly proportional to the concentration of the element of interest.

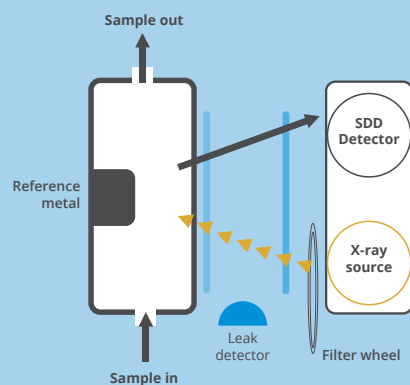


Figure 2. Measuring cell

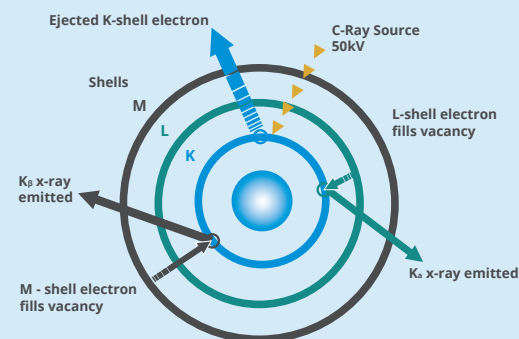


Figure 1. X-ray fluorescence principle

Measuring cell

The measuring cell is constantly flushed with fresh samples. The X-rays generated by the source are first filtered by one of six different optical filters. The X-rays then travel through a thin window before hitting the actual sample.

Relevant Industries

- Oil & Gas
- Metals & refining
- Mining & minerals
- Petrochemicals
- Polymers
- Environmental
- Food & Pharmaceuticals
- Drilling and wells
- Steel industry
- Waste water

Applications

- Pipeline monitoring (total sulfur & metals measurement)
- Fuel Blending (total sulfur measurement)
- Sulfur and/or metals in all Refinery processes
- Salt, metals and sulfur in crude oil
- Sulphate in injection water
- Catalyst monitoring for PTA and PIA plants
- Metals in mining and minerals
- Fe, Ni, Zn and Sn in metal plating
- Fe, Co, Ni, Cu, S, Cl, As, Mo & PGM in metal refining/recycling
- Cu, Ni, Mo, V, W, Fe & Co in metal recycling
- Waste water monitoring
- Metal extraction

The periodic table displays elements with their symbols, names, atomic numbers, and relative atomic weights. Two callouts provide detailed information on measurement methods:

- Callout 1 (Silver, Ag):**
 - Atomic Number (Z):** 47
 - Relative Atomic Weight (A_r):** 107.87
 - Measurement of Atomic Number:** Difficult to measure with C-QUAND.
 - Measurement of Relative Atomic Weight:**
 - Measured using K-lines (K_α¹, K_β¹)
 - Measured using L-lines (L_α¹, L_β¹)
- Callout 2 (Helium, He):**
 - Atomic Number (Z):** 2
 - Relative Atomic Weight (A_r):** 4.00
 - Measurement of Atomic Number:** Difficult to measure with C-QUAND.
 - Measurement of Relative Atomic Weight:** Measured using K-lines (K_α¹, K_β¹)

The periodic table includes elements from Hydrogen (H) to Oganesson (Og), with Lanthanide (La) and Actinide (Ac) series shown separately at the bottom.

