

## X-Ray Spectrometry & Programming

### Objectives:

- How to function and develop X-Ray programs
- How to conduct the needed measurement on the X-ray device
- Measurements of X-Ray samples preparation
- Error handling during preparing or measuring the samples
- How to prepare the periodical maintenance for the X-Ray device

### Participants:

All Lab Engineers and Chemists

### Course contents:

#### Part 1: Analysis principle

- 1- Introduction
- 2- X-ray emission
- 3- Photoelectric absorption
- 4- Nomenclature used in XRF
- 5- Instrumentation
  - 5-1-Difference between XRF and XRD
  - 5-2-Difference between WDX and EDX
  - 5-3-X-ray tube
    - 5-3-1-Continuum
    - 5-3-2-Characteristic spectra and choice of the X-ray tube target
    - 5-3-3-Spectral line interference
    - 5-3-4-Window thickness
  - 5-4-Type of WDX instrumental
    - 5-4-1-Sequential instrumentals
    - 5-4-2-Simultaneous instrumentals
  - 5-5-Instrumental components
    - 5-5-1-Goniometer
    - 5-5-2-collimators
    - 5-5-3-Crystals
    - 5-5-4-Detection
      - 5-5-4-1-Gas filled counters
      - 5-5-4-2-Scintillation counters

## **Part 2: Sample preparation**

- 1-introduction
- 2-sample preparation for Solids
- 3-sample preparation for powders
  - 3-1-Briquet method
  - 3-2-Fusion technique
- 4-sample preparation for liquids

## **Part 3: Errors in X-Ray Analysis**

- 1-Types of error in X-Ray analysis
- 2-Sources of random error in Quantitative X-Ray spectrometry
- 3-Systemic errors in quantitative X-Ray spectrometry
- 4-Sample preparation

## **Part 4: SOFTWARE**

- 1- How to do Calibration
- 2- How to change the environment
- 3- How to do a zero goniometer
- 4- How to see the energy profile graphic
- 5- How to do an HV calibration if energy profile not in position
- 6- How to run a routine analysis
- 7- How to send instrument configuration