X-ray Analytical Microscope

XGT-9000 Series

X-ray Analytical Microscope

Look Below The Surface
The XGT-9000 Series is a micro-XRF spectrometer, which provides non-destructive elemental analysis of materials.

What is the XGT-9000 Series?

Single point, multi-points and mapping analyses can be done by one instrument.

1. Incident X-ray beam is guided towards a sample placed on the motorized stage.
2. Sample surface can be observed by the optical camera to find an area of interest on the sample.
3. The motorized stage moves to the measurement position once a measurement starts.
4. Fluorescent X-rays and transmission X-rays are detected by individual detectors.

What is XGT-9000 Pro and XGT-9000 Expert?

XGT-9000 Pro

Excellent sensitivity

Cu intensity comparison
XGT-9000 Pro vs. [1]HORIBA conventional micro-XRF with a standard detector

XGT-9000 Expert

Ultimate sensitivity & Wide element range

Light elements peak intensity comparison
XGT-9000 Expert vs. [1]HORIBA conventional micro-XRF with a light elements detector
Unique key features

Multi-probes including most advanced 15 µm ultra-high intensity

The XGT-9000 Series provides a wide selection of probe. Multi-probes can be installed in the instrument and switchable on the software. Two ultra-high intensity probes of 15 µm and 100 µm can be chosen.

Multiple probes for the XGT-9000 Series to select
- 10 µm probe
- 50 µm probe
- 100 µm probe
- 400 µm probe
- 1.2 mm probe
- 15 µm ultra-high intensity probe
- 100 µm ultra-high intensity probe

Clear and flexible optical image

The XGT-9000 Series has high quality cameras with adjustable focus and advanced illumination modes. They provide a clear view of the targeted areas of interest on a sample. The figures on the right show a small bearing with corrosion inside. Clear images can be obtained for both the surface of the bearing and the corroded zone inside.

Simultaneous imaging of fluorescent X-rays and transmission X-rays

Combination of elemental images and transmission images allows one to detect hidden defects.

Multiple measurement environments for your analysis

Multiple measurement environments can be selected depending on the application and the nature of the investigated sample. Whole vacuum mode offers the best sensitivity especially for light elements. Partial vacuum mode allows a sample under ambient condition to be measured with enhanced sensitivity. He purge module (optional) is available.
The XGT-9000 Series: Wide range of applications

Lithium-ion battery: Foreign particle analysis

The XGT-9000 Series can detect and determine the composition of foreign particles, and therefore track the source of contamination. The particle detection function (see page 6) within the XGT-9000 Series makes it possible to count the number of particles, characterize particle sizes, and get the coordinate position of particles to re-analyze them in detail.

Fuel cell: Catalyst loading mass and radical quencher imaging

Proton exchange membrane fuel cell, for example, includes some inorganic elements such as radical quenchers and precious metal catalysts, and the composition and the spatial distribution play important roles in the fuel cell performance. The XGT-9000 Series allows non-destructive composition analysis and elemental distribution imaging on fuel cell materials.

Semiconductor: Coating thickness measurement

The combination of micro-probe and thickness calculation function makes the XGT-9000 Series useful for semiconductor applications such as coating thickness measurement of narrow patterns on a wafer and coating on small electronics. Examples on the right show an optional 4-inch wafer holder and coating thickness measurement result of Au pattern on a Si wafer using calibration curve method.

Electronics: Failure analysis, RoHS testing

Simultaneous imaging of transmission X-rays and fluorescent X-rays is effective to find defects inside electronic components (see page 3). The XGT-9000 Series is also an effective screening tool for RoHS testing. It can perform elemental mapping to find suspicious components on a complex sample and analyze them to obtain the concentration of the regulated elements. The software can display compliance with the RoHS thresholds with a pass/fail result.
Geoscience/Mineralogy: Elemental composition identification

The XGT-9000 Series can be equipped with various probes and spot sizes providing comprehensive and detailed understanding of geological and mineral samples. Chemical phase distribution can be obtained with Labspec Link function (see page 7).

Sample: Thin section of a stone

Forensic: Trace evidence identification, fake product identification

The XGT-9000 Series can be used for identification of trace evidences such as collected gunshot residues, glass fragments, and fibers with sizes even down to tens of micron. It can also be used for fake product identification. This data shows comprehensive and detailed elemental map images of gunshot residue on a cloth with two different probes under partial vacuum condition.

Biology: Metabolism investigation

Elemental distribution is important to understand metabolism in biological samples. Biological samples contain water or gas and therefore cannot be measured in a whole vacuum because they will be significantly affected or damaged. The unique partial vacuum mode or optional He purge mode with the XGT-9000 Series enables analysis of biological samples without compromising sensitivity to the light elements.

Archaeology: Origin investigation

Non-destructive elemental analysis is important for valuable archaeological samples, and the elemental information helps us determine when and where they were made. Elemental composition of a dragonfly eye bead (shown right) revealed that it originated in Egypt/Middle East during the 2nd century B.C. The XGT-9000 SL Series (super large chamber model) can fit large samples without compromising performance and X-ray safety.
The XGT-9000 Series Software Suite

Simple and rich GUI/Customizable windows/Advanced functions

The user interface offers a flexible way to measure multiple samples or areas in unattended mode (queue function), display the analytical results, present the data, and edit reports. Advanced treatments include image processing, particle detection, co-localized measurement and multivariate analysis (refer to “Combination of XRF and Raman Spectroscopies”).

Particle detection function

The particle detection function is available from optical image, fluorescence X-ray images, and transmission X-ray image. The particle detection function detects particles automatically and marks their position for multi-point measurement, classification and analysis.

Coordinates of detected particles are automatically stored and transferred to the multi-point analysis mode.
Do more with your HORIBA XRF

Combination of XRF and Raman Spectroscopies

- XRF and Raman spectroscopies are complementary techniques.
- XRF provides information about elemental composition of the material, whereas Raman offers molecular information.
- Co-localized measurements between the XGT-9000 Series and HORIBA Raman Spectroscopy provide more information about a sample.
- Transfer of XGT-9000 Series data to the advanced LabSpec Suite software using LabSpec Link.

Sample holders

Various sample holders are provided to fit different shapes and types of samples. Fast and easy change between holders with HORIBA's modular stage design.

Sample holders

- One touch sample holder
- Sample tray (WR type)
- Water holder (2-inch, 4-inch and others)
- Transfer vessel (Measurement of samples isolated from air)

HORIBA XRF family

XGT-9000SL Series

HORIBA XGT-9000SL Series is an X-ray analytical microscope with a super-large chamber which allows a non-destructive analysis of your valuable large samples such as a large printed circuit board, a fuel cell sheet, a brake rotor, wafers, or archaeological samples without compromising user safety.

- Available chamber size: 1030 mm (W) x 950 mm (D) x 500 mm (H)
- Maximum mapping size: 350 mm x 350 mm on a 500 mm x 500 mm sample
- Sample environment: partial vacuum, whole ambient, He purge (optional)

Compact XRF

Sulfur / Chlorine-in-Oil analyzer

In / On-line analyzer

Real time analyzers for coating thickness or composition
### XGT-9000 Series Specification

#### Basic Information
- **Instrument**: X-ray analytical microscope
- **Principle**: Energy dispersive X-ray fluorescence spectroscopy
- **Detectable elements**:
  - F (6) - Am (95)
  - C (6) - Am (95)
  - B (5) - Am (95)
- **Available chamber size**: 450 mm (W) x 500 mm (D) x 80 mm (H)
- **Maximum mass of sample**: 1 kg
- **Maximum mapping area**: 100 mm x 100 mm on 300 mm (W) x 250 mm (D)

#### Measurement Environment
- **Sample observation**:
  - Whole vacuum
  - Partial vacuum
  - Whole ambient
- **Optical design**:
  - Vertical-coaxial X-ray and optical observation
- **Sample illumination / Observation**:
  - Top, bottom, side illuminations / Bright and dark fields
- **X-ray generator**:
  - Power: Up to 50 W
  - Voltage: Up to 50 kV
  - Current: Up to 1 mA
  - Target material: Rh
- **X-ray guide tube (Probe)**:
  - Probe spot size selection: Various probe combination can be offered
- **Detectors**:
  - X-ray fluorescence detector: Liquid nitrogen-free Silicon Drift Detector (SDD)
  - Transmission detector: NaN [TS]

#### Operating Mode
- **Whole vacuum**
- **Partial vacuum**
- **Whole ambient**
- **He purge (optional)**
- **Whole vacuum**
- **Partial vacuum**
- **He purge (optional)**

#### Instrument Dimensions (main unit)
- **Dimensions (Unit: mm)**
  - Width: 680 mm
  - Height: 860 mm
  - Depth: 760 mm

#### Weight
- **Mass weight**: Approximately 200 kg

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*Please read the operation manual before using this product to assure safe and proper handling of the product.*

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We have now integrated Business Continuity Management System BS22301 in order to provide our products and services in a stable manner, even in emergencies.

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