

# HORIBA

Explore the future

X-ray Analytical Microscope

# XGT *New*

X-ray Guide Tube

5000 series

X-rays Focused to 10  $\mu\text{m}$  Expand the Realm of Human Vision.

- Optical Observations
- Element Analysis
- Non-Destructive Inspection
- Penetrating Internal Inspection

INNOVATION



It is you, the user, who takes the XGT-5000 to its full potential.

Optical Image Observation

Fluorescence X-ray Element Analysis

10  $\mu$ m Micro Analysis

10 cm x 10 cm Macro Analysis

Instantaneous Analysis

Analysis with the Sample at  
Normal Atmospheric Pressure

Transmission Image Observation

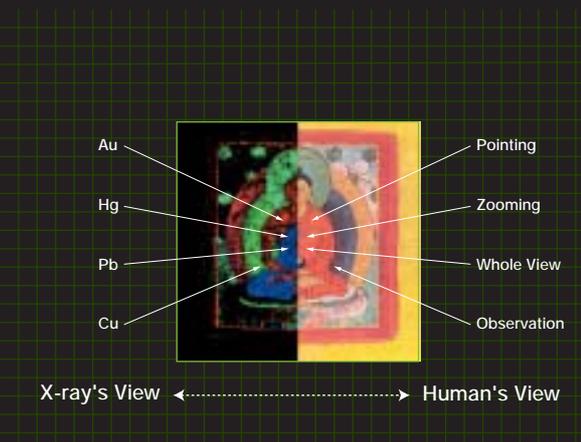
Non-Destructive Analysis

Foreign Material Analysis

Internal Structure Analysis

Analysis of Samples Containing Water

Analysis of Living Organisms



The XGT-5000 makes it possible to analyze samples that are difficult to analyze using conventional systems.

Furthermore, the XGT-5000 requires no bothersome pre-treatment, vacuum making, etc.

— the sample is simply placed in the sample chamber at normal atmospheric pressure, the image enlarged, and element analysis performed.

This natural feeling "new viewpoint for the human eye" is one of the most appealing features of the XGT-5000 X-ray analytical microscope. Instantaneous 2-dimensional analysis of

element composition and structure can be performed at the sample location being viewed by the operator, and the acquired data simultaneously records information for the optical image, element map, and transmitting image.

Various types of analysis are possible without damaging the sample, providing greater analytical possibilities.

The XGT-5000. It is you who brings it to its full potential.

Open the doorway to new types of analyses.

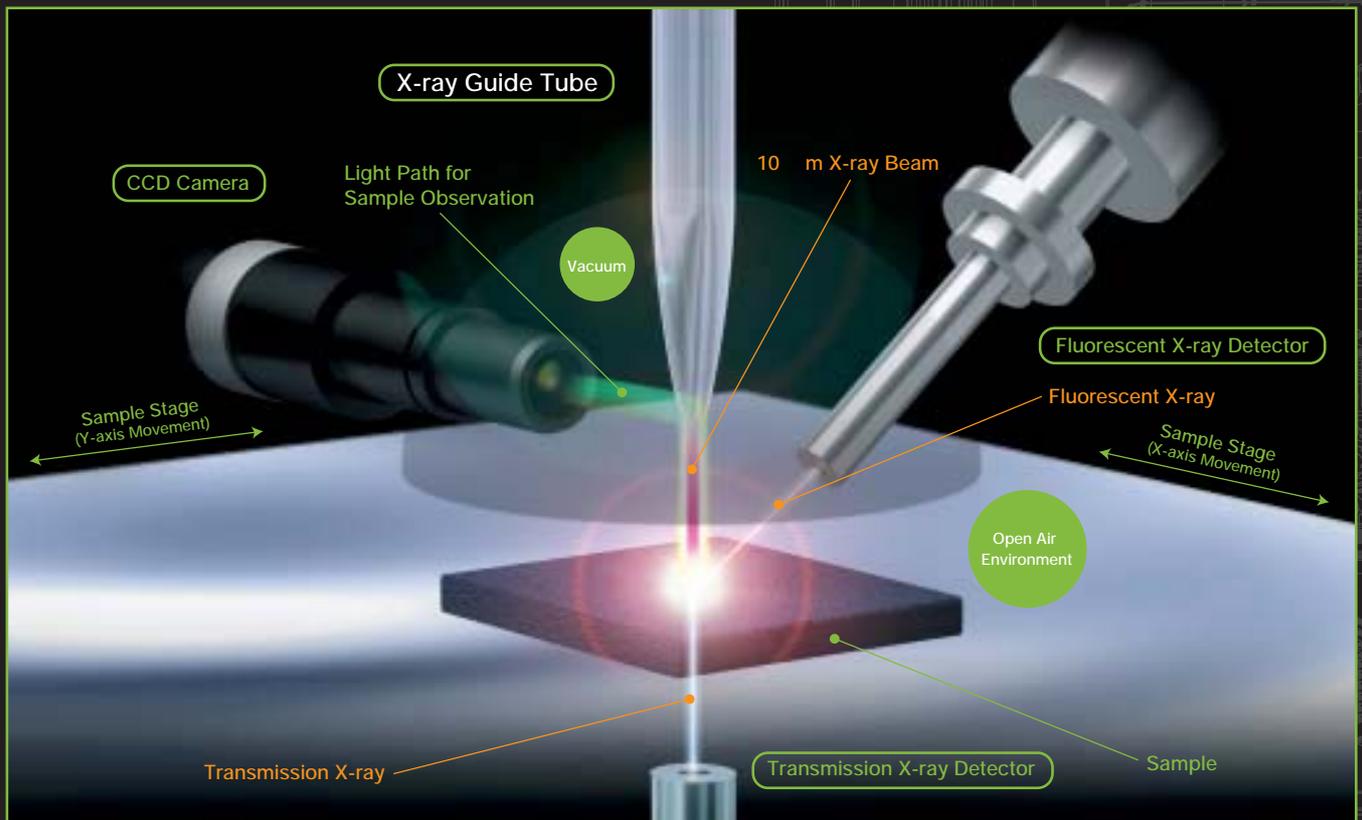


# The 10 $\mu\text{m}$ Innovation

The X-ray guide tube, which focuses the X-ray beams, revolutionizes the very foundation of sample observation and analysis.

The ultra-narrow 10  $\mu\text{m}$  X-ray beam has been made possible with the development of HORIBA's original X-ray guide tube. While the sample is being scanned, the X-ray guide tube irradiates the sample with an X-ray beam, with the CCD camera and X-ray detector working in linked operation. The result is a completely seamless merger of optical microscope observation and the element analysis functions of the X-ray analyzer.

The XGT-5000 represents a completely new generation of microscopes, and the XGT leads the way to a new era of science.



10  $\mu\text{m}$  high special resolution. Greatly reduced measurement time (measurement speeds up to maximum 50 times faster than conventional equipment). Just 3 clicks to go from full specimen observation to 10  $\mu\text{m}$  analysis.

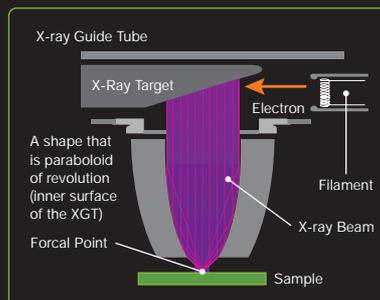
## Measurement Method

The X-ray guide tube (XGT), created using original HORIBA technologies, irradiates the sample with a 10  $\mu\text{m}$  high-intensity X-ray beam. The analysis probe is set in vacuum, making it possible to analyze the sample at normal atmospheric pressure. A sample on the XY scanning stage can be visually observed via a CCD camera from the same axis as the X-ray beam.

The XGT-5000 measures fluorescence X-rays and transmission X-rays from the sample while the sample is being scanned, and then uses these data to create the sample images.

(Patent No. 2900086)

The function by which an optical microscope image is used to specify the measurement point for fluorescence X-ray analysis, and then that point is irradiated by primary X-rays, is covered by this HORIBA, Ltd. patent.



## Comparison of Various Types of Analyzers

The XGT-5000 combines the advantages of various types of measurement devices.

|  | XGT              | SEM/EDX                                | Micro focus X-ray scope |
|--|------------------|--|-------------------------|
| Sample Positioning Using Optical Image     |                  | Electron Microscope Image (Monochrome) |                         |
| Maximum Analysis Area                      | 10 cm x 10 cm    | 1 - 2 mm                               |                         |
| Minimum Analysis Area                      | 10 $\mu\text{m}$ | 0. Several $\mu\text{m}$               |                         |
| Measurable Elements                        | 11Na - 92U       | 4Be - 92U                              |                         |
| Sample Preprocessing                       | No               | Conductivity Processing                | No                      |
| Sample Damage                              | No               | Yes                                    | No                      |
| Sample Contamination                       | No               | Yes                                    | No                      |
| Measurement at Normal Atmospheric Pressure | Yes              | In Vacuum                              | Yes                     |
| Acquired Image/Element Map                 |                  |  |                         |
| Transmission X-ray Image                   |                  |  |                         |
| Optical Image                              |                  |  |                         |

# Various types of analyses are possible with just one unit.

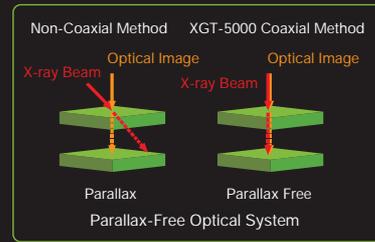
## Narrow 10 μm Beam

With the new development of the 10 μm X-ray guide tube, which provides a higher X-ray beam concentration ratio than conventional X-ray guide tubes, HORIBA has realized a more powerful 10 μm X-ray beam. High-speed measurements are possible at speeds up to maximum 50 times faster than conventional equipment, providing much greater usability.



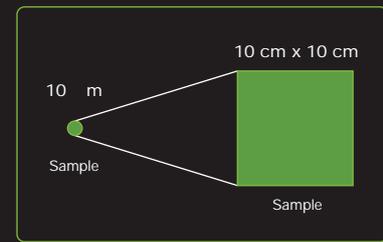
## Simple, Accurate Sample Positioning

The XGT-5000 uses a structure that places the CCD sample observation image along the same axis as the X-ray beam. There is no analysis position parallax, even for samples with uneven surfaces, providing a perfect merger of sample observation operations and analysis results. The XGT-5000 provides an outstanding combination of sample operability and data accuracy.



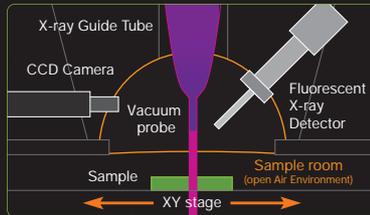
## From Micro Measurements to Macro Measurements

The range of measurable sample area extends from a minimum diameter of 10 μm to a maximum area of 10 cm x 10 cm, making the XGT-5000 flexible with a wide range of sample sizes. This flexible system covers everything from macro analysis, for a general survey of a wide area, to the inspection of a specific micro area.



## Instantaneous Analysis at Normal Atmospheric Pressure

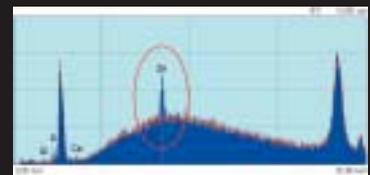
The XGT-5000 uses a structure in which the analysis probe is in vacuum probe, which increases sensitivity to light elements. As a result, samples can be measured at normal atmospheric pressure, so there is no need to wait until a vacuum forms in the sample chamber, and the need for pre-treatment procedures such as sample drying has been eliminated.



The 10 μm X-ray beam brings new focus to the field of analysis.

## Fluorescence X-ray Element Analysis

The XGT-5000 performs quick element analysis using fluorescence X-rays. In addition to qualitative and quantitative analyses of the sample, the XGT-5000 can also easily perform multi-point analysis, line analysis, and mapping, and can even perform phase-analysis-based material analysis.



## Transmission image by parallel X-Ray Beam

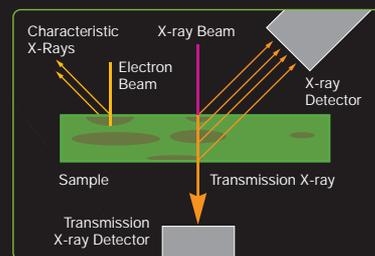
The XGT-5000 can obtain transmission X-ray images, so it can be used to easily observe internal areas of electronic parts, etc., and to perform structural analyses. Scanning is done with a narrow perpendicular beam that does not scatter, resulting in clear transmission images even for non-flat samples such as cylindrical parts.



Perpendicular transmission Images Can Even Be Made for Cylindrical Samples

## Internal Analysis and Foreign Material Analysis

The irradiated X-rays penetrate into the sample, providing transmission images and also making it possible to obtain information about the elements inside the sample.



## Analysis of Samples Containing Water

With HORIBA's original vacuum probe, no sample pre-treatment is needed and analysis is performed with the sample at normal atmospheric pressure. As a result, samples containing water, even plants and animals, can be measured and analyzed. There is no damage to the sample, making the XGT-5000 well suited for medical and biological applications as well.



Simple, Easy Operations

**Visually check the sample, and then start analysis right away.**  
**Easy positioning -- what you see is what you get.**

**1** STEP

### Easy Sample Loading

The sample is placed XGT-5000 open air. No pre-treatment is required, so analysis can be started quickly.

There is no need to make a vacuum in the sample chamber.

A series of small samples can be set on a holder, and can be easily analyzed one by one.

Place the sample in the sample holder.



Place the sample in the sample holder. There is no need for sample preprocessing, such as conductivity processing or drying. The measurement position is also specified from the monitor after the sample is loaded into the XGT-5000, so there is no need to worry about sample positioning during loading.



Load the sample holder into the XGT-5000.  
There is no need to make a vacuum.



Load the sample holder into the XGT-5000. At this point, there is also no need for XGT-5000 preprocessing operations such as vacuum making, so after the sample holder is loaded, you can proceed right to the measurement position specification operation.

The sample is analyzed at normal atmospheric pressure.

The sample chamber is maintained at normal atmospheric pressure, so even samples that would be damaged by a vacuum (samples containing water, living samples, etc.) can be analyzed with no preprocessing.

**2** STEP

### Quick Positioning Using Magnified Images

Just 3 clicks from a view of the entire sample to the start of the analysis of a 10  $\mu$ m area. started quickly.

The CCD light and X-ray are fixed on coaxial path, so measurement positioning is easy and highly accurate.

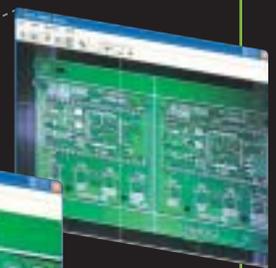
The displayed sample image corresponds exactly to the analysis point, providing greatly enhanced operation efficiency.

Quickly proceed from a view of the entire sample to the selection of the target point.

Just three clicks from a view of the entire sample to the selection of the point to be measured.

After the image of the entire sample is displayed on the monitor, you can select the exact point for high-precision 10  $\mu$ m analysis in just 3 mouse button clicks.

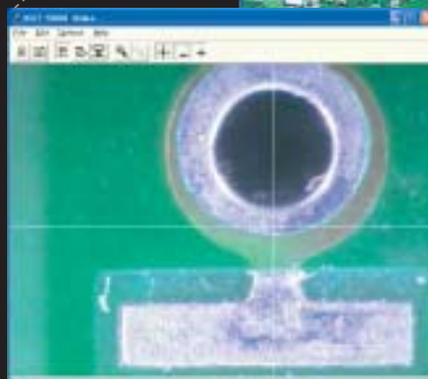
1. Full Image



2. 25X Magnification

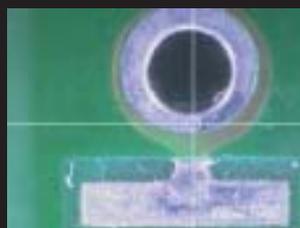


3. 100X Magnification



Move the sample stage by clicking the optical image.

When you need to make minor compensations to the measurement position, simply click the displayed optical image to move the sample stage. There is absolutely no need for complex operations.



Before Moving Stage



After Moving Stage



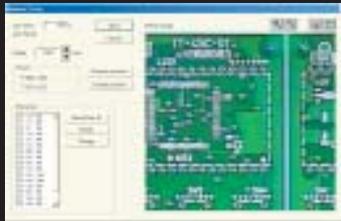
One of the major advantages of the XGT is that it provides superb, seamless operations, from optical image observation to element analysis. In just three easy clicks, you go from a view of the entire sample to specifying the 10 μm point to be measured. All operations, from sample loading to the creation of the analysis report, are done with natural, intuitive operations.

### 3<sup>STEP</sup> Diverse Range of Analytical Methods

Specification of analytical location is available by several ways such as multi-point and line analysis.

Phase analysis can also be used to analyze the materials in the sample.

The XGT-5000 is also equipped with spectrum matching functions to identify sample materials.



#### Mapping Start Screen

The area to be mapped is selected while viewing the sample on the monitor.



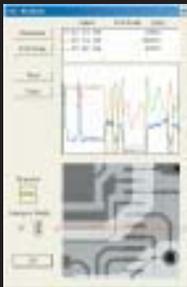
#### Multi-Point Analysis

If points are selected for multiple locations, the spectrum at each location can be collected automatically.



#### Line Analysis

The XGT-5000 can also perform linear analysis, which is effective for analyzing areas such as a sample cross-section.



#### Phase Analysis (Option)

Phase analysis is available as an optional function. With phase analysis, the various phases of a sample are displayed in different colors, based on multiple element maps. This option is recommended for applications requiring material analysis.



#### Matching Functions

Previous data can be searched for spectrums similar to the current analysis results, and the search results displayed in order of the degree of similarity. Saving data acquired from foreign substances makes it possible to quickly identify new substances.

### 4<sup>STEP</sup> Easy-to-Understand Results

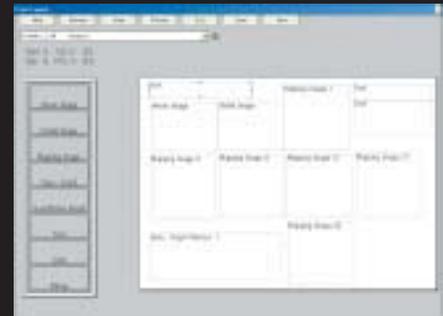
A wide range of output options is available, including optical image, mapping image, and spectrum image.

The output layout of the acquired data can be freely arranged.

Layout formats can be saved and edited.

#### Data layout can be arranged freely.

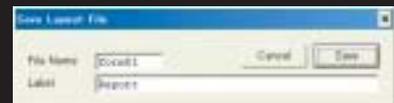
Analytical results can be printed, with optical images, spectrums, mapping images, and text freely arranged in the printing layout.



Freely position data within the layout.

#### Layout formats can be saved.

The XGT-5000 can save user-set layout formats. New reports can then be created easily by loading the corresponding formats.



#### Example of a Measurement Results Report.

Optical images, X-ray mapping images, and X-ray transmission images can be saved in one file, making it easy to quickly draft analysis reports.



Flexible Adaptation to Sample Size

## Compatible with a wide-range of sample sizes, from micro-samples to macro-samples.

10  $\mu$ m (Minimum Analysis Unit)

0.5 mm x 0.5 mm (Minimum Mapping Area)

### Examples of the Element Analysis of Micro-Samples

Analysis of Cut Circuits and Foreign Materials in Electronic Parts  
Ion Migration Analysis  
Analysis of Circuit Board Parts, LEDs, and Metal Fragments  
Analysis of Material Fragments



1 cm x 1 cm

### Examples of the Element Analysis of Macro-Samples

Non-Destructive Analysis of Relics, Foreign Materials, etc.  
Analysis of Concrete Fragments and Geologic Stratum  
Rock Samples

10 cm x 10 cm (Maximum Mapping Area)



### 10 $\mu$ m Analysis of a Lead-Free Solder Circuit Board

Analyze a 1.0 mm area of a circuit board using a 10  $\mu$ m-diameter beam.

Measurement Conditions: X-ray Tube Voltage: 50 kV,  
X-ray Tube Current: 1.0 mA, X-ray Radiation Diameter: 10  $\mu$ m  
Samples Measured: Lead-Free Solder Circuit Boards, Sn, Bi, Ag and Ge Solder,  
Circuit Boards after 80 °C, 85 % Tests

#### Considerations

Voids within a sample could be checked using the transmission X-ray image obtained by irradiating the sample with a 10  $\mu$ m-diameter X-ray beam. From the data measured for tin (Sn), copper (Cu) and bromine (Br) images as well as RGB composite images, it was possible to verify that it was the copper that was causing the ion migration. The ends of the copper pads were not covered by solder, leaving the copper exposed. It could be surmised that this along with the effects of residual flux and residual cleaning solution caused the migration.

Test Sample Provided by Dr. Suganuma, Osaka University

### 1 cm Analysis of a Foreign Substance in a tablet

Analyze a foreign substance inside a 1 cm tablet with no pre-treatment.

Measurement Conditions: X-ray Tube Voltage: 50 kV,  
X-ray Tube Current: 1.0 mA, X-ray Radiation Diameter: 100  $\mu$ m  
Samples Measured: Foreign substance inside a tablet

#### Considerations

A foreign substance visible from the surface of the tablet could be specified for analysis simply by using the mouse to click the area displayed on the optical microscope image. By comparing the spectrums of the foreign substance and the background, it was possible to verify that the foreign substance was a stainless-steel material, for which the primary component was iron.

### 10 cm Analysis of a Relief Image from a Nepalese Manuscript

Analyze the pigments across the entire surface of a valuable 10 cm x10 cm painting.

Measurement Conditions: X-ray Tube Voltage: 30 kV, X-ray Tube Current: 1.0 mA,  
X-ray Radiation Diameter: 100  $\mu$ m  
Samples Measured: Relief Image from a Nepalese Manuscript,  
The Book of Constant Life in Sanskrit (Kojukai Ver. C)

#### Considerations

Because the X-rays penetrated into the paper, it was possible to detect not only the surface layer of the pigment, but also the components of underlying layers where the image had been painted over. ( This depends on the combination of elements contained in the material and the material thickness) The results of analysis using XGT have verified the types of coloring pigments as well as the techniques used to apply the pigments. Through the collection of this type of data, it may also be possible to surmise who created this important cultural asset, as well as the location and era in which it was created.

Relief Image from a Nepalese Manuscript, The Book of Constant Life in Sanskrit (Kojukai Ver. C)  
Test Sample Provided by: Dr. Enami, Ryukoku University Ancient Books Digital Archive Research Center, from the Collection of the Ryukoku University Library

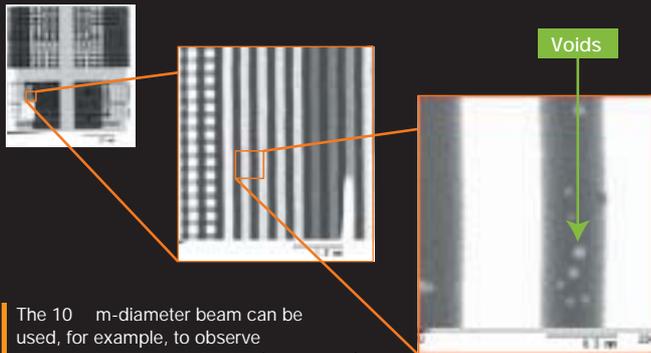


The XGT-5000 can flexibly adapt to a wide-range of sample sizes, for the microanalysis of an area on the order of 10 μm in diameter, to the analysis of a maximum area of 10 cm x 10 cm.

The XGT-5000 can be applied to everything from the element analysis of a 10 μm area of a microchip to the element analysis of the entire image area of an archeological relic.

**Minute areas on circuit boards can also be examined and analyzed on the micro-order.**

**Observation of Internal Structure Using Transmission Images**

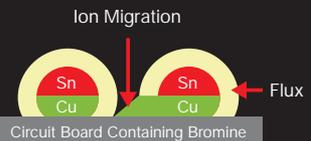


The 10 μm-diameter beam can be used, for example, to observe transmission images of voids (air bubbles) in solder and to analyze element distribution, including ion migration, in minute areas.

**Ion Migration Analysis Using Fluorescence X-rays**

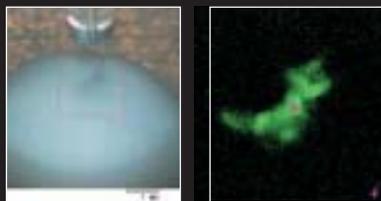


RGB Composition image (R:Sn G:Cu)



**Easy, direct analysis of a visible foreign substance.**

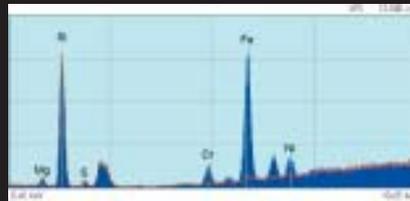
**Direct Element Analysis of a Foreign Substance in a Tablet**



optical image

Fe-K

**Measurement Results**



Blue: Foreign Substance, Red: Background

A foreign substance inside a tablet can be analyzed with no pre-treatment, such as removing the substance or cutting a cross-section of the sample.

The ability to perform this type of analysis depends on the combination of elements contained in the foreign substance, the depth of the substance in the sample, and the size of the substance.

**Non-destructive element analysis can also be performed for large samples.**

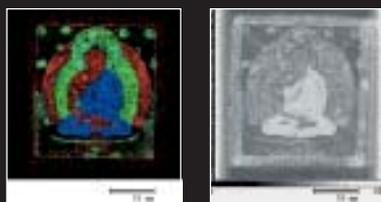
**Mapping Results**



Au-L

Cu-K

Pb-L



RGB Composition image (R: Au G: Cu B: Pb)

Transmission X-ray image



From the penetrating X-ray image, it was possible to verify the differences in X-ray penetration resulting from pigment components and pigment thickness. The X-ray mapping image makes it possible to surmise the types of coloring pigments used in the Amida (Buddha) image painted on the paper.

| Analyzed place            | Color                    | Detected element     | Estimated pigment (Ideal chemical formula)   |
|---------------------------|--------------------------|----------------------|--|
| ① Baking of overall paper | Yellow                   | Pb Cr                | Chrome yellow (PbCrO <sub>4</sub> )  |
| ② Frame                   | Vermillion               | Hg                   | Vermillion sand (HgS)  |
| ③ Stole                   | Orange                   | Pb                   | Red lead (Pb <sub>3</sub> O <sub>4</sub> )   |
| ④ Skin                    | Gold                     | Au                   | Attached gold leaf   |
| ⑤ Leaf                    | Green                    | Cu                   | Patina (CuCO <sub>3</sub> /Cu (OH) <sub>2</sub> )  |
| ⑥ Back                    | Blue                     | Cu                   | Ultra marine (2CuCO <sub>3</sub> /Cu (OH) <sub>2</sub> )   |
| ⑦ Petal                   | Gradation by white, pink | Ca Mg Si<br>Pb Cr Cu | Chalk white (CaO, CaCO <sub>3</sub> ), Talc (Mg <sub>3</sub> (Si <sub>4</sub> O <sub>10</sub> ) (OH) <sub>2</sub> ) & Chrome (PbCrO <sub>4</sub> ) drawn from the above of blue pigment Cu |

# Various analytical problems and difficulties, solved by the XGT.

**It takes a lot of time and effort to cut cross sections of foreign substances.**

The process of cutting out a sample could take half a day. And, the foreign substance sample could be damaged or completely destroyed during the cutting process.

**The XGT offers solution!**

Foreign substances can be analyzed without first being extracted, even when they are inside plastic material. With conventional systems, it could take up to half a day to prepare and analyze a foreign substance, but with the XGT-5000, the total time from sample loading to report drafting is a mere 10 minutes. This is truly a great savings in time and effort.

Non-Destructive Analysis of Foreign Substances inside Plastics and Papers  
 Analysis of Metallic Substances in Food and Pharmaceutical Products  
 Analysis of Foreign Substances in Electronic Materials

**You need to perform element analysis for a sample containing water.**

Too much time and work is involved in drying the sample. The sample would be destroyed if it were dried.

**The XGT offers solution!**

Samples that cannot be subjected to a vacuum can be analyzed by the XGT-5000 at normal atmospheric pressure. Analysis can also be started quickly for samples containing water, including living samples, with no sample preprocessing.

Element Analysis of Food Products (Element Distribution, Foreign Substance Analysis, etc.)  
 Living Samples Such As Plants and Animals Tissue Samples Such As Teeth and Internal Organs

**EXAMPLE**

**A foreign substance can be seen but not measured, and, it would be extremely difficult to remove for analysis.**

**Analysis of a Foreign Substance in Plastic**  
 Measurement Conditions: X-ray Tube Voltage: 50 kV, X-ray Tube Current: 1.0 mA, X-ray Radiation Diameter: 100 μm  
 Sample Measured: A foreign substance inside a plastic sample

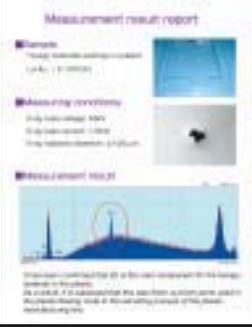
Designating a point from an optical micro scope: Direct measurement of a foreign material portion (with out the pre-treatment of extracting the cross-section and taking out the foreign material etc.)

The foreign substance can be seen, but it would be difficult to remove.



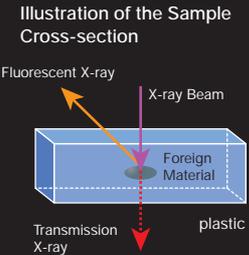
Optical microscope image

Example of a Measurement Results Report

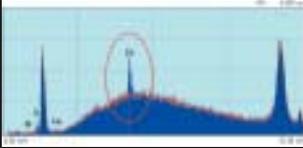


Less than 10 minutes from the time the sample is loaded until the report is drafted.

Illustration of the Sample Cross-section



Measurement Results



Blue: Foreign Substance, Red: Background

**EXAMPLE**

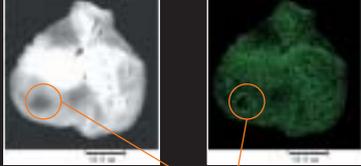
**If the sample is dried, its element distribution will change**

**Analysis of an ulcerated section of the stomach of a rat**  
 Measurement Conditions: X-ray Tube Voltage: 30 kV, X-ray Tube Current: 1.0 mA, X-ray Radiation Diameter: 100 μm  
 Sample Measured: Tissue from a rat stomach. The stomach is cut at the center, the sample submerged in formalin, and then sandwiched between two sheets of film for analysis.

Zinc components are said to contribute to the healing of gastric ulcers. In order to verify the effects of zinc, rats having gastric ulcers were orally given medication containing zinc, and the micro-quantities of elements in the area surrounding the ulcer examined. Rats not given the zinc medication also showed the same type of improvement as rats given the medication, which was thought to be due to the natural healing powers of a living organism. When testing the tissue samples, if the samples are dried, the zinc distribution could be altered. Therefore, the XGT is highly effective for use in the analysis of tissue samples from living organisms.

Mapping Results

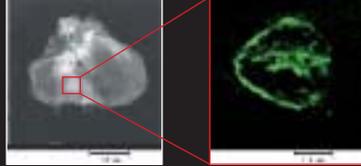
Stomach of a Rat Receiving the Oral Medication



Transmission X-ray Image      Z -K

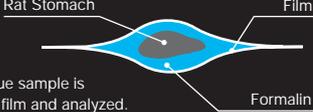
Ulcerated Area

Analysis Results for the Stomach of a Rat Not Receiving the Medication



Transmission X-ray Image      Z -K

Sample Pre-treatment



The rat stomach is cut at the center. After immersion in formalin, the tissue sample is sandwiched between two sheets of film and analyzed.



The introduction of the XGT-5000 into a laboratory provides fundamental solutions to a wide-range of analytical work problems, problems that could not be resolved with conventional systems. In this section, we will examine some specific examples of these problems, looking at the factors that caused the problems and the ways in which the XGT-5000 solved the problems.

**You need to locate a malfunction on a circuit board without damaging the circuit board.**

You have no idea where the malfunction is. You need to analyze the circuit board as a package. If the circuit board is disassembled, it will be impossible to locate the malfunction.

**The XGT offers solution!**

There is no need to damage the protective resin on the circuit board, so the defective area in the circuit board can be accurately identified. Furthermore, because both transmission X-ray images and X-ray mapping images can be viewed simultaneously, information about internal elements can also be checked, providing useful information for deducing and identifying the cause of the problem.

- Analysis of Defects in Resin Molds
- Analysis of IC Package Defects
- Analysis of Defects in Condensers, LEDs, etc.

EXAMPLE

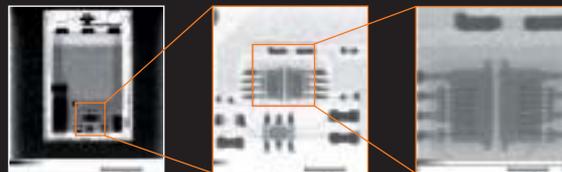
**If the circuit board is disassembled, it will be impossible to analyze the conditions of the defects.**

Analyze a defect inside a digital camera battery

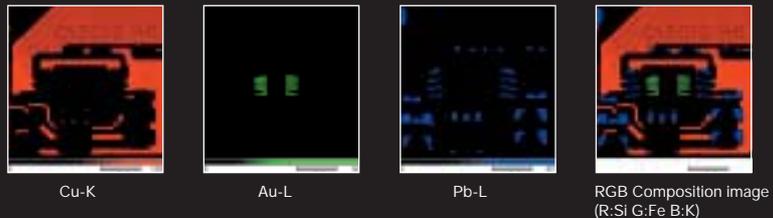
Measurement Conditions: X-ray Tube Voltage: 50 kV, X-ray Tube Current: 1.0 mA, X-ray Radiation Diameter: 100 μm  
Sample Measured: Digital camera battery, measured directly.

With electronic parts encased in molded plastic, the external appearance of the parts provides no information about the internal circuit structure. With the XGT, however, transmission X-ray images can be used to check the internal structure. After the location of the defect has been identified, X-ray mapping images can be used to analyze the part's interior and deduce the cause of the defect.

Internal Observation Using Penetrating Images



Mapping Results



**You need to analyze a large sample.**

With conventional systems, there is no way to check for uneven element distribution over a large area. It would take a lot of time and effort to divide a large sample into smaller pieces and to perform repeated analyses.

**The XGT offers solution!**

Large samples that are difficult to divide into smaller pieces, such as rocks, can be loaded into the XGT-5000 as is (maximum sample size: 350 x 400 x 40 mm). Wide-range mapping can be performed over a maximum area of 100 mm x 100 mm. Procedures such as element segregation can also be performed easily, and transmission X-ray images can be obtained for rock samples up to 25 mm thick.

- Geologic Stratum Rock Samples and Concrete Fragments
- Archaeological Specimens
- Various Types of Molded Products

EXAMPLE

**There is no way to examine element distribution over a wide area with conventional systems.**

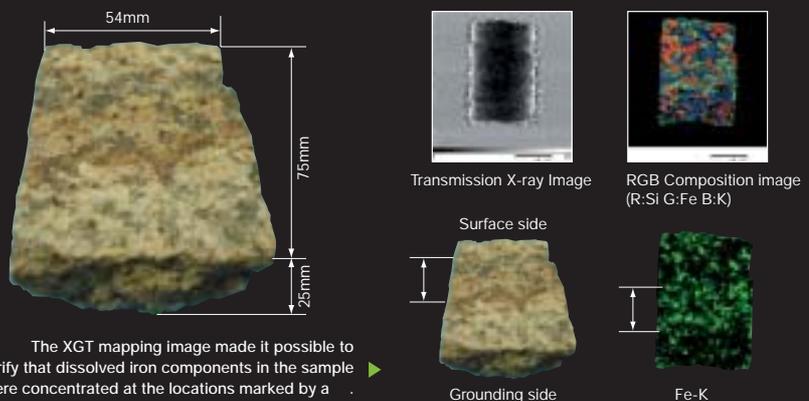
Analysis of a Granite Sample

Measurement Conditions: X-ray Tube Voltage: 50 kV, X-ray Tube Current: 1.0 mA, X-ray Radiation Diameter: 100 μm  
Sample Measured: Granite Sample

A wide area (maximum mapping area: 10 cm x 10 cm) could be analyzed and the properties of the sample checked without cutting the granite sample. It is thought that when granite is subjected to weathering, iron in black mica tends to flow from the ground surface into the ground. With the XGT, a wide area of the sample (98.816 mm x 98.816 mm) could be mapped, making it possible to check the conditions of sample weathering.

Mapping Area: 98.816 mm x 98.816 mm

Mapping Results



The XGT mapping image made it possible to verify that dissolved iron components in the sample were concentrated at the locations marked by a red arrow.

Granite generally contains the following minerals: Quartz SiO<sub>2</sub>, Plagioclase CaO, Al<sub>2</sub>O<sub>3</sub>, 6SiO<sub>2</sub>, Black Mica K (Mg Fe)<sub>3</sub>(AlSi<sub>3</sub>O<sub>10</sub>)(OH)<sub>2</sub>, Potash Feldspar K<sub>2</sub>O, Al<sub>2</sub>O<sub>3</sub>, 6SiO<sub>2</sub>

Unparalleled Specifications Forge the Way for New Analytical Possibilities

# XGT-5000 Specification · Dimensional out line

## Specifications

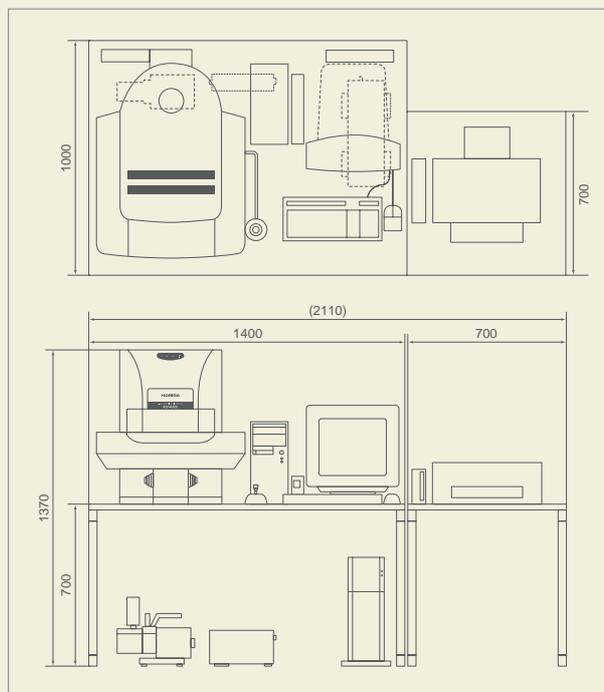
| XGT-5000  |                                 | Type I   | Type II |
|---|---------------------------------|--|---------|
| High Intensity Model<br>(Spatial Resolution: 10 μm, 100 μm) |                                 |  |         |
| Standard Type<br>(Spatial Resolution: 100 μm)               |                                 | Can be upgraded to 10 μm   |         |
|   |                                 | (Option) <sup>1</sup>  |         |
| Full Sample Optical Image Observation System                |                                 | (Option)   | ( 2 25) |
| Enhanced Optical Image Coaxial Observation System           |                                 | ( 30) <sup>2</sup>   | ( 100)  |
| Measurement Position Setting from the Optical Image         |                                 |  |         |
| X-ray Tube  |                                 | 50 kV max., 1 mA, Rh target  |         |
| Fluorescence X-ray Detector                                 |                                 | High-Purity Si Detector (Xerophy)  |         |
| Elements Detected   |                                 | Na to U (with sample at normal atmospheric pressure)   |         |
| Energy Range  |                                 | 0~40 keV   |         |
| Maximum Measurement Area / Maximum Sample Size              |                                 | 100 mm 100 mm/350 mm 400 mm x 40 mm  |         |
| OS  |                                 | Windows XP   |         |
| Software  | Qualitative Analysis Functions  | Automatic Qualitative Analysis, Multi-Point Analysis, Matching   |         |
|   | Quantitative Analysis Functions | FPM Quantification (Standardless, 1-point Calibration) Analytical Curve Quantification   |         |
|   | Mapping Analysis                | Simultaneous Mapping of the Transmission Image and Mapping Image, Pseudo Color, RGB Composition, Image Line Analysis, Inter-Image Calculation, Phase Analysis (Option), Contrast Adjustment, Analysis Position Specification from the Transmission Image, Mapping Image and Optical ImageCART Display, Printer Output, |         |
|   | Option                          | Phase Analysis, Data Output, Analysis Report   |         |
| Power Supply  |                                 | AC100~240 V/50/60 Hz/1.3 kVA or less   |         |
| Device Weight   |                                 | 280 kg   |         |
| External Dimensions   |                                 | 2110 (W) 1000 (D) 1350 (H) mm  |         |

Vacuum Pump Color Printer MO Drive (Option) CD-RW Drive (Option)  
17-in LCD Monitor (Option) Transmitted Light Illumination System (Option)

- <sup>1</sup> The transmission X-ray window is displayed during mapping even if the transmission X-ray detector is not installed.  
<sup>2</sup> Maximum 100 magnification is available when full sample optical image system is installed.

The X-ray analytical microscope is a device that was successfully developed with the technological assistance of the National Institute for Materials Science accordance with the New Technologies Consignment System of the Japan Science and Technology Corporation.  
Application Patents Awarded. Patent Nos. 1699838, 1806535, 1828290, 1866194, 2032556, 2032557

## Dimensional outlines Units: mm



# The XGT Series Lineup

## Lineup of Systems for Testing Compliance to WEEE and RoHS Directives

Both the WEEE and RoHS are regulations related to electrical and electric products in the EU. WEEE is a regulations based on EC175 promoting the collection and recycling of electrical and electric equipment.

RoHS is a regulations based on EC95 regulating substances such as lead, mercury, cadmium, etc., that are contained in electrical and electric equipment.

These regulations apply to both imports and exports, and require that all parts in all types of electrical and electric products be checked. With the XGT Series, parts and products can be quickly and easily inspected for compliance with these directives.

### XGT-5000WR

Large samples up to 350 x 400 x 40 mm can be measured.



#### Easy Sample Pre-treatment

Small samples can be measured (Minimum Size: 1.2 mm diameter)

When using an X-ray guide tube with a 1.2 mm X-ray irradiation diameter.

Large samples up to 350 x 400 x 40 mm can also be measured.

Samples with uneven surfaces can be measured with no position misalignment.

#### X-ray Microscope Functions

Measurement position selection from an image of the entire sample area.

Element distribution measurement.

Element mapping and automatic XY stage.

Multi-point analysis.

Automatic measurement of samples in the order they are placed in the sample chamber.

Can also be used as a micro-area element analyzer.

### XGT-1000WR

Directly measures parts and products.

An easy way to perform manufacturing line inspections.



Cd/Pb in products and parts can be measured with no sample pre-treatment. Simply place the sample by hand directly into the large sample chamber (460 x 360 x 150 mm), and then easily position the measurement location by hand while verifying the location with the CCD camera image. The XGT Series has been designed to simplify inspections such as analyses performed on manufacturing lines. The XGT Series instruments are equipped with a standard 1.2 mm-diameter high-intensity X-ray guide tube. When the guide tube is switched to the optional 0.1 mm X-ray guide tube, XGT Series instruments can also be used as micro-area element analyzers.

**Horiba continues contributing to the preservation of the global environment through analysis and measuring technology.**



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

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