

XRF-PT230

XRF Plating Thickness instrument
User Manual



Chapter I: Symbols

1.1 notation



Indicates a safety sign and a warning sign of potential danger to the instrument or accessory, and possibly to the operator himself.

★ Indicates particularly important tips and notes.

• Show List.

"5 Start Up" Refer to one of the chapters in this operator's manual.

<**START**> Usually refers to the operation keys on the measuring head console, but also refers to the keys on a computer keyboard.

[**CANCEL**] Usually refers to command buttons such as those displayed on the screen.

<**HV ON**> Usually refers to the indicator on the console of the measuring head.

1.2 clarification

Plating thicknesses, compositions, or statistical results in this manual are examples only.

It may be different from the data shown on your display or printed out by your printer. This does not indicate an error in operation.

Chapter 2: Operation, Maintenance and Storage of Instruments and Accessories

2.1 Instrument Usage

The XRF-PT230 is suitable for coating thickness measurement and material analysis.

2.2 Operator skill requirements

★ Personnel operating the XRF-PT230 must be trained.

When using the EFP-T software, the operator should have a basic knowledge of Microsoft Windows.

★ Information on using Microsoft Windows can be obtained from the Microsoft Windows manual, Microsoft Windows online help, or references

2.3 Radiation safety aspects

The XRF-PT230 is designed to meet national and international X-ray safety requirements because of the radiation generated by the use of X-ray tubes in the measuring head:

- The high voltage key determines whether X-radiation is produced or not by turning the high voltage on the X-ray tube on or off.
- A multi-stage fail-safe interlock system controls the generation of X-rays for operator protection.
- If the measuring door is not completely closed, X-radiation will not enter the measuring chamber.
- Adequate shielding is used to minimize the amount of radiation from the outside.

To ensure safe operation of the XRF-PT230, the following points must be observed:

- ★ Always operate the instrument in accordance with this operation manual.
- ★ Do not damage any components of the safety interlock system, such as microswitches!
- ★ Do not make any changes to the instrument!

2.4 Electrical safety aspects

Normal use of the instrument in accordance with this operation will not cause any danger or damage to people.

2.4.1 power connection

To avoid damage to the instrument, the supply voltage must match that shown on the instrument nameplate.

The instrument must be connected to a grounded outlet using a three-phase plug.

2.5 Maintenance of instruments and accessories

Only authorized personnel should repair the XRF-PT230.

2.5.1 Turn on the instrument.

The instrument contains components that generate high voltage.

Only authorized personnel may open the instrument.

The power supply must be disconnected before opening the instrument !

Great care must be taken when opening the instrument for maintenance !

2.6 Environmental conditions for the operation and storage of instruments and accessories

The XRF-PT230 complies with the relevant regulations regarding **electromagnetic compatibility**. The measurement results are not affected by the maximum values of the parameters mentioned in the standard EN 50082-1(referring to the standards IEC 801-2, 801-3 and 801-4) . Special care should be taken to isolate the instrument from the presence of electromagnetism (e.g. motors).

The instrument is suitable for operation and use at ambient temperatures from 10 to 40°C (50 to 104°F) and for storage at temperatures from 0 to 50°C (32 to 122°F).

The permissible humidity range for operation and storage is between 0 and 85% (non-condensing). The ambient temperature and humidity should be kept constant during operation.

When the instrument is exposed to sunlight, the temperature behind the window glass can easily exceed 50°C(122°F)!

In order to avoid high temperature damage to the instrument, please do not operate and store the instrument and accessories in such an environment.

If liquid enters the instrument, unplug it immediately! Have the instrument thoroughly checked by a technician before reuse.

To avoid short-circuiting, do not allow the instrument to come into direct contact with liquids.

The instrument is not acid-proof. Avoid operating the instrument in acidic environments (e.g., plating).

The instrument cannot be used in explosive atmospheres.

2.7 Use, storage and transportation of calibration standards

Adjustment standards are used to adjust the XRF-PT230.

The condition of the calibration standards is a prerequisite for proper calibration and measurement. The following points will help to keep the calibration standards in good condition

★ **Do not damage the adjustment standards! Dirt and scratches on the tuning standards can cause incorrect readings.**

★ **Do not remove dirt from the calibration standards with cleaning materials that may cause mechanical or chemical contact with the calibration standards! If necessary, gently wipe off the dirt with a soft, lint-free cloth.**

★ **To avoid contamination or damage to the calibration standards, store and transport the calibration standards in a storage box.**

2.8 representations

The Instrument refuses to provide a warranty if.

- **XRF-PT230 instruments or accessories are not intended for normal use.**
- **Attachments are connected to devices that are not recommended or approved by our company.**
- **Repairs or structural changes to XRF-PT230 instruments or accessories are carried out by unauthorized third parties.**
- **Improper operation of the XRF-PT230 instrument or accessories (e.g., use in explosive, corrosive environments, or where ambient temperatures are too high)**
- **Not used as recommended in the operating manual.**

Chapter 3: Introduction to the Instrument

EFP-T Software and Accessories

3.1 Measurement Methods

The XRF-PT230 utilizes the standard ISO 3497-2000 and ASTM B568-1998x-ray test method for coating thickness measurement and material analysis.

3.2 EFP-T software

The EFP-T software is used to control the measurement head of the XRF-PT230 and to analyze the measurement signals generated by the head.

The EFP-T software can be used to analyze, display and calculate plating thickness or material composition. Figures 3.1 to 3.2 show the operation window of the EFP-T software

These different windows are labeled with terms in this operator's manual.

3.3 Technical data and current functionality

Technical data and available features for each model of the XRF-PT230 as well as information on the EFP-T software , can be obtained from the specification sheet (see **Appendix Specification Sheet**)

★ In order for the EFP-T software video to display properly, the appropriate driver software must be installed (if not already installed!)

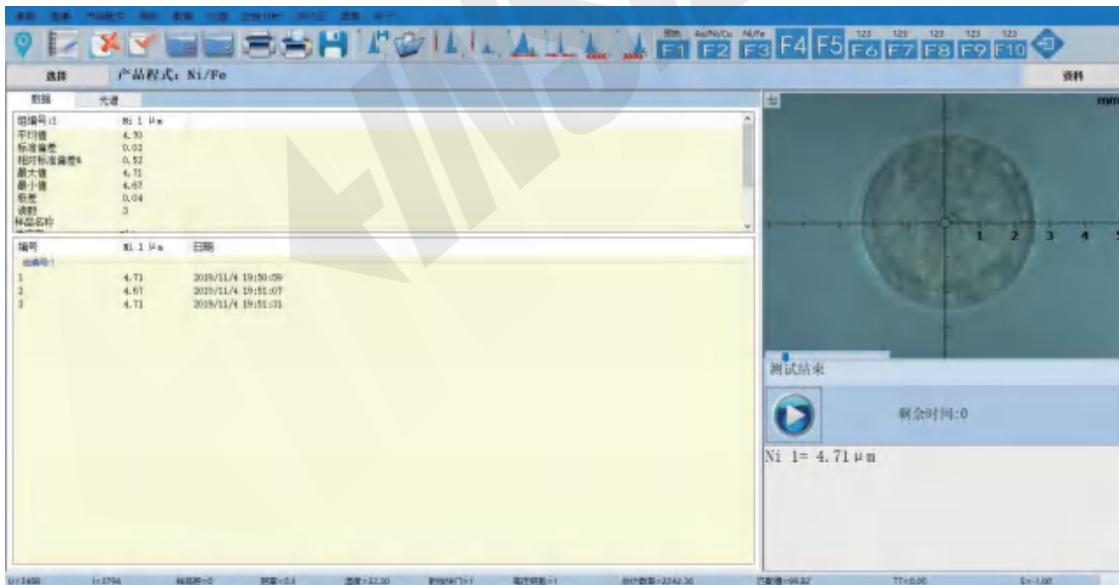
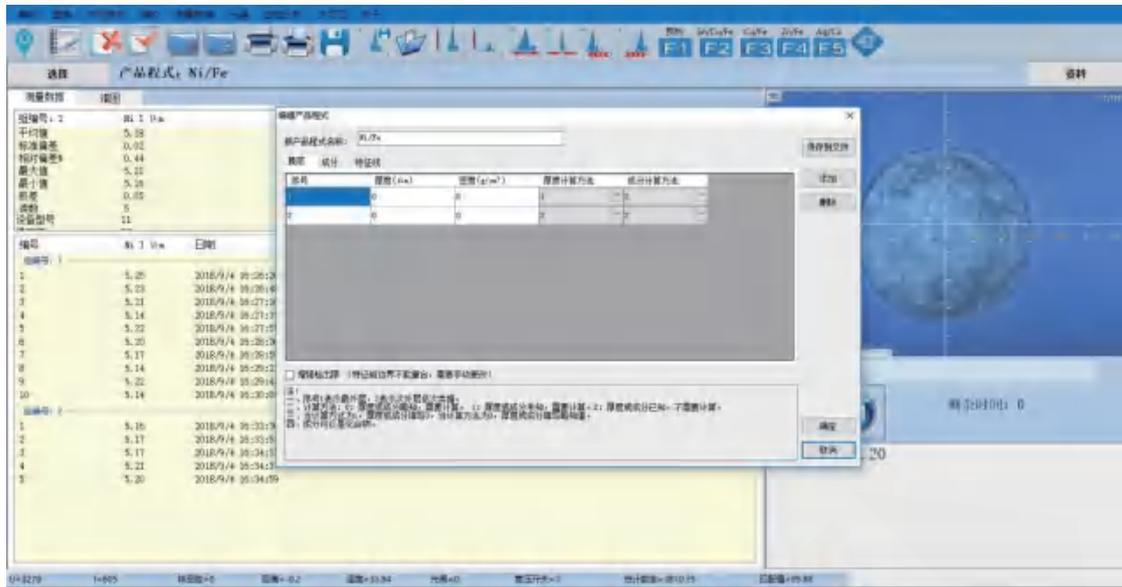


Figure 3.1: Measurement Window of the EFP-T Software



3.2: Modify Product Program dialog box, Expression field

3.4 measuring head

The measuring door can be opened and closed in order to place the measurement sample on the measuring table.

★ **Measurement cannot be performed if the measuring door is not completely closed.**

A flashing <<CONTROL>> lamp indicates that the measuring door is not fully closed !

3.4.1 key switch

A key switch is used to turn the high voltage supplied to the X-ray tube on and off.

If the X-ray tube is not supplied with high voltage radiation is not produced and measurements cannot be made.

★ **Measurement can only be performed when the key is inserted and turned to the upper right ON position!**

3.5 Adjustment Standards

Depending on the measurement mode and application there are many different types of adjustment standards. The number and type of calibration standards depends on the measurement mode and application.

Adjustment standard tablets placed in a special box, each time after use placed in the box loaded, and placed in a dry place.



Figure 3.3: Tuning Standard Cassette (Opened)



Figure 3.4 Adjustment Standards Alloy Coating Standards

★ **Measurements must be made with the actual standard! Measurement errors will occur if there is plastic on the actual standard.**

The numbers immediately following the element names of the alloy plating standards indicate the mass percentage of each element. In Figure 3.4, the standard sheet is coated with 85% Zn and 15% Ni.

Composition 1 indicates the alloying element first mentioned in the alloy name. For example, for the alloy ZnNi/Fe, Zn is component 1 and Ni is component 2.

3.5.1 Certificate of Conformity for Tuning Standards

All new tuning standards supplied have a valid Certificate of Conformity. Typically, the three-month qualification period refers to the allowable tolerance limit of the standard. This does not mean that the standard tablets must be re-examined after this period. However, the tuning standards should be tested or examined within a specified time period. If the specimen is used for routine control of the product, it is sufficient to test the Tuning Standards within 12 months.

However, if the standards are used on a daily basis, it is recommended that they be tested in approximately 3 to 6 months.

Chapter IV. Measurement

★ Please read "Chapter 2: Operation, Maintenance and Storage of Instruments and Accessories" carefully before measurement

4.1 Measurement preparation

Before taking measurements, the computer, the instrument and test area should be prepared as described below.

Measurement preparations

1. Determine the effective work area in accordance with the criteria.

2. Ensure that the work area is free from disturbing contaminants (e.g. moisture, dust and grease) and is not damaged.

★ **Dirt or vandalism on the sample can lead to incorrect measurement results. The sample surface must be cleaned before performing measurements.**

3. Make connections (including instrument connections and printer connections).

4. Turn on the computer, instrument, and printer, and the X-RAY instrument and EFP-T software begin to wire up.

Warm up the instrument for a while first.

5. Select the appropriate product program for the sample.

6. Perform a tuning test with the specimen to determine if normalization and tuning are required

4.2 Turn the instrument on/off to allow the instrument to be wired to the EFP-T software

4.2.1 Turn the instrument on/off, and allow the instrument to be wired to the EFP-T software

The instrument is ready to be turned on after the following power-up preparations.

★ **The instrument can be turned on only when all the cables are connected and secured.**

Booting

1. Press the Bi-Stable switch to turn on the instrument.

2. Insert the key in the key switch and turn it to the "ON" position (to the upper right) to turn on the high pressure supply to the X-ray tube.

3. Turn on your computer, monitor and printer.

4. Click on the EFP-T software icon on your computer desktop to wire the instrument to the EFP-T software.

5. Once online, the Measurement application window of the EFP-T software appears and the instrument is ready to measure. The most recent measurement results are automatically displayed.

★ For proper measurements, the X-ray tube must first be warmed up after turning on the instrument. It is best to allow the instrument to warm up least 30 minutes and then perform a peak calibration. For example, open the warm-up program, click Start Test, end the measurement after 30 minutes, do the peak calibration, put in the Ag and Cu tablets according to the software prompts, and after the peak calibration is completed, select the product program and start the test.

★ If the instrument is not used for a sustained period of time (e.g., an entire weekend or vacation), the instrument can be turned off.

4.2.2 Switching off the instrument

Switching off the instrument:

- 1.Exit the EFP-Tsoftware by clicking the Exit icon from the software interface**
- 2.Turn off the high voltage key and then turn off the instrument power.**
- 3.Turn off the computer, monitor and printer.**

4.2.3 Link between the instrument and EFP-T

Parameters such as U or I measurement distance cannot be displayed at the bottom of the EFP-T software application window.

When the connection is normal, the status bar displays the parameters U and I as well as the measured distance.

When the EFP-T software is turned on, the program automatically connects the instrument to the EFP-Tsoftware. The connection can be made at any time as long as the instrument is connected to the computer and powered on.

To realize the connection (turn on the instrument):

- 1.Selectthe menu bar Parameters-Online**
 - 2.The instrument is wired to the EFP-Tsoftware and the instrument isready for measurement.**
- If the connection is interrupted, this means that the EFP-Tsoftware cannotmake measurements.

4.3 Selecting the right product program

In order to make measurements, the instrument requires some basicinformation from the product program. Therefore, it is necessary toselect the appropriate product program for the sample beforeperforming the measurement.

Select Product Programs

- 1. Click on the menu "Product Program - Select" to open the "SelectProduct Program" window, which shows a series of product programsthat have been set up.**
- 2.Select the desired product program.**
- 3. Click OK to invoke the selected product program.**

4.4 Tuning Inspection Measurement

When performing the tuning check measurements,the specimen is correctly placed, the measurements are repeated at least five timesunder the same conditions, and the mean X_1 and standard deviation of these measurements are calculated.

If the difference between the mean value X_1 and X_{vp} (the nominal value of the specimen) is greater than four times the standard deviation s

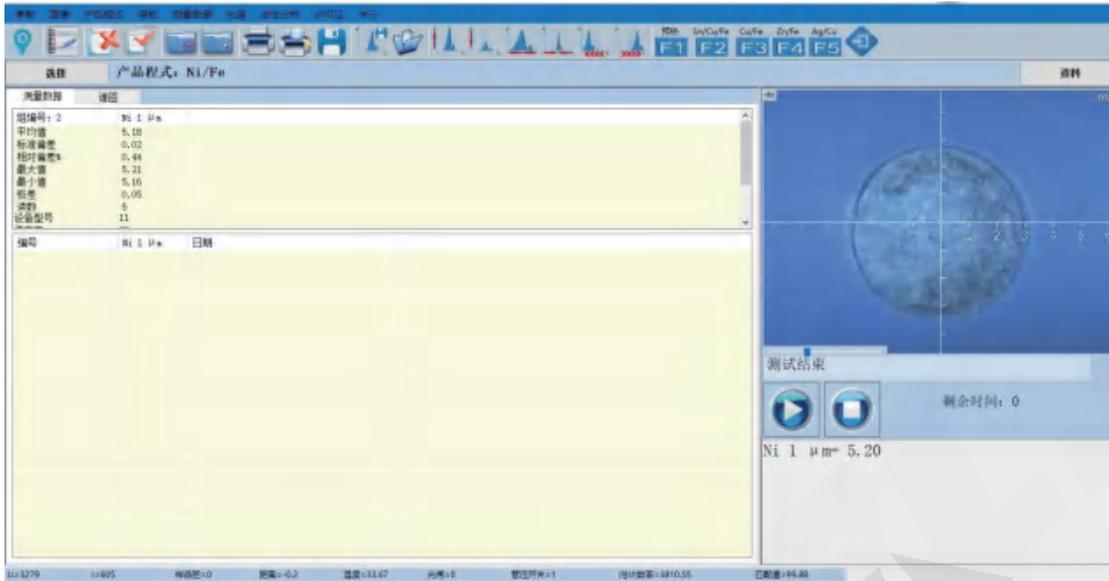
$$| X_1 - X_{vp} | > 4s$$

At this point, a normalization operation should be performed. After thenormalization operation, make another adjustment test measurement.If the deviation still exceeds $4 s$ it is recommended to adjust the instrument.

4.5 Sample Placement

The measurement direction is from bottom to top, i.e. the sample must be placed on the measuring table with the measuring surface downwards.

In order to measure correctly, the measuring point must be focused in the centre of the crosshairs.



4.5.1 Basic

Placement Rules The test area shown in the video is circular, according to the installed **reticle**. **The size of the display area depends on the collimator installed and the distance between the sample and the X-ray source and detector.**

Placement of samples:

★When placing the sample, follow the basic placement rules! Correct measurements are not possible without following these rules.

2. Place the sample on the measuring stage, move the sample and adjust the adjustment knob on the left side of the instrument until the measurement point is visualized in the video.



2.1 When moving the test platform, pay attention to the position of the test window to ensure that the X-rays can reach the surface of the test specimen.



Figure, do not move the test platform to an off-center position.

3. Rotate the focus handle until the measuring point is in focus in the video. The scale of the crosshair and the size of the measuring area change accordingly.

Adjust the video surface light source brightness if necessary.

★The measurement point must be focused! Otherwise it is impossible to measure correctly.

4. Move the sample until the measurement point is in the center of the crosshairs. Clarity can be improved by changing the color of the crosshairs. Use the command buttons in the upper left corner of the video window to change the color.

5. Close the measuring door.

4.5.1 Basic placement rules

From the operator's point of view, the front of the sample on which the X-ray fluorescence detector is placed. The sample must be placed correctly so that the X-ray fluorescence reaches the detector without interference.

For samples with very flat surfaces such as standards, it is sufficient to place them on the measuring table.

For cylindrical samples in the form of rods, care should be taken when placing them so that the longitudinal axis of the sample on the measuring stage is parallel to the instrument axis.

Cylindrical or curved parts must have a minimum diameter or radius of curvature (for small diameters or curvatures, the thickness of the coating layer is measured to be somewhat greater than it actually is. This is due to the fact that at the edges of the measurement point the radiation passes through the coating at an angle, resulting in an increase in fluorescence intensity). In order to properly measure the thickness of the coating layer, the diameter ϕ of the sample should be greater than twice the test area:

$$\phi > 2M$$

For the radius of curvature r , the corresponding equation is: $r > M$

Information on measuring fine lines can be obtained from authorised dealers or directly from our company.

The angled or stepped sample be placed so that the sample does not block the X-ray reception.

4.6 carry out measurements

★Measurement can be started only after placing the sample! Otherwise it will not be possible to measure correctly.

The following options are available to start the measurement:

- Press the <START> key on the measuring head control panel.
- Click the Start Test icon.

The <<SHUTTER OPEN>>LED lights up after the measurement is started. This indicates that an X-ray measurement is in progress. During measurement, the window 'Sample test...' is displayed on the screen during measurement.

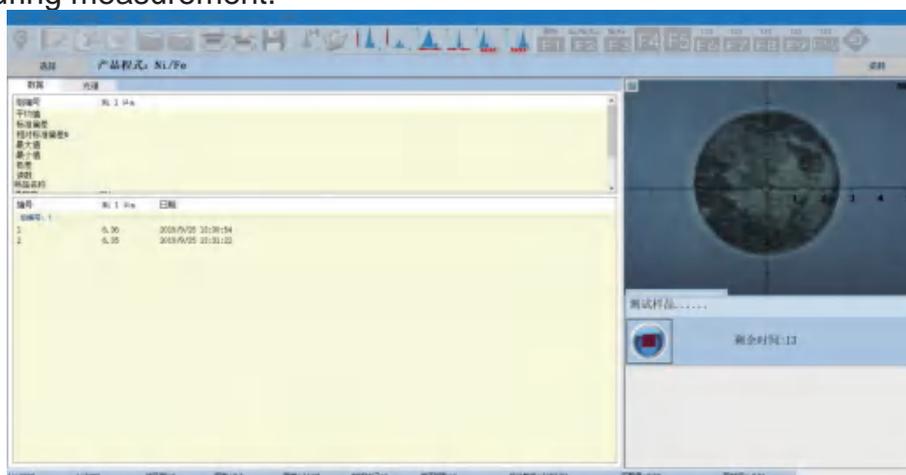


Figure 4.6: Measurement in progress window

When measurement is completed, the <<SHUTTER OPEN>>indicator turns off and the measurement result is displayed on the screen.

If the measuring door is opened, measurement cannot be carried out. The message 'Error: Measuring door open' indicates that the door is not closed. After closing the door, select [OK] and the measurement starts again.

4.7 stop measurement

Measurements in progress can be aborted in the following way:

- Press the <STOP> key on the measuring head control panel.
- Select the stop icon in the window "Measurement in progress".

4.8 Deletion of erroneous measurements

Measurement results with errors can be deleted as follows:

- Check the test result data or data group
- Select Select Delete Data or Data Group in the software menu.

The measurement will be deleted.

4.9 Printing of measurement results

Printing a data set:

1. Select a measurement data group to display the calculation results for the current data group.
2. Preview or print the report from the selection menu.

4.10.0 peak level correction

Perform peak level correction, required:

- An Ag and a Cu pure elemental tuning standard (as an Ag reference) Should be benchmarked in the following cases:
 - The instrument is operational.

4.10.1 Peak Level Correction Preparation

The instrument must be warmed up before starting peak calibration.

After turning on the instrument, select the warm-up program and warm up for at least half an hour.

4.10.2 Performing peak corrections

Performing peak corrections:

1. Proper placement of Ag standard tablet.
2. Select Menu: Peak Calibration and the interface prompts for an
★ Peak calibration can be started only after placing the Ag standard tablet
Otherwise it is impossible to measure correctly.

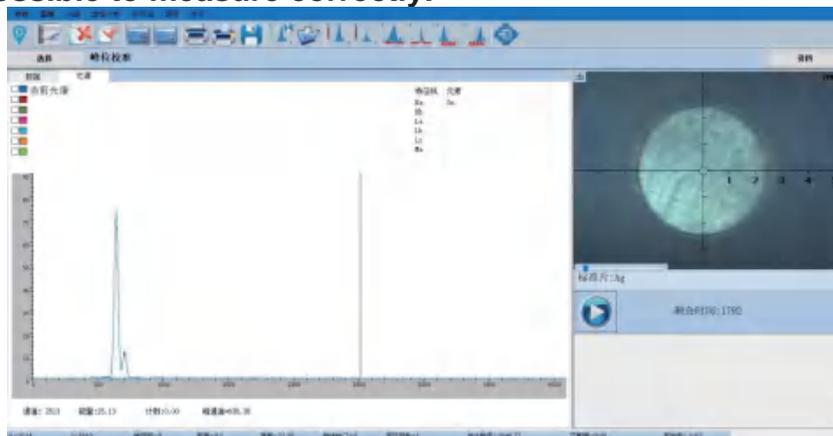


Figure 4.7: Peak Level Calibration Window

3. Click on the Peak Level Correction button, place the Ag standard tablet and click on the Start button in the lower right corner.

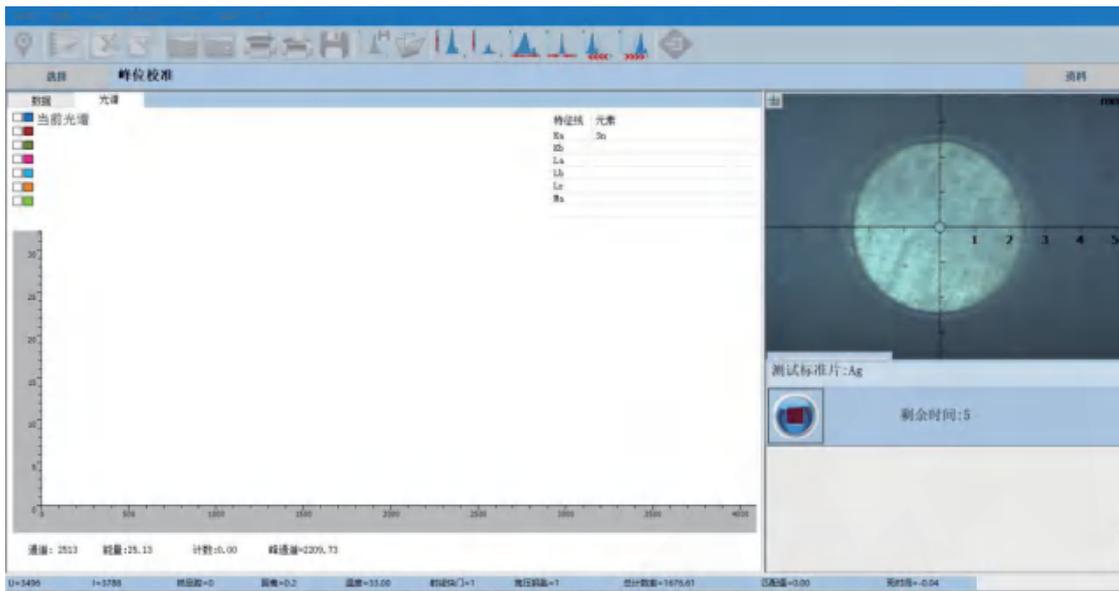


Figure 4.8: Calibration in Progress window

4. At the end of the Ag peak calibration, it will prompt to put in the copper standard tablets, and finally it will show that the peak calibration is successful .

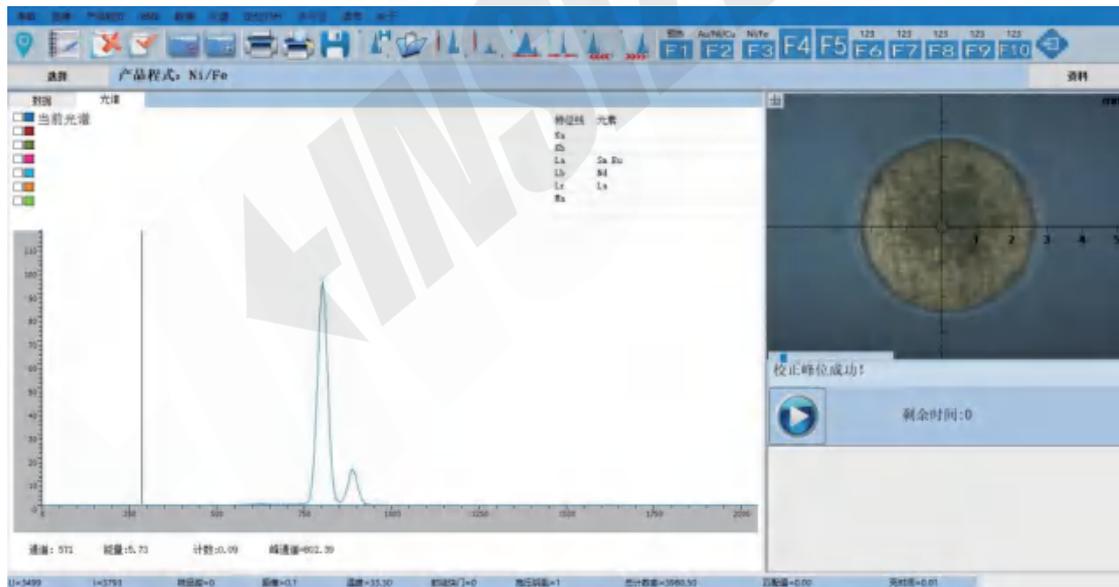


Figure 4.11: "Peak Level Correction Successful" Message

Chapter 5: Product Programming, Substrate Correction, Normalization, Tuning

In order to make measurements, the instrument needs to know certain information in the product program. Therefore, the product program must first be set up and selected before measurement.

Product programs include:

- Measurement data
- Product-specific settings

5.1 Importing Product Programs

If the product program you want to set up already exists in the previous product program library, you can import the product program directly through the program library as follows

1. Select menu Product Program - New and click Load from File.
2. Select the product program to be newly created. For example, if the product program 'Zn/Fe' is selected, find the file for Zn/Fe in the program library.
3. Check the box and click OK.
4. After setting up the new product program, you can choose to do normalization or tuning as needed.
5. After the program is adjusted, the instrument is ready for measurement.

5.1.1 Backup Product Program

Product programs can be backed up by copying them to a hard disk or other folder on a network or floppy disk.

Back up a product program,

1. Select Product Program - Edit in the menu.
2. Edit the required program.
3. Click Save to File (specify a folder), to save the backup.

5.2 Modify the product program

The following settings are used to create a new product program, specifically related to the product:

- Product Program Name
- measuring time
- unit of measure
- Display Accuracy
- Size of the data set automatically created after a fixed number of measurements

5.3 Delete Product Program

Product programs that are no longer needed can be deleted.

It is not possible to delete a product program in use. When attempting to delete a product program in use, the program will prompt a message accordingly. Press [OK] to confirm this message.

Delete Product Programs :

1. Select Product Programs in the menu to open a window with a list of existing product programs.
2. Select the product programs to be deleted.
3. Select the option. The message "Note: Prompted Are you sure you want to delete the program?" appears.
4. Select [Yes] to confirm the information and delete the product program. Select [Cancel]

to return to the deletion program.

5.The measurement application window of the EFP-T software reappears and the instrument is ready for measurement.

5.4 Setting up the product program

Set up the product program:

- 1.Select Product Program in the menu and click New, the software pops up the New Product Program window.
- 2.Write product programs.
- 3.Finish editing the program by going through the membrane layers, components, and feature lines on the right side and then following the box prompts below.
- 4.The product program is then calibrated by normalization or tuning.
- 5.Once calibration is complete the instrument is ready for measurement.

5.5 Selection of Tuning Standards

Typically, purely elemental sheet tuning measurements are used in all measurement modes, considering that measurements should be possible without a standard sheet.

Tuning corrections can be made by using multiple standards, and after tuning, measurements can be taken.

The thickness or composition of the plating on the selected standard surface should be similar to that of the sample to be measured. If several standards are used, they should be evenly distributed over the desired measurement range.

5.6 style

A specimen (**working standard**) is a sample with a clearly defined measurement area and a known coating thickness or composition. The standard may be a component that has been measured by a suitable calibrator obtained from its own or another party's product.

Markers are used for instrument tuning control.

The thickness or composition of the coating layer in the test area should be uniform. The specimen for the set product program should have the same characteristics as the sample under test (substrate, plating or composition of the substrate, etc.)

★ After powering up, warm up the X-RAY instrument for a while before making substrate corrections. Do this by warming up the program for at least half an hour of measurement.

★ Substrate correction is only available for the current application. It does not work for other applications.

5.7 Perform substrate correction

- 1.The Select the product program in the menu according to the product, and click “Substrate Correction” in Adjustment. The software interface appears, please put in the sample Substrate.
- 2.The Place the substrate and select [OK] to start measurement.
- 3.The substrate correction is finished and the instrument is ready to measure.

5.8.1 normalize

If the deviation at the time of the tuning test measurement is four times the standard deviation.

Normalization requirement:

- 1.The Substrate (a sample without a coating to be tested). (not required if the substrate is purely elemental)
 - 2.The Standard sheet substrate (not required if substrate is purely elemental)
 - 3.The Pure Element Standard Tablets
 - 4.The Measurement of materials that interfere with the spectrum. (e.g. bromine on printed circuit boards)
- ★ After powering up, the instrument should be warmed up for a while before making substrate corrections.
 - ★ Normalization is used only for the current application and does not work for other applications.

5.8.2 Perform normalization:

- 5.The Select the menu "Adjustment, Normalize" to open the "Normalize" application window. The command window appears with instructions for the next step.
- 6.The Follow the prompts in the command window to take measurements. If a pure elemental standard or substrate is to be measured several times, gently move the standard or substrate several times. This will homogenize the potential inhomogeneity on the material.
- 7.The At the end of normalization, the dialog box appears Normalization Complete, click OK. The instrument is ready to measure.

5.9.1 tune (a musical instrument)

If, after normalization, the deviation at the time of the tuning test measurement is greater than four times the standard deviation S , then tuning is performed.

Tuning Requirements:

- Substrate (sample without coating layer to be tested). (Not required if the substrate is purely elemental)
 - Standard sheet substrate. (Not required if the substrate is purely elemental)
 - Pure elemental standardized tablets.
 - Measurement of materials that interfere with the spectrum. (e.g. bromine on printed circuit boards)
 - Standard piece (if required for measurement)
- ★ After powering on, warm up the instrument for a while before making substrate corrections.
 - ★ Tuning is only available for the current application, not for other applications.

5.9.2 Tuning

- 1.Select menu Product Program, Edit. Enter the value of the standard piece to be added.
- 2.Click on Tuning to bring up the operation interface.
- 3.Follow the prompts on the interface to start the test for substrate, pure element or specimen in turn.
- 4.At the end of tuning, the end of tuning appears and the instrument is ready to measure.

Chapter 6 Installation of instruments

6.1 safety warning

★The recommendations in the chapter "Chapter 2: Operating, Maintenance and Storage of Instruments and Accessories" must be followed.

6.2 Installation steps

In general, we install the X-RAY instrument for you and commission it until it is ready for use.

Installed Instruments

1 The Open the box, place the computer, printer, and X-RAY instrument, and remove the transportation fixtures. (if any).

★ If the temperature of the instrument differs significantly from the ambient temperature (e.g., after low-temperature transportation or storage), the machine should be allowed to acclimatize to the room environment before work should be performed.

2 The Check line voltage and connect the computer and X-RAY instrument power cords to an outlet.

3 The Connect the wires from the computer to the X-RAY .

4 The Connect the printer to the computer.

5 The Turn on the computer and install the EFP-T software (if not already installed).

6 The Turn on the instrument and wire the X-RAY instrument to the EFP-T software.

7 The preheating was done for more than half an hour, followed by peak correction.

6.3 Choose the right location

When selecting a location for the instrument, the recommendations in 'Environmental conditions for the operation and storage of instruments and accessories' must be followed. The instrument should be placed on a sturdy table along with the computer, monitor, and printer.

The left side of the instrument should be easily accessible, with the instrument's on/off bi-stable switch and port, where the power plug holder is located.

6.4 connect a wire



6.5 Printer Selection and Page Setup

6.5.1 Printer Selection

To ensure proper communication between the computer and the printer, and to print out the desired measurement data and calculation results, the appropriate printer must be selected in the EFP-T software.

Select the printer in the EFP-T software:

1.The Selecting Menu Parameters - Printers in the EFP-T software brings up the window of connectable printers.

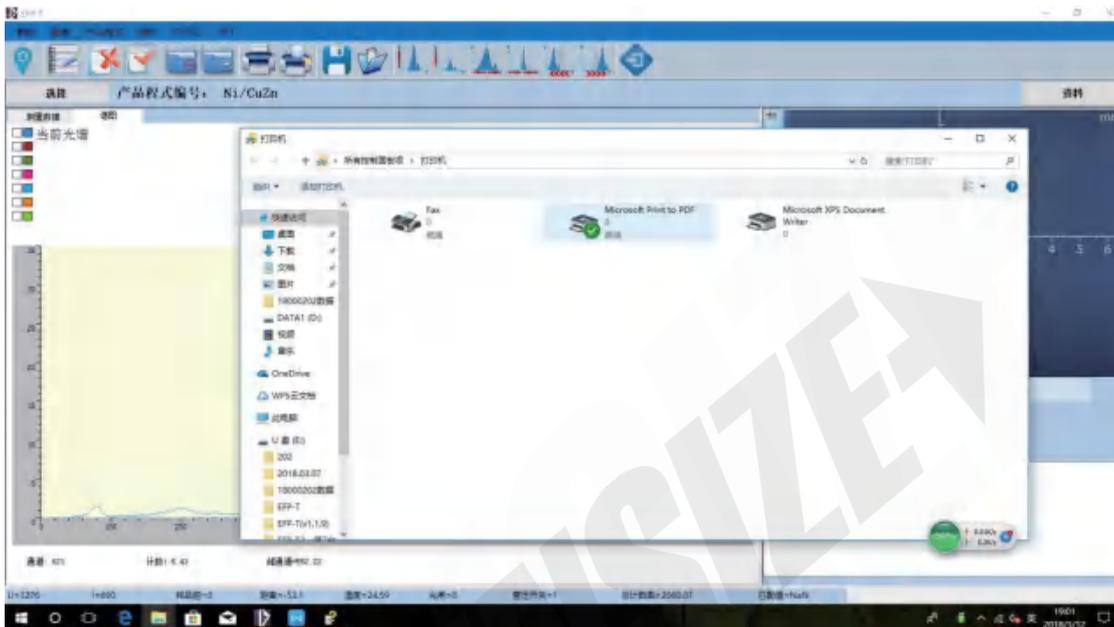


Figure 6.2:Printer Selection Window

2.The Select the appropriate printer and make the necessary settings (e.g. page orientation portrait or landscape, etc.)

★ If there is no existing printer model in the list, you must install it Microsoft Windows Installation methods can be obtained from the appropriate manuals, online help or references.

3.The Select [OK] to confirm your selection.

4.The After selecting [OK] ,the application window of the EFP-T software reappears.

Chapter VII. Purification and maintenance

Before starting decontamination or maintenance, verify that the instrument's power cord is disconnected. This will ensure that the instrument is not inadvertently turned on during decontamination or maintenance.

7.1 Purification and maintenance

7.1.1 Cleaning Instruments

If there is dirt on the instrument, a damp cloth moistened with alcohol can be used to clean and remove it.

★Do not pour any liquid on the instrument to prevent the liquid from entering the inside of the instrument, and do not immerse the instrument in liquid!

Otherwise, it will cause a short circuit of the power supply!

7.1.2 Purification Standards

Dirt or scratches on the test surface can cause erroneous measurement results.

When decontaminating standards, do not use any means that could cause mechanical or chemical damage to the standard! A soft, lint-free cloth can be used to remove dirt!

7.2 take good care of (or conserve) one's health

7.2.1 Replacement of fuses

The line fuse is 3A/250V. Replace if necessary. The line fuse is on the power terminal on the left side of the instrument.

Replacement fuse required:

- One 3A/250V Fuse
- Screwdriver

1. Turn off the instrument and unplug it from the power supply.
2. Carefully remove the fuse holder with a screwdriver.

Be careful of hitting yourself or others with the screwdriver (e.g., the driver slips when lifting the fuse holder)!

3. Remove the bad fuse and replace it with a new one.
4. Put the fuse holder back in place.

Chapter 8 Troubleshooting

malfunctions	Possible causes	cure
No display on the monitor	screensaver	Move the mouse (to cancel the screen save)
	The monitor is not on.	Turn on the monitor.
	The computer's not on.	Open the computer.
	Power management function activation	Interrupt power management function
frequency display unfocused	Incorrect focusing	Turn the focus knob until the test area is on the screen Until you focus on the screen
Blurred video display	The surface light source lamp is not turned on or is not bright enough	Adjusting the brightness of the surface light source lamp
Video window without sample display	Improper sample placement	Correct Sample Placement
	Instrument and EFP-T Software Interruption	Instrument wired to EFP-T software
	USB cable not connected	Connect the USB cable to the instrument and the calculator The USB socket on the machine
	USB cable damaged	Replacing the video cable
	software error	Turning off the instrument, after shutting down the EFP-T software reopen
<<CONTR OL>> lamp blinking	Measuring door not fully closed	Close the measuring door.
	Failure of the safety function system (if measured)closed, <<CONTROL>> still blinks no	Notify us
Instrument does not turn on when switch is pressed	The instrument is not connected to the power supply	Turn off the instrument and insert the plug into the socket.
	Power outlet switch off	Turn on the power outlet switch
	Fuse blown	Determine the cause of the fuse, and correct the problem after treatment.Replacement of fuses
Printer prints out useless data	Printer driver error	Install the correct printer driver
	Printer cable failure	Cable replacement
No printout	The printer is not on.	Turn on the printer.
	The printer is not properly connected to the computer	Turn off computers, instruments and printers.Check the connection line and turn it back on
	The printer is not connected to the computer	Connecting the printer to the computer
	Printer cable misuse	Use the correct printer cable
	Damaged printer or printer cable	Replacing the printer and printer cable
	Printer connected to faulty printer port	Troubleshooting Port
Measurement data error	The selected product program does not match the sample	Select or set the correct product program for the sample
	Normalization or tuning error	Correct normalization or tuning
	peak level correction error	Re-perform peak level correction
	No peak level correction	Perform peak level correction
EFP-T Software-Instrumentation Line Breaks	The instrument is not properly connected to the computer	Turn off the instrument, check the wiring and turn it back on instrumentation
	The instrument is not connected to the computer	Connect the instrument to the computer.
	Installation process error	Correct mounting
	Faulty connecting cable or interface	Troubleshooting connecting cables and interfaces
XY platform cannot be moved	The XY platform has been moved to the top (bottom, right or bottom Left)	Move the XY platform in the opposite direction
	The safety device is restrained, i.e., the measuring platform is restrained by the externalimpede	Remove obstacles

XRF-PT230 Operating Procedures

I. Purpose of the instrument

The XRF-PT230 is used to measure the thickness and composition of coated layers, to analyze the composition of alloys, and to measure the concentration of main salt ions in plating solutions.

II. Start-up and shutdown procedures

1. boot-up procedure

- 1) Power on the instrument
- 2) Turn on the high voltage key
- 3) Turn on the computer.
- 4) Turn on the printer
- 5) Open the EFP-T software and wire the instrument to the software to complete the power-up procedure.

2. shutdown procedure

- 1) Close the EFP-T software
- 2) Turn off computers and printers
- 3) Turn off the high voltage key
- 4) Turning off the instrument

III. Measurement preparation

1. Warming up the instrument

In order to ensure the accuracy and stability of the measurement, the instrument must be fully warmed up after switching on. Warm-up method is as follows:

After completing the normal power-up procedure, open the warm-up programme and click on the Start icon to begin measurement. 30 minutes later, click on Finish Measurement to complete the warm-up process.

2. peak level correction

Note: This step is very important.

NOTE: The instrument must be warmed up before performing peak calibration.

Since the instrument is calibrated against the element Ag, the position of the element Ag must be accurately located and must not be shifted.

The peak level correction procedure is as follows:

- 1) Place Element Ag on the table, reposition it and focus it so that it is clearly displayed in the center of the video window crosshairs.
- 2) Select the peak calibration icon in the upper left corner, the software prompts to put in pure elemental Ag, press OK to start calibration, Ag peak calibration is complete, press the software prompts to put in Cu tablets.
- 3) At the end of peak level correction, the software prompts a peak level correction success message.

IV. Making measurements

1. After completing the power-up steps and performing warm-up and peak level correction, you can start measuring the sample.

2. The steps for making measurements are as follows:

- 1) Depending on the coating of the sample to be measured, click on the menu 'Product programme - select...'. Select the appropriate product programme.
- 2) Place the sample on the bench, adjust its position and focus sharply so that it is clearly displayed in the center of the video window crosshairs.
- 3) Press the start button at the lower right corner of the display or the 'START' button on the

instrument console to start the measurement, and the measurement will be completed when the countdown is finished.

3. Measurement Precautions

1) Selection of measurement time.

The longer the measurement time the better the stability. Generally speaking, the measurement time is not less than 15 seconds for single plating, 30 seconds for double plating and alloy. In general, the measurement time is not less than 15 seconds for single plating, 30 seconds for double plating and alloying, 45 seconds for triple plating, and between 30 and 60 seconds for the main salt ion concentration of the plating solution.

2) Principles of Sample Placement

When viewed from the front, the X-ray fluorescence receiver is in front of the placed sample. The sample must be placed correctly to ensure that the X-ray fluorescence reaches the detector without interference.

3) If the message "Invalid spectrum, cannot measure, etc." appears at the end of measurement, proceed as follows:

A: Check that the plating condition of the measured samples is consistent with the selected product programme.

B: Perform substrate correction

C: Perform peak correction.

4) Prior to measurement, the composition of the substrate of the sample to be measured should be checked for consistency with the set substrate.

V. Printing of the report

1. Check the test groups to be printed.

2. Print (print preview)



VI. Adjust the product program

Correct tuning is necessary to ensure the measurement accuracy of the instrument.

The instrument must be fully warmed up and peak corrected before tuning.

This is very important.

Determining whether or not a tune-up should be performed can be tested by measuring the tune-up standard disc. Place the standard film on the workbench and move the standard film to take several measurements. If the difference between the average value of the measured data and the standard film does not meet the accuracy of the standard film, the "normalisation" operation can be carried out. If, after normalisation, it still does not meet the accuracy of the standard, it should be adjusted.

Tuning Steps:

- 1) Select the product programme to be tuned
- 2) Select the menu "Adjustment - Adjustment" to start the "Adjustment". The command window in the screen will show the instructions for the next step. Follow the instructions to place the appropriate material and standards for measurement. If a pure element or substrate is to be measured several times, gently move the standard or substrate several times.

VII. Cautions

1. The voltage supplied to the instrument must be the same as that on the nameplate of the instrument. The instrument must be connected to a grounded outlet using a three-wire plug.
2. This instrument is a precision instrument, and it is recommended to equip a high-precision voltage stabilized power supply. The computer should be equipped with an uninterruptible power supply (UPS)
3. Special care should be taken to isolate the instrument from the presence of electromagnetism.
4. The instrument is suitable for operation at ambient temperatures from 10 to 40°C (50 to 104°F), and at temperatures from 0 to 50°C (0 to 50°F). (32~122°F)
The temperature at which the product is stored is the same as the temperature at which it is stored. The permissible humidity range for operation and storage is between 0 and 95% (non-condensing) The ambient temperature and humidity should be kept constant during operation.
5. When the instrument is exposed to sunlight, the temperature behind the window glass will easily exceed 50 C. Therefore please do not operate and store the instrument in such an environment to avoid high temperature damage to the instrument.
6. To avoid short-circuiting, direct contact between the instrument and liquid is strictly prohibited. If liquid enters the instrument, turn off the instrument immediately! And have a technician thoroughly inspect the instrument before reuse.
7. This instrument can not be used in acidic environment and explosive occasions.
8. Do not dirty or scratch the calibration standards! Failure to do so will result in incorrect readings!
9. Do not use any mechanical or chemical methods to remove dirt from the adjustment standards! If necessary, gently wipe off the dirt with a lint-free cloth.