

ESCALAB Xi⁺:

Simplified Sample Navigation and Feature Location Using the Platter Camera Option

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With any X-ray photoelectron spectroscopy (XPS) system, accurately locating samples or features once loaded into the system hinders obtaining repeatable data. Reproducing measurement positions in the future or on other measurement platforms is difficult in cases where large viewports are used to observe the sample platter in order to navigate to a given sample position. The result is a lack of confidence that the area being analyzed is that which is required. What is needed is a method of consistently locating the exact measurement point of an analysis and being able to return to that point in the future.

Solution

The standard Thermo Scientific™ ESCALAB™ XPS Microprobe product family addresses the problem of accurate sample navigation by using computer controlled stage movement and a live high-magnification optical view to locate the correct samples on the platter. Once sample measurement positions are defined they are then stored as part of the experiment tree for later reference or repeat measurements. A schematic representation of the sample block is loaded such that the user can navigate around within the expected measurement area to find areas of interest for data collection. These two navigation tools are combined within one window in the Thermo Scientific Aantage™ software to allow both course and fine navigation around the samples mounted in the system. Once the features of interest are located, measurement points, can be defined and saved through the same view that is used for the navigation, with the point automatically appearing within the experiment tree to allow adjustment of measurement parameters and fine tuning of experimental conditions.

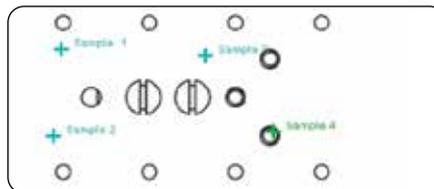
The Platter Camera option (Figure 1) enhances the ESCALAB user experience by capturing an image of the sample block prior to loading into the system. This option is a stand-alone item that can be positioned on any conveniently located flat surface, such as the computer desk or system bench (cable lengths permitting). It is fully integrated into the Aantage software (Figure 2) and has integrated LED lighting panels to ensure samples can be identified easily on the captured image.



Figure 1: The Platter Camera option, shown beside the sample loading door on the ESCALAB

Any ESCALAB sample block can be mounted into the Platter Camera option, as it utilizes the same mounting mechanism as inside the vacuum system. Using the same mounting in both places allows full calibration between the captured image and stage movement, once the samples have been loaded into the vacuum system. Capture of an image of the sample platter is completed via a single click of a button within the Aantage software, with the calibrated image appearing instantly into the sample navigation window. The image is saved to a pre-defined, easily accessible, location on the local hard drive, where a defined number of images are stored before being automatically cleaned to prevent unnecessary usage of hard-drive space.

Once the calibrated image is captured and the samples loaded into the entry-lock chamber, the user can then use the calibrated image of the samples to start to define measurement positions and build up an outline of the experiment to be run before the samples are loaded into the main analysis chamber. As sample positions are defined through the captured image section of the navigation window, the position information is automatically loaded into the experiment tree. This is already possible without the use of the Platter Camera option, but involves relying upon estimating where the samples sit relative to the schematic



Navigation via schematic (no Platter Camera)



Navigation using Platter Camera option

representation, rather than being fully confident of identifying the correct sample by selecting it visually using the image.

After transferring the samples into the main analysis vacuum system, navigation between samples and features can be performed in several ways:

- Double-clicking on the desired sample in the calibrated static image
- Selecting and moving to a point already defined through the static image
- Movement via click-hold activation of buttons around the edge of the live image
- Double-clicking on features in the live high-magnification image

A Platter Camera option has been introduced on the Thermo Scientific ESCALAB system to allow customers to locate samples and features quickly and with confidence, to improve efficiency and ease of use.



As measurement positions are added to the experiment tree, the defined points appear with a description on the captured image, providing a quick and easy reference of which measurement points that have already been added, preventing any unnecessary repetition of data collection from any one area. The height of the sample at any measurement point can be defined by use of the live optical view, or by the in-built auto-height facility which maximizes the signal from the sample.

The ESCALAB has the facility to “auto-analyze” any one of the defined points. If this option is selected the captured calibrated image is output into an automatically generated Microsoft® Word® document, together with collected and processed data in the form of a survey spectrum, regional spectra, quantification data, chemical state suggestions and an instantaneous capture of the live high-magnification image. Once generated, the report will retain all visual and positional information regarding the measurement positions for future reference and reporting out. If the captured image is not available (i.e., if the Platter Camera option is not present), descriptions of the analyzed points will be output, but there would be no visual reference as to where on the sample was analyzed.

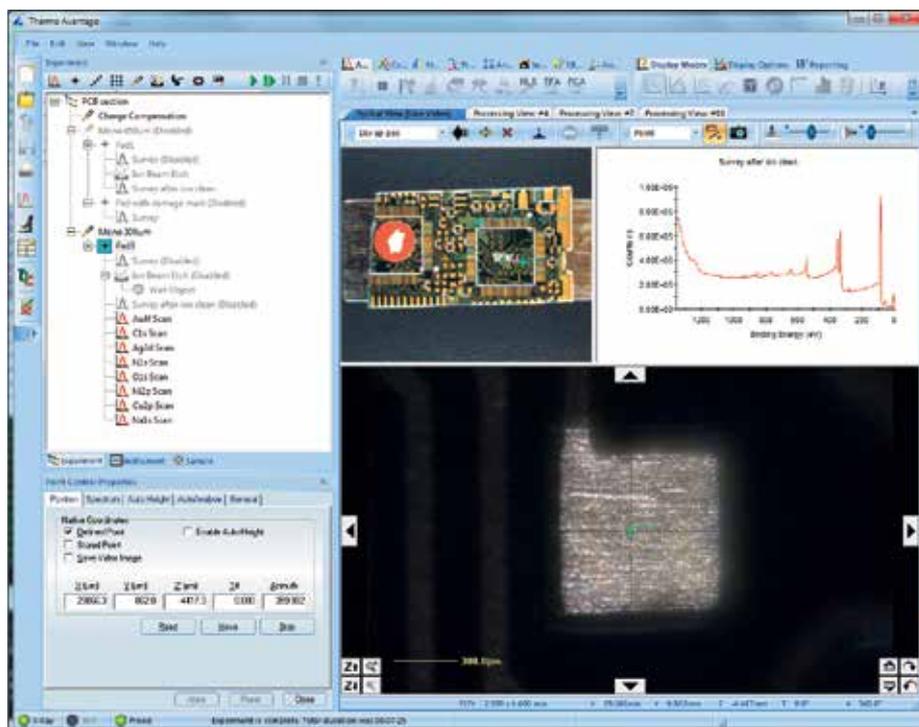


Figure 2: An example of the Avantage software with the navigation window open, including the static platter image, live optical view and live data display

Summary

The Platter Camera option on the Thermo Scientific ESCALAB system gives the user an enhanced experience and higher confidence level in analysis position, and allows photographic records to be kept for future reference and reporting.

