

Sub-micron X-ray Photoelectron Imaging

Key Words

- Surface Analysis
- High Spatial Resolution X-ray Photoelectron Imaging
- Rapid Image Acquisition
- Sub-micron Resolution

Analyses which require a combination of high sensitivity and spatial resolution are possible using the Thermo Scientific ESCALAB 250. The example shown here illustrates many of the important features of the instrument.

Fast imaging is provided by the monochromatic X-ray source. A photoelectron image can be acquired in a few seconds for accurate sample alignment.

A high quality photoelectron image can be produced in a few minutes. The images shown here have a spatial resolution of less than 1 μm . All images are acquired with 256 x 256 pixels.

Gold Pad on GaAs

Microelectronic devices provide a critical test of the resolution of any imaging instrument. In this example gold features, deposited on a gallium arsenide substrate, were analyzed.

The retrospective line scan at the position shown on the high spatial resolution image illustrates sub micron spatial resolution.

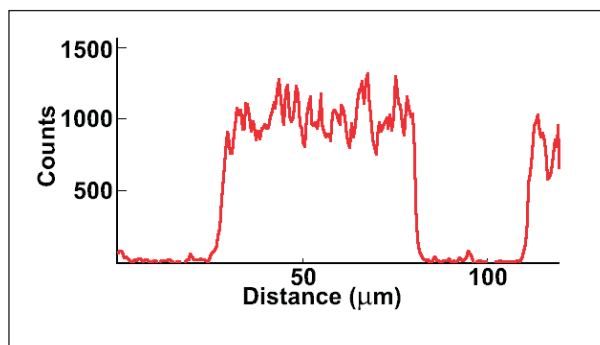


Figure 1: Retrospective line scan from image (Figure 3)

Rapid XP Image for Alignment

Au $4f_{7/2}$ X-ray photoelectron image (peak - background).

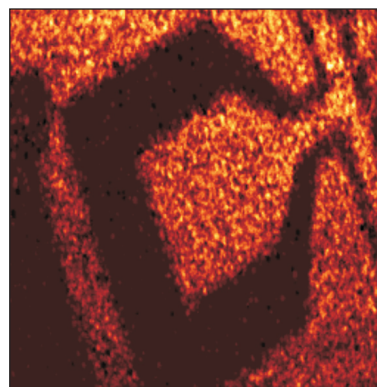


Figure 2: Gold X-ray Photoelectron image (peak - background) 200 μm field of view, 12 second acquisition

Conditions:

Total acquisition time: 12 seconds
Pixel resolution: 256 x 256
Field of view: 200 μm
Monochromated X-ray spot size: 650 μm

High Spatial Resolution XPS Image

Au $4f_{7/2}$ X-ray photoelectron image (peak - background).

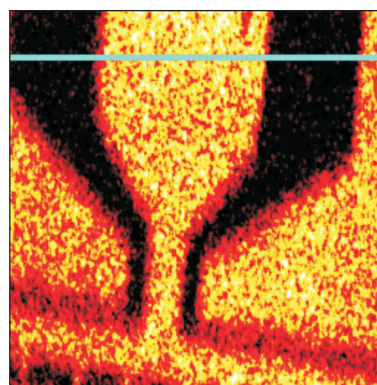


Figure 2: Gold X-ray photoelectron image (peak - background) 120 mm Field of view, 5 minute acquisition

Conditions:

Total acquisition time: 5 minutes
Pixel resolution: 256 x 256
Field of view: 120 μm
Monochromated X-ray spot size: 650 μm

www.thermo.com/surfaceanalysis

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AN31051_E 05/08M

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