

Thermo Scientific K-Alpha X-ray Photoelectron Spectrometer



Innovative Design for Surface Characterization



Metals and Materials



Polymers



Semiconductor and Microelectronics



Nano-Engineering and Bio-Materials



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Designed for Productivity

The award-winning Thermo Scientific K-Alpha X-ray photoelectron spectrometer (XPS) features superior performance, fast analysis and outstanding chemical detectability. By combining cutting edge mono XPS performance with intelligent automation, K-Alpha is designed for a multi-user environment. The K-Alpha's intuitive operation meets the requirements of both experienced XPS analysts and newcomers to the technique. Analytical options now include a tilt module for ARXPS data collection and a recirculating inert-gas glove box for transfer of air-sensitive samples.

Powerful Performance

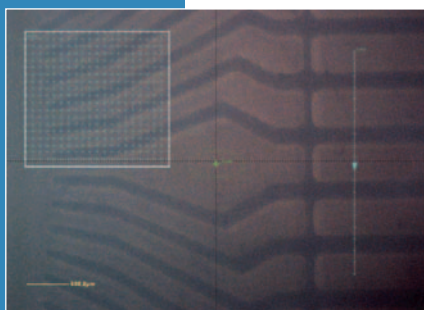
- Selectable area spectroscopy
- Sputter depth profiling
- Micro focused monochromator
- Snapshot acquisition
- High-res chemical state spectroscopy
- Insulator analysis
- Quantitative chemical imaging

Unparalleled Ease of Use

- Point-and-click sample navigation and experiment set-up
- Automated sample transfer
- Calibration on demand
 - Full spectrometer set-up
 - Ion gun set-up
- Full remote operation

World-class Software

- Thermo Scientific Avantage data system, the total package
 - Control
 - Acquisition
 - Interpretation
 - Processing
 - Reporting
 - Data archive management
 - Audit trail logging
 - System performance logging



The K-Alpha XPS Reflex View of a sample in the analysis position. Positions for point analysis, a line scan and a map are indicated. The position and size of the ellipses indicate the position and size of the X-ray spot selected for the analysis.



K-Alpha

XPS analysis from research to routine

High Performance Spectroscopy

- Source-defined analysis area from 30-400 μm
- 5 μm step size ensures that the analysis area closely matches the feature to be analyzed
- Rapid survey spectrum acquisition
- Excellent energy resolution for chemical state determination

Chemical State Imaging XPS

- Spectral Imaging
- Rapid 128 channel snapshot spectra
- Entire sample stage area imaging
- Overlay XPS data with automatically collected optical images

Insulator Analysis

- Insulating samples are easily analyzed using state-of-the-art charge compensation
- Simple one-click turnkey operation

Depth Profiling

- Ion gun provides high current density even at low beam energy
- Azimuthal and Comp-eucentric rotation
- Full computer control of the ion gun and gas handling for excellent reproducibility
- Automatic alignment of source

Three Operation Modes for All Experience Levels

- Fully interactive expert mode
- Recipe mode for routine analysis
- Fully automatic mode to go seamlessly from analysis to report

Sample Navigation

- Platter View – rapid navigation between samples
- Reflex View – precise sample alignment, point and shoot experiment set-up
- Height adjust view – fast, accurate alignment for small area XPS

Sample Illumination

- Off-axis illumination – ideal for rough samples
- Co-axial illumination – essential for feature alignment on reflective samples

Calibration and Alignment

- Automatic calibration for optimal performance
- Built-in calibration samples
 - Energy scale
 - Transmission function calibration
- Ion gun alignment and beam-tuning
- Full-system log for traceability

Avantage Data System

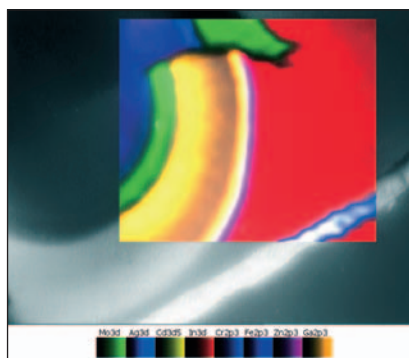
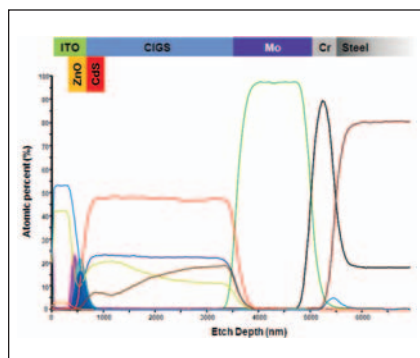
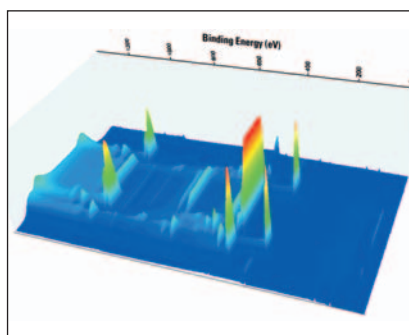
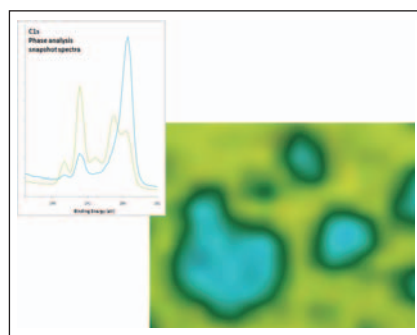
The Avantage™ data system incorporates a comprehensive suite of software for:

- Total instrument control
- Data acquisition
 - Spectra
 - Images
 - Profiles
 - Linescans
- Data interpretation
 - Auto elemental and chemical state ID
- Data processing
 - Quantification, peak fitting, real-time profile display, spectrum-image manipulation
- Advanced processing
 - PCA, Phase analysis, TFA, NLLSF, PSF removal
 - Optical/XPS image overlays
- Report generation
- Vacuum system and sample handling

Avantage runs on a PC using Microsoft® Windows®

Easy Maintenance

- Vacuum system and electronics combined in single unit
- Small footprint (1.8 m \times 1.2 m)
- Rapid installation and service design
- Easy consumable replacement
- Simple bake-out
- Automatic de-gas





K-Alpha XPS Configuration

Analyzer

- 180° double focusing hemispherical analyzer
- 128-channel detector

X-ray Source

- Al K α micro-focused monochromator
- Variable spot size (30-400 μ m in 5 μ m steps)

Charge Compensation

- Dual beam source
- Ultra-low energy electron beam

Data System

- Avantage data system
- Processing license
- PC

Ion Gun

- Energy range 100 eV – 4 keV

Sample Handling

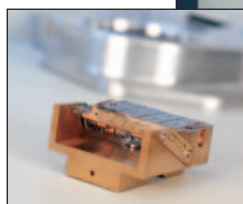
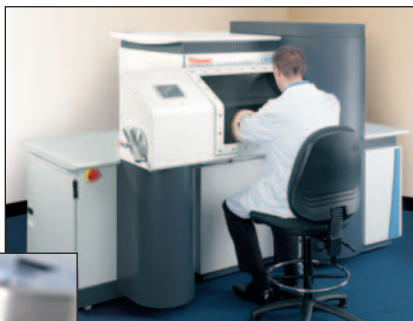
- 4-axis Sample Stage
- 60 \times 60 mm sample area
- 20 mm maximum sample thickness

Vacuum System

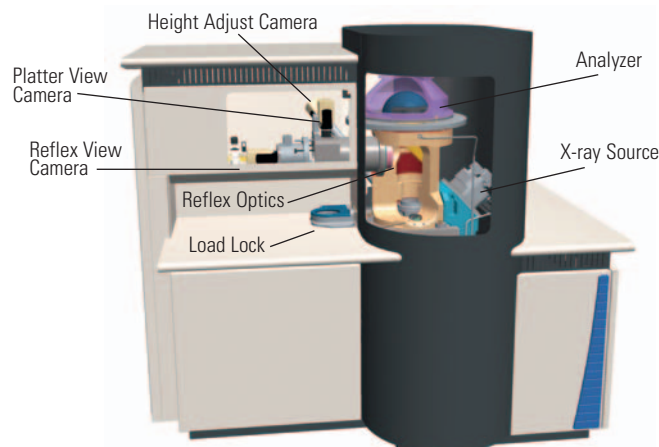
- 2x 260 l/s turbomolecular pumps for entry and analysis chambers
- Auto-firing, 3 filament TSP

Options

- Tilt module for ARXPS
- Inert-gas glove box for air-sensitive sample handling



K-Alpha XPS options include the inert-gas glove box and tilt module for ARXPS



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