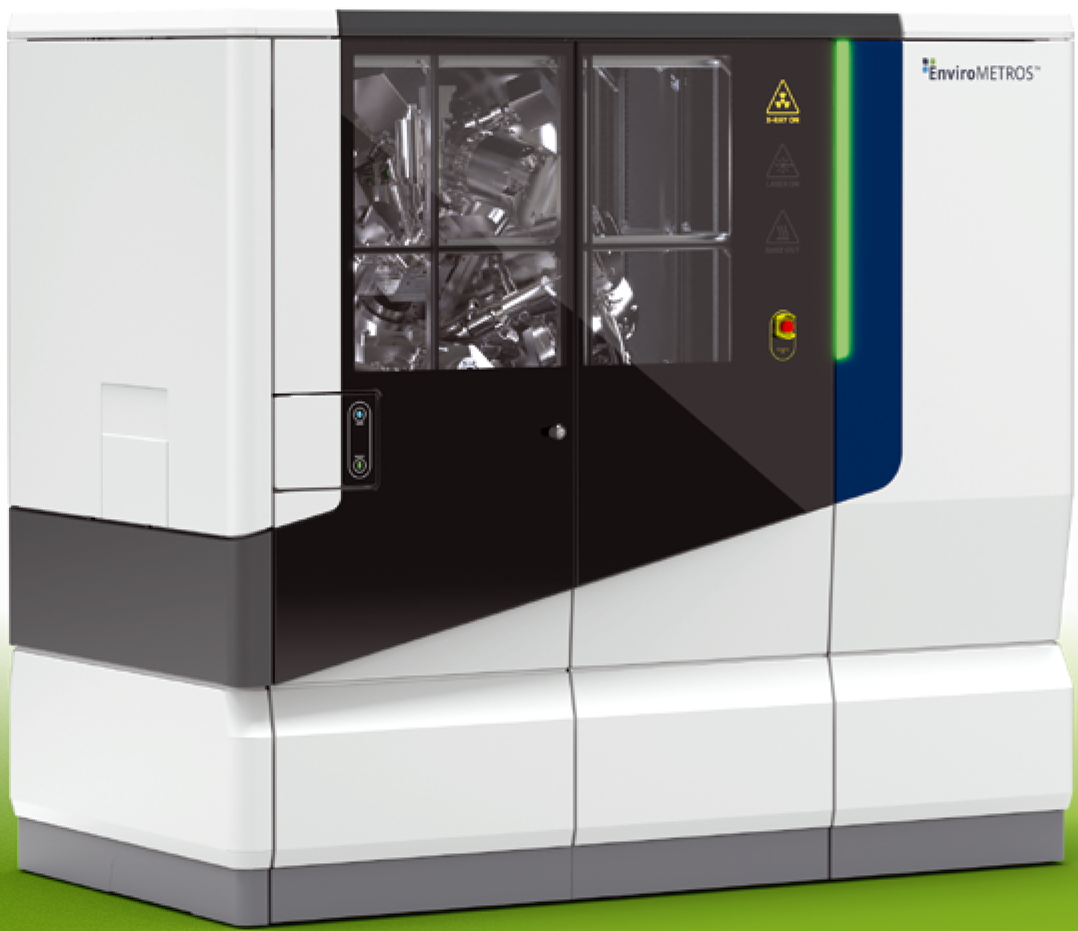
UPDATE Small spot < 10 µm

EnviroMETROS LAB

MULTIMODAL SURFACE AND INFERFACE CHARACTERIZATION
FOR ADVANCED MATERIALS RESEARCH

KEY FEATURES

- Non-destructive depth profiling via PARXPS and HAXPES
- Four X-ray lines Al, Ag, Ti and Cr
- < 10 µm X-ray spot size
- Near-ambient pressure optional
- Additional techniques: UPS, IPES, REELS, SEM / SAM, RAMAN / IRRAS



Enviro™

A member of SPECSGROUP

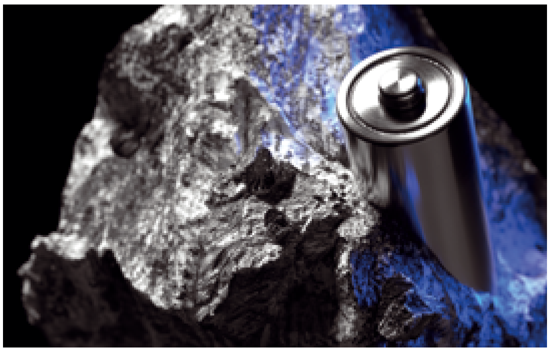
Complex materials require correlated insights

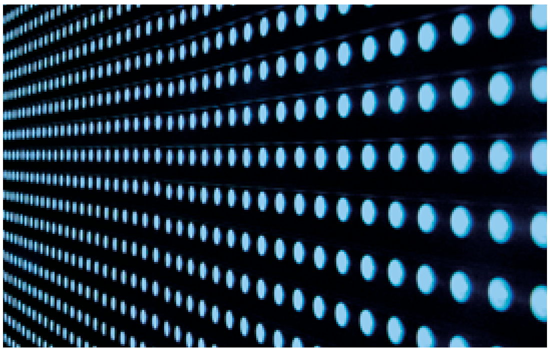
Beyond surface chemical composition

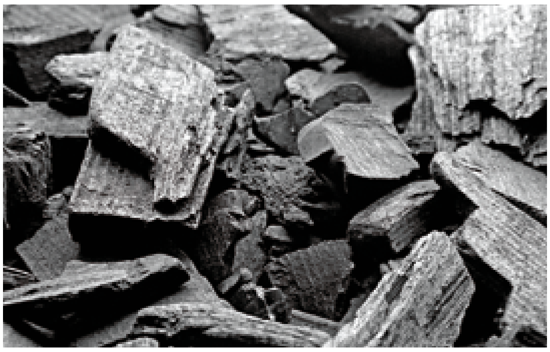
Advanced materials are defined by more than their surface composition. Their performance depends on the interaction of chemistry, electronic structure, molecular information, morphology and buried interfaces.

For researchers, the challenge is to connect these different dimensions without losing sample integrity or spending valuable time transferring samples between separate instruments.

EnviroMETROS series provides an integrated approach to advanced surface and interface analysis, enabling correlated insight from the same research sample in one controlled workflow.







From scientific heritage to advanced surface analysis

More than 40 years of innovation

Founded in Berlin in 1983, SPECS began by developing hardware and software for the automation and control of scientific experiments. This scientific foundation shaped a continuing focus on precise instrumentation, flexible system architecture and reliable automation. The strategic expansion into UHV surface analysis in 1992 was followed by the first SAGE system in 1994 and the introduction of the self developed PHOIBOS electron analyzer in 1998.

Over the following decades, expertise expanded from electron spectroscopy into scanning probe and electron microscopy, thin-film preparation, advanced experimental control, Near Ambient Pressure (NAP) analysis and small-spot X-ray excitation. Milestones such as the Aarhus STM, LEEM, PHOIBOS 150 NAP and µFOCUS source series progressively extended the accessible information from atomic-scale structure and electronic states to pressure-dependent surface chemistry.

Today, the combined experience of the brands SPECS, Focus, Nanonis and Enviro comes together within SPECSGROUP. EnviroMETROS series represents the next step in this development: an automated platform that integrates advanced XPS, HAXPES, PARXPS and complementary surface-analysis techniques into one controlled workflow, from sample preparation and handling to measurement, data analysis and reporting.

EnviroMETROS series brings this heritage into a new generation of automated advanced surface and interface analysis. Designed for complex research samples, it combines XPS, HAXPES and PARXPS with complementary methods and unique ability to control the condition from UHV to 50 mbar.

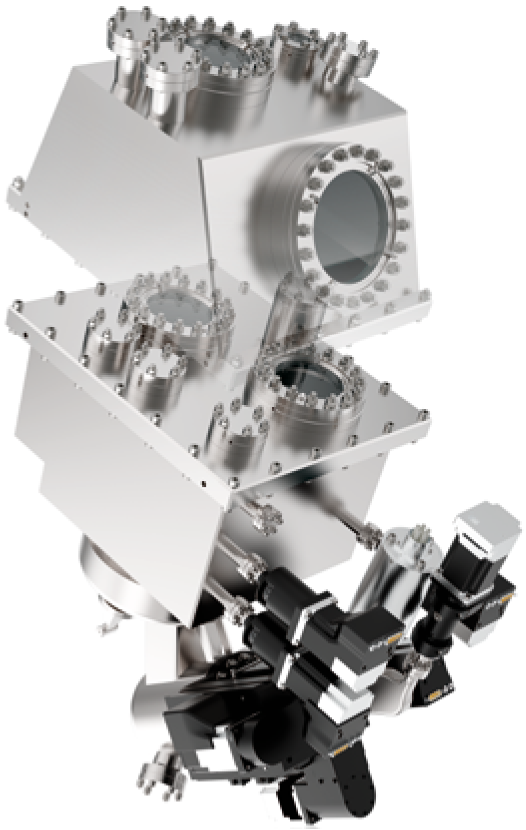
2000

2026

System capabilities

- X-ray Photoelectron Spectroscopy (XPS)
- Hard X-ray Photoelectron Spectroscopy (HAXPES)
- Auger-Meitner Electron Spectroscopy (AES)
- Parallel Angle Resolved X-ray Photoelectron Spectroscopy (PARXPS)
- Low Energy Ion Scattering Spectroscopy (LEISS)
- Ultraviolet Photoelectron Spectroscopy (UPS)
- Inverse Photoelectron Spectroscopy (IPES)
- Reflected Electron Energy Loss Spectroscopy (REELS)
- Infrared Reflection Adsorption Spectroscopy (IRRAS)
- RAMAN Spectroscopy
- Scanning Electron Microscopy / Scanning Auger Microscopy (SEM / SAM)
- Near Ambient Pressure Condition (NAP)

Core Components

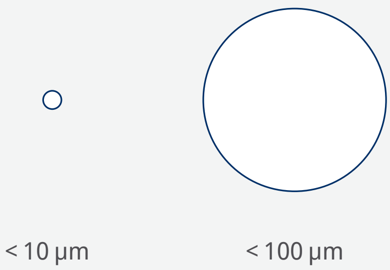


Optimized X-ray excitation for advanced surface analysis

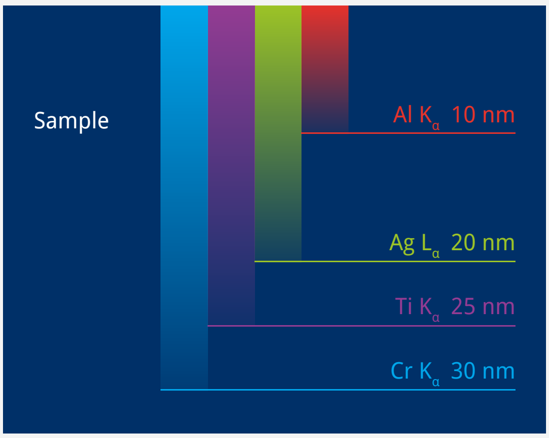
The quality of a XPS measurement begins with the excitation beam. The µFOCUS X-ray source series offers flexible combinations of X-ray excitation lines, from conventional Al K_α to Ag L_α, Cr K_α and the recently introduced Ti K_α. The different excitation energies provide various information depths, allowing the excitation to be matched to the analytical problem. Each line uses a dedicated anode and individually optimized monochromator crystal.

With the newly introduced small spot size, µFOCUS series now also enables measurements with spots below 10 µm, further extending its capabilities for high-resolution applications.

- Dedicated optics for every selected X-ray line
- Optimized photon flux density
- High spectral purity and analytical performance



Available spot sizes.



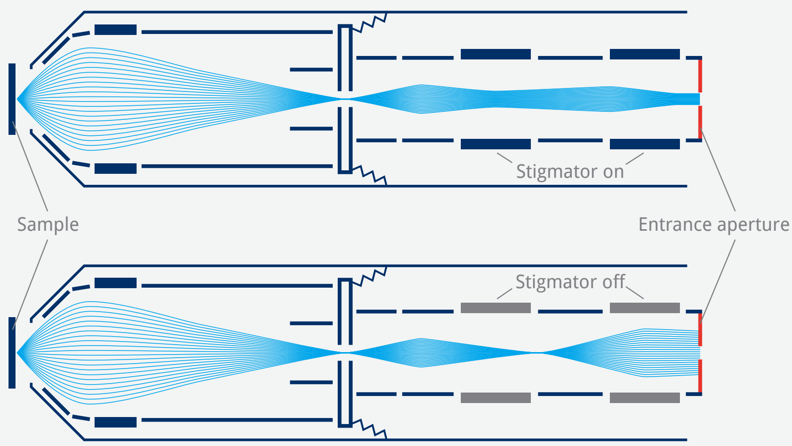
Available information depth by four X-ray lines.

Optimized electron analyzer for advanced surface analysis

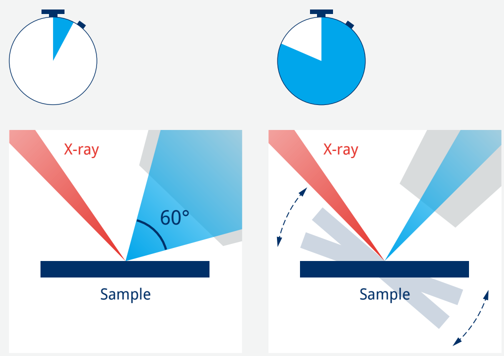
At the heart of EnviroMETROS systems is the AEOLOS 150, a high-transmission hemispherical electron energy analyzer developed for advanced XPS, HAXPES and angle-resolved measurements.

Its 60° acceptance angle captures a broad angular range in parallel, supporting non-destructive depth-dependent analysis without mechanically repositioning the sample. Combined with the AD-CMOS true pulse counting detector, AEOLOS 150 delivers high count rate performance, excellent linearity and an adaptive detection format for spectroscopy, angular-resolved analysis and imaging workflows.

- Grazing emission: more surface sensitive
- Near-normal emission: deeper information
- 60° parallel angular range



Patented beam forming lens for up to 2x count rate at constant resolution.



The time advantage of non-tilt depth measurement in AEOLOS 150 vs. common tilting setups.

Core Techniques

Surface-to-interface analysis
from traditional XPS to advanced PARXPS-HAXPES

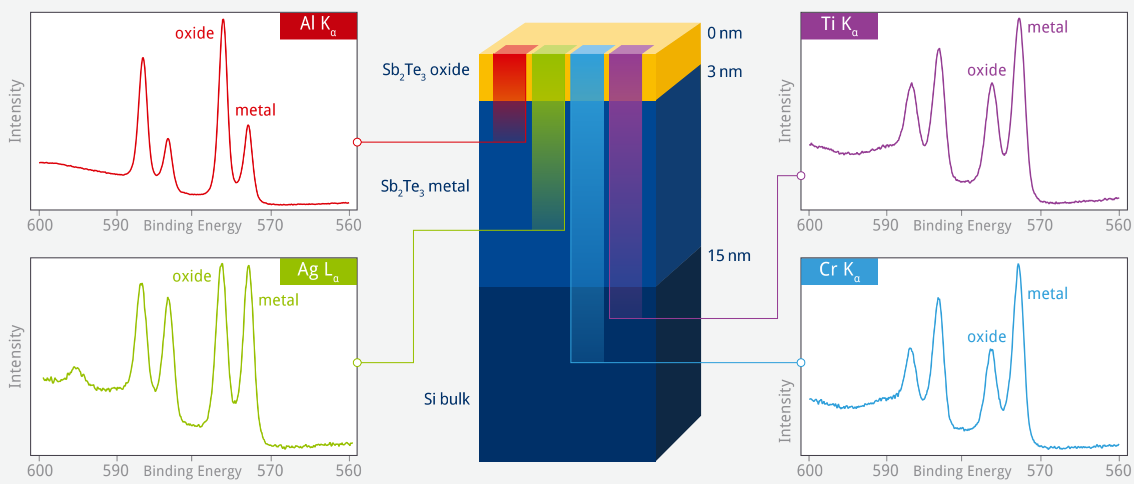
X-ray photoelectron spectroscopy (XPS)

The sample is irradiated with focused X-rays, causing core-level electrons to be emitted from atoms near the surface. Each element produces photoelectrons at characteristic kinetic energies, creating a spectral fingerprint that reveals which elements are present and in what quantities.

Because only electrons from the topmost 1–10 nm escape without energy loss, XPS is inherently surface-sensitive, therefore ideal for studying thin films, coatings, interfaces, catalysts, nano-materials, and 2D-materials. Beyond elemental identification, the precise binding energy position of each peak reveals chemical bonding states: oxidation states, functional groups, and coordination environments can all be distinguished, giving a complete picture of surface chemistry rather than composition alone.

In practice, these capabilities make XPS the technique of choice for a wide range of applications. Wherever surface chemistry drives performance, XPS provides the insight needed to optimise processes and ensure product quality.

The EnviroMETROS LAB features the µFOCUS small spot, monochromatic four-line X-ray source (Al K_α, Ag L_α, Ti K_α, and Cr K_α) paired with the AEOLOS 150 AD-CMOS analyzer and its wide 60° acceptance cone. This combination enables parallel angle-resolved measurements with each available X-ray line, probing different depths depending on photon energy and emission angle. By combining these measurements, composition and chemical-state depth profiles can be obtained from the outermost atomic layers down to buried interfaces without sputtering or repositioning the sample.



High-resolution Te 3d core-level spectra of a Sb_2Te_3 sample on Si substrate, measured with four X-ray lines (Al K_α, Ag L_α, Ti K_α and Cr K_α).

Parallel angle resolved X-ray photoelectron spectroscopy (PARXPS)

At grazing emission angles, photoelectrons travel a longer path through the material before escaping, so the signal becomes dominated by the outermost atomic layers. At near-normal angles, electrons from deeper layers contribute more strongly. By recording the full angular distribution in parallel with the analyzer's wide 60° acceptance cone information from different emission depths can be obtained without sputtering. This allows non-destructive modeling of the composition and chemical-state of the topmost surface layers of the sample.

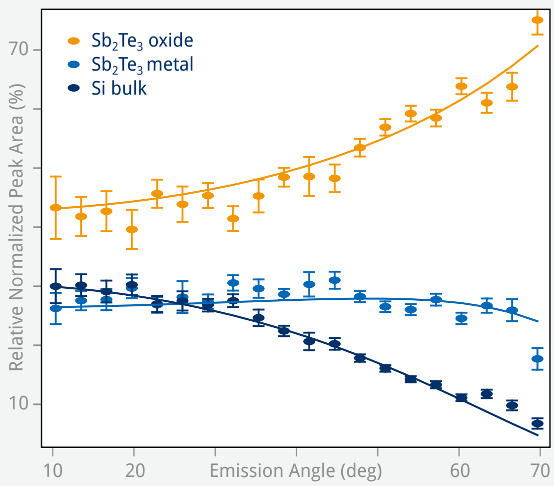
This makes PARXPS particularly valuable for characterising layered structures, oxide growth, surface segregation, and ultra-thin functional coatings, applications where conventional sputter profiling would alter or destroy the very features under investigation.

Hard X-ray photoelectron spectroscopy (HAXPES)

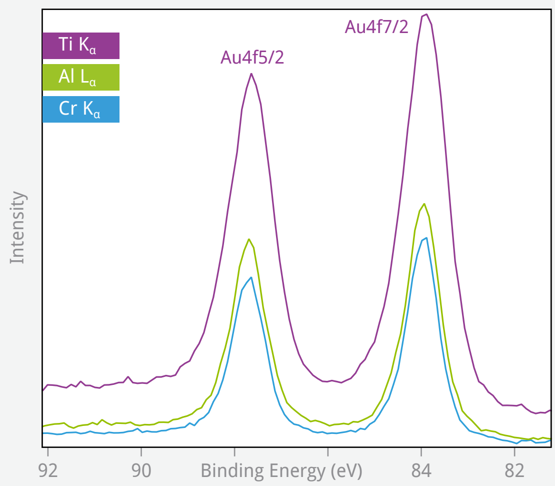
Photoelectrons escape from significantly greater depths than in conventional Al K_α XPS when using higher-energy X-ray excitation with Ag L_α, Ti K_α, or Cr K_α. This extends non-destructive analysis to, for example, buried interfaces by reaching information depths of up to 20–30 nm. Among the available hard X-ray lines, Ti K_α delivers a higher photon flux than Ag L_α or Cr K_α.

The result: Laboratory HAXPES spectra can be acquired more quickly and with better statistics, making daily routine depth-resolved analysis accessible to a wider range of users.

Together, HAXPES and PARXPS provide ways to better understand the sample from the outermost atomic layer down to tens of nanometres without destroying it.



Depth profile of the same Sb_2Te_3 sample on Si substrate (see on the left page).



Au 4f core level spectra acquired with HAXPES excitation energies.

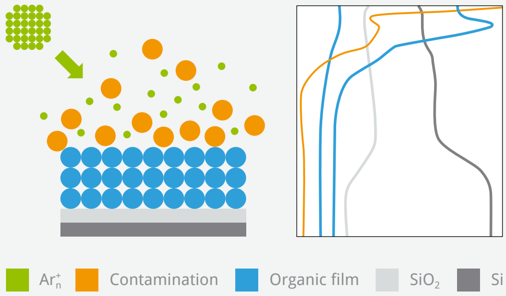
Techniques Overview

Chemistry & chemical states

Technique: XPS / AES

Research fields / applications:

- Battery materials and SEI / CEI chemistry
- Catalysts and active surface species
- Thin films and coatings
- Semiconductor-related materials and interfaces
- Oxides, contamination and functional surfaces



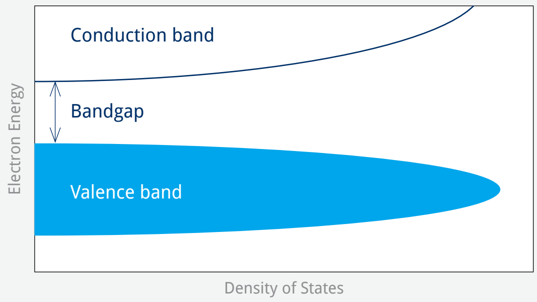
XPS sputter depth profiling of organic thin films with gas cluster ion beam (GCIB).

Electronic structure

Techniques: UPS / IPES / REELS

Research fields / applications:

- Organic electronics
- OLED materials
- Quantum materials
- 2D materials
- Work function studies
- Band gap and near-surface electronic transitions



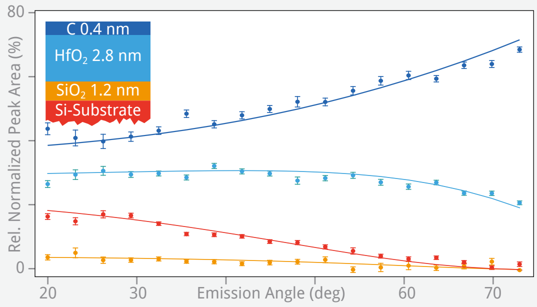
Bandgap, valence band and conduction band information of insulators and semiconductors.

Surface-to-interface depth information

Techniques: HAXPES / PARXPS

Research fields / applications:

- Buried interfaces
- Semiconductor gate stacks and multilayers
- Battery electrode interfaces
- Oxide growth and surface segregation
- Ultra-thin functional coatings



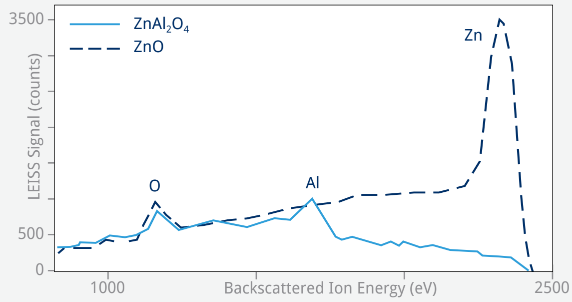
Two layer thin film on Si-wafer, depth profile gate oxide.

Top atomic layer sensitivity

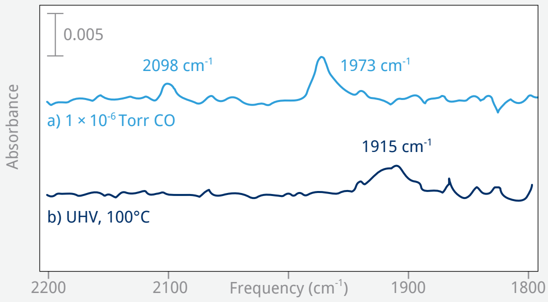
Technique: LEISS

Research fields / applications:

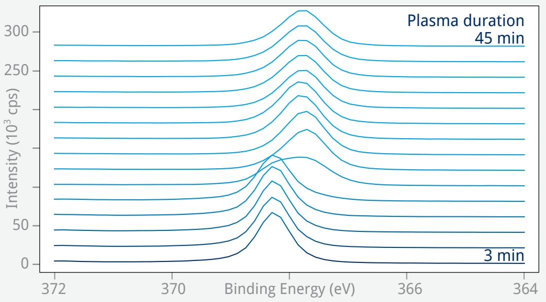
- Catalysts
- Surface segregation
- Adsorbates
- Contamination layers
- Functional surfaces
- Ultra-thin coatings



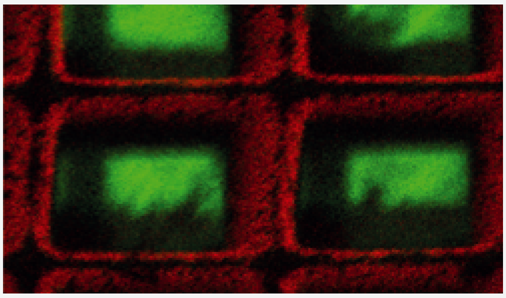
LEISS spectra of zinc oxide (ZnO) and spinel oxide ($ZnAl_2O_4$) show Al cations exposed to the surface, which correlates directly to catalytic activity.



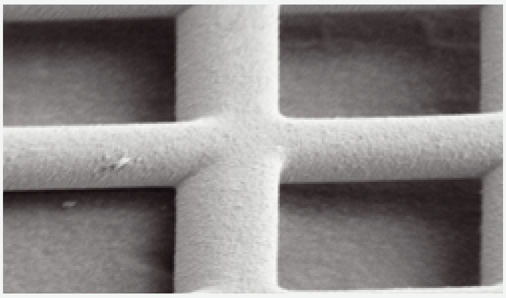
IR spectra of CO adsorbed on Pd(100) under different conditions.



High-resolution Ag 3d spectra acquired in oxidizing ambient air plasma.



SAM chemical map of a Cu grid (25 µm bars) on Ag — Cu LMM (red), Ag MNN (green).



SEM map of a Cu grid (25 µm bars) on Ag.

Molecular & structural information

Techniques: Raman / IRRAS

Research fields / applications:

- Polymers
- Organic layers
- Molecular coatings
- Battery materials
- Catalysts
- Functional groups and molecular fingerprints

Variable environments

Techniques / modes: UHV to NAP

Research fields / applications:

- Operando catalysis
- Gas-solid interfaces
- Surface reactions
- Environmental exposure studies
- Near-realistic surface chemistry
- Pressure-dependent chemistry

Morphology & elemental mapping

Techniques: SEM / SAM / XPS mapping

Research fields / applications:

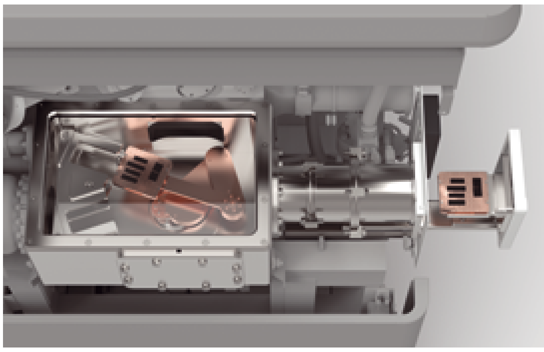
- Heterogeneous samples
- Microstructured devices
- Coatings
- Particles and powders
- Defects
- Patterned materials
- Spatially resolved surface chemistry

We invite you to contact us for any demo measurement at our Berlin facility.

Workflow

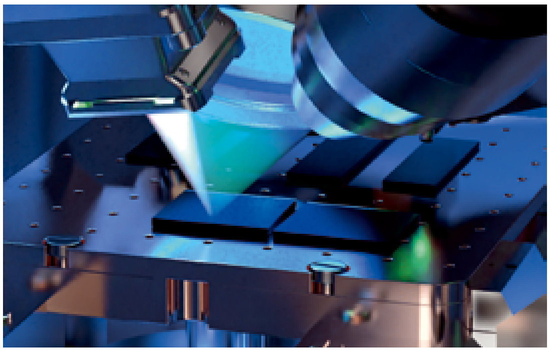
From sample to result

The side-panel drawer enables fast and convenient loading of sample holders.



The storage chamber can accommodate up to four sample holders.

An integrated camera captures the sample layout on each introduced sample holder and displays the image in Keystone M software for convenient measurement planning.



Each sample on the 80 × 80 mm* sample holder can be analyzed with all available techniques at the same analysis spot, enabling directly correlated results.

* Full wafer (8/12") measurements are available in EnviroMETROS FAB.

One-spot concept

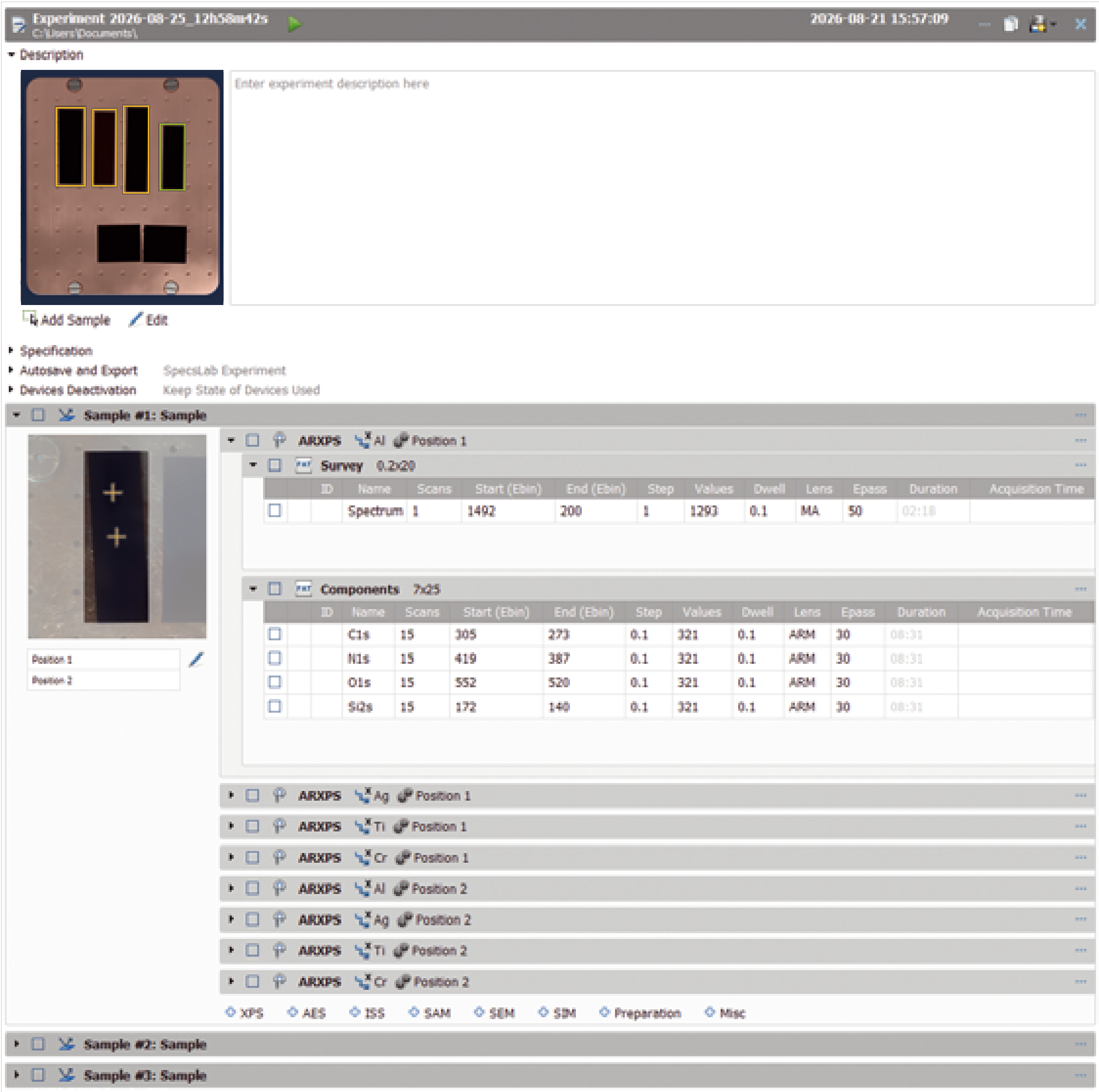
EnviroMETROS LAB integrates a broad range of complementary analytical techniques around a common measurement position. This allows correlated measurements on the same sample location.

By eliminating the need to transfer samples between instruments or independently align measurement locations, EnviroMETROS LAB enables more direct correlation between chemical, structural, electronic, and morphological information.

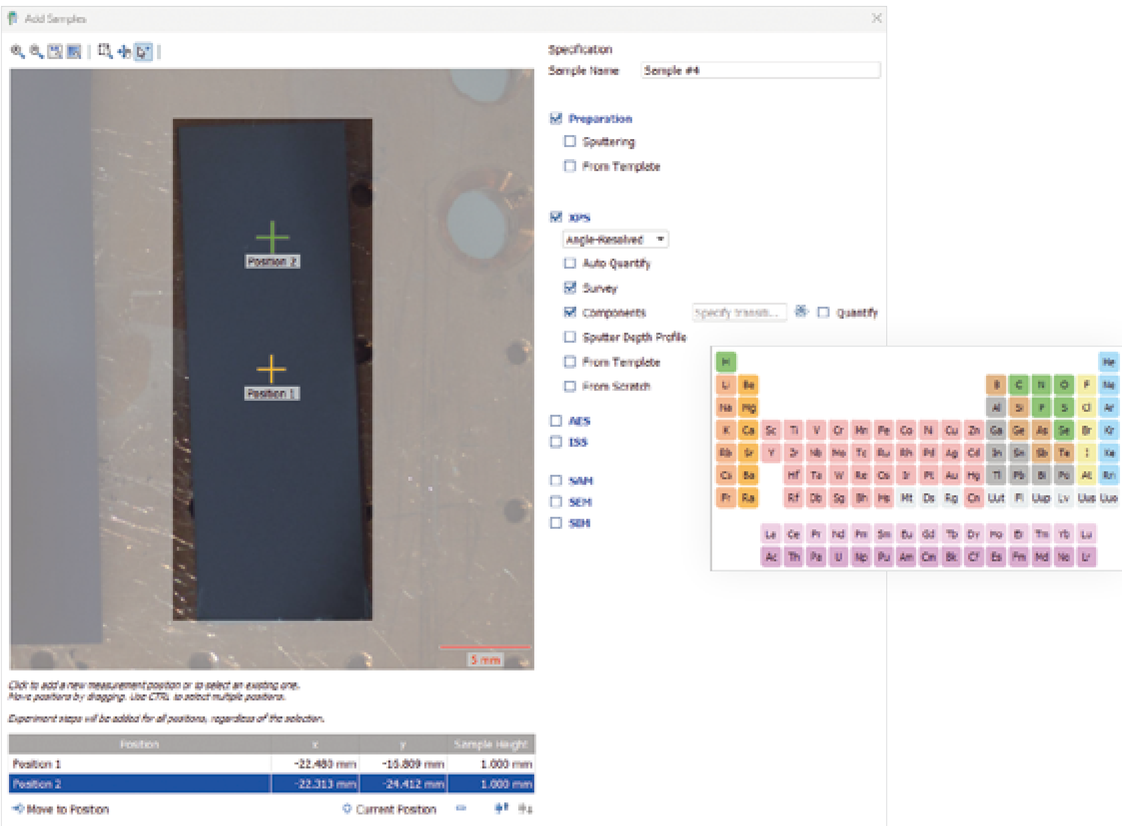
One software for the entire experiment

Keystone M software brings system control, experiment automation, data acquisition and analysis together in one intuitive software environment. Operators can monitor the real-time status of EnviroMETROS LAB, navigate the sample through the integrated camera view, define measurement positions and configure all available analytical techniques without switching between separate applications. Complex workflows, including sample movements, source changes, spectral acquisitions and sputter cycles, are assembled from individual tasks and can be executed automatically and unattended.

All acquired spectra and images are immediately available in the same workspace for visualization, comparison and processing. Built-in tools support multidimensional 1D, 2D and 3D data evaluation, peak fitting, sensitivity-factor correction and elemental quantification. Dedicated PARXPS modules reconstruct concentration-versus-depth distributions, translating angle-resolved measurements into layer thickness and composition information. From the first camera-based sample identification to the final chemical depth profile, Keystone M keeps the entire workflow connected, transparent and easy to use.



Select a sample directly from the camera-captured layout and define multiple measurement positions for precise, automated analysis.



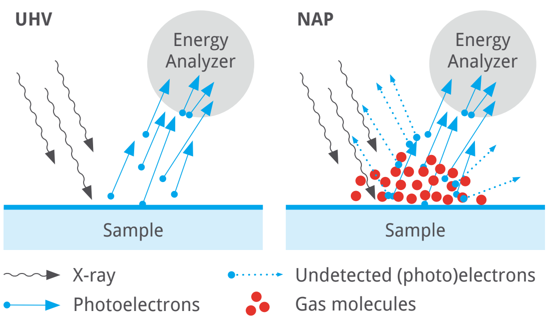
Assign multiple measurement techniques to each defined position, creating a customized workflow for automated, same-spot analysis.

NAP-Upgrade

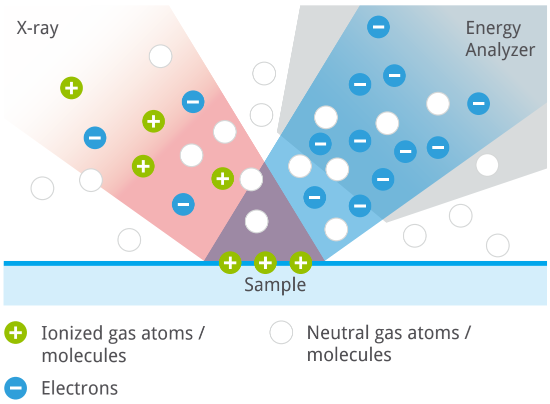
Expand the system with near-ambient pressure (NAP) capability

Bridging the pressure gap with NAP

Near-ambient pressure (NAP) XPS extends surface analysis beyond traditional ultra-high vacuum, enabling chemical states and surface reactions to be studied in controlled gas environments under conditions closer to actual operation. The capability can be included from the outset or added later and is seamlessly integrated into the automated system architecture, enabling straightforward switching between UHV and elevated-pressure measurements within the same software-controlled workflow. Proven vacuum, gas-handling and charge compensation concepts guarantee reliable day-to-day operation.



Ultra High Vacuum (UHV) vs Near-Ambient Pressure (NAP) measurements.



Environmental charge compensation.

Key research applications

Study reactions in gas environments
Controlled gas atmospheres enable pressure-dependent surface chemistry to be investigated under in-situ or operando conditions. Chemical states, adsorbate populations and reaction intermediates can be monitored during catalysis, oxidation, reduction, adsorption and other gas-solid reactions.

Preserve relevant surface conditions
Elevated-pressure measurements are valuable when evacuation to ultra-high vacuum would remove adsorbates or modify the interface under investigation. Gas-induced surface species and equilibria can therefore be characterized closer to functional or reaction conditions.

Investigate unconventional samples
Samples with significant outgassing or vapor pressure can be difficult or impossible to analyze using conventional UHV-XPS. Depending on the experimental configuration, NAP-XPS extends surface analysis to gases, porous materials, and polymers.

Extensions

Expand the system from sample preparation to integration

Possible extensions

Glovebox
A directly connected glovebox enables sensitive samples to be prepared, stored and transferred without exposure to ambient conditions. This preserves reactive surfaces and interfaces from sample preparation through analysis.

Preparation chamber
An external preparation system can add cleaning, cleavage, ion treatment, gas dosing or other specialized surface-preparation steps. Repeated preparation–analysis cycles take place without breaking the controlled environment.

Thin-film deposition
Connected ALD, PVD or evaporation modules enable thin films and interfaces to be created and analyzed step by step. This provides direct insight into nucleation, chemical evolution and interface formation without air exposure. Preserve sensitive samples during transfer between remote facilities.

Sealed vacuum-transfer
The transport and loading via a vaccum-suitcase can preserve sensitive samples between an external glovebox, preparation system and the analysis platform. This provides flexibility when permanent cluster integration is not required.

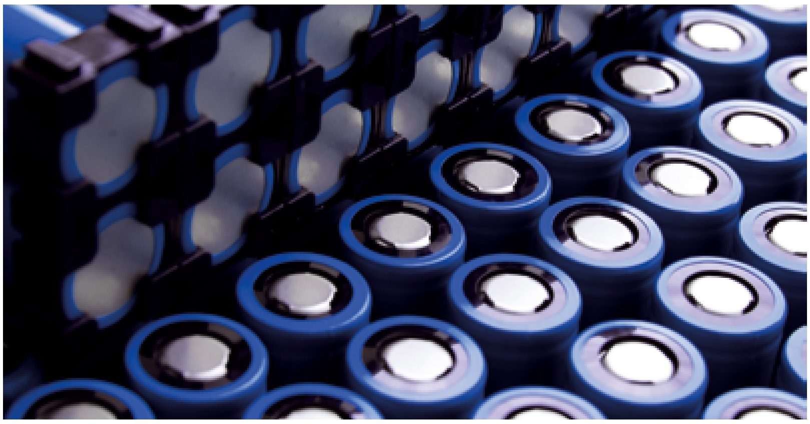
Multi-technique research cluster
A common UHV transfer infrastructure can connect EnviroMETROS LAB with complementary preparation and characterization modules such as STM/AFM, LEED, deposition, reaction or gas-analysis systems. This creates an integrated environment for multi-step and correlative research workflows.

Applications

Batteries – from electrode surfaces to buried solid-state interfaces

Key research questions

- Which chemical species form at electrode surfaces and solid-state interfaces?
- How do oxidation states change during preparation, cycling and ageing?
- What is the composition and thickness of reaction layers and protective coatings?
- How are chemical states distributed from the outermost surface to buried interfaces?
- How do moisture, oxygen and controlled gas exposure modify solid battery materials?



Battery performance depends strongly on the chemistry of electrode surfaces, reaction layers and buried solid-state interfaces. XPS, HAXPES and PARXPS provide complementary chemical state and depth information, while NAP-XPS enables solid battery materials to be studied during controlled gas exposure.

Techniques

XPS – surface chemistry and chemical states
Quantifies oxidation states, interphase species and degradation products in cathodes, anodes, solid electrolytes, SEI/CEI layers and protective coatings.

HAXPES – buried solid-state interfaces
Probes through thin SEI/CEI layers and protective coatings toward buried electrode–electrolyte and coating–active-material interfaces.

PARXPS – non-destructive layer analysis
Enables non-destructive modeling of composition, chemical states and thicknesses in ultra-thin interphases and protective electrode coatings.

NAP-XPS – controlled gas exposure
Follows oxidation, reduction, adsorption and moisture-induced changes in solid electrodes, solid electrolytes and protective coatings under controlled gas atmospheres.

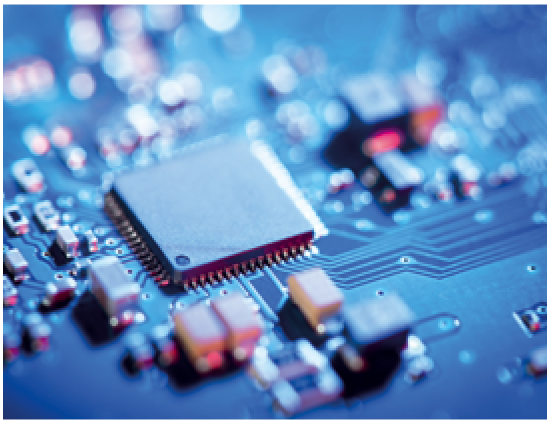
SEM/SAM – spatial correlation
Correlate particle morphology with local chemistry, binder distribution, agglomeration and degradation in composite electrode materials.

Raman and IRRAS – structural and molecular information
Identify crystalline phases, molecular species, functional groups and structural changes in active materials, solid electrolytes and electrode coatings.

Semiconductors – chemical-states of thin films, device materials and buried interfaces

Key research questions

- What are the composition and chemical states of an ultra-thin layer?
- Has deposition, etching or cleaning left chemical residues?
- How does oxidation affect a film or interface?
- What is the composition of a dielectric, barrier layer or contact interface?
- Are chemical changes localized to specific microstructures?
- Can multiple layers be characterized without destructive sputtering?



Ultra-thin films, residues and chemically sensitive interfaces can strongly affect semiconductor material properties. XPS provides surface composition and chemical states, while HAXPES and PARXPS extend the analysis non-destructively toward buried interfaces in research coupons, device fragments, small structured substrates and full size wafers.

Techniques

XPS – composition and chemical states
Quantifies composition, oxidation states, contamination and process residues in high-k dielectrics, metal oxides, barrier layers, contacts and semiconductor surfaces.

HAXPES – deeper interface sensitivity
Probes chemical states beneath capping layers and thin films toward dielectric–semiconductor, metal–oxide and contact interfaces.

PARXPS – ultra-thin layer reconstruction
Reconstructs composition, chemical states and thicknesses in gate oxides, high-k stacks, passivation layers and interfacial oxides.

SEM / SAM – microstructures and defects
Correlate morphology with local composition in patterned structures, bond pads, contacts, particles, residues and device defects.

LEISS – outermost atomic layer
Identifies termination chemistry, segregation, adsorbates and contamination in the outermost atomic layer of semiconductors, oxides and deposited films.

UPS, IPES and REELS – electronic properties
Characterize work function, valence and conduction states, band-gap-related properties and electronic transitions in semiconductor and dielectric materials.

NAP-XPS – gas-surface reactions
Monitors oxidation, reduction, adsorption and passivation of semiconductor surfaces, metal oxides and functional thin films under controlled gas atmospheres.

Organic devices – connecting molecular chemistry, electronic structure and interface properties

Key research questions

- What are the composition and chemical states of the organic layers?
- How are energy levels aligned across organic–metal or organic–oxide interfaces?
- What are the work function, valence-band onset and unoccupied electronic states?
- Has oxygen, moisture, processing or ageing changed the material?
- How are molecular composition and morphology distributed across the device?
- Can an organic–inorganic stack be analyzed without losing chemical information?

Organic-device performance is determined by molecular composition, energy-level alignment and interface chemistry. Combining XPS with UPS, IPES, REELS and molecular spectroscopy connects chemical states, electronic structure and molecular information across sensitive organic and hybrid layer systems.

Techniques

XPS – molecular and interface chemistry
Distinguishes bonding environments, oxidation and contamination in organic semiconductors, transport layers, molecular coatings and organic–electrode interfaces.

UPS, IPES and REELS
Reveal the complete electronic structure of organic and hybrid materials, from work function and occupied and unoccupied states to energy-level alignment, band-gap-related properties and interface energetics.

Raman and IRRAS – molecular fingerprints
Identify molecular species, functional groups, bonding motifs and structural changes in polymers, emissive layers and molecular coatings.

PARXPS/HAXPES – interface information
Distinguish surface and buried chemical contributions across organic–metal, organic–oxide and multilayer device interfaces.

Gas-cluster depth profiling – sensitive multilayers
Reduces chemical damage during depth profiling of polymers, organic semiconductors and hybrid organic–inorganic device stacks.

NAP-XPS and NAP-UPS – environmental stability
Reveal oxygen- and water-vapor-induced changes in chemical states, adsorption, work function and energy level alignment in solid organic layers.

Insulating and unconventional solid samples – analysis beyond conventional UHV-compatible materials

Key research questions

- Can reliable chemical-state information be obtained from an electrically insulating solid?
- Does UHV remove adsorbed water or volatile surface species?
- How does humidity or controlled gas exposure modify surface chemistry?
- Can porous or strongly outgassing solids be analyzed reliably?
- How do pressure and gas composition influence spectral stability and charging?
- Can chemical changes be followed as a material dries, adsorbs gas or reacts?

Insulating, porous and outgassing solids can be challenging for conventional XPS because of surface charging and vacuum-induced changes. Charge compensation and controlled gas environments extend reliable chemical state analysis to ceramics, polymers, powders, porous materials and other unconventional solid samples.

Techniques

XPS with dual-beam charge compensation
Compensates simultaneously low-energy electron and ion irradiation positive surface charging and stabilizes binding energies in electrically insulating solids.

NAP-XPS with environmental charge compensation
Neutralizes surface charge in suitable insulating samples, reducing peak shifts and spectral distortion without conductive coating via gas-phase ionization.

NAP-XPS for outgassing solids
Extends chemical-state analysis to porous, moisture-containing or outgassing solids that are difficult to maintain under conventional UHV conditions.

Pressure- and time-dependent XPS
Track chemical changes automatically during desorption, gas adsorption and controlled environmental exposure as functions of pressure and time.

PARXPS / HAXPES – depth-dependent information
Distinguish adsorbates, surface contamination and subsurface composition without relying exclusively on destructive sputtering.

Raman and IRRAS – molecular characterization
Identify molecular structures, functional groups and adsorbed species in polymers, porous materials and organic coatings.

SEM / SAM and XPS mapping – local heterogeneity
Locate and image particles, inclusions, defects and compositionally distinct regions in heterogeneous solid samples.

EnviroMETROS LAB / µLAB

Model comparison

EnviroMETROS LAB

The EnviroMETROS LAB is equipped with a monochromatic four energy line X-ray source enabling fast acquisition of high-quality spectra from well-defined analysis areas. The LAB configuration is also compatible with Near-Ambient Pressure (NAP) measurements. This enables operando studies observing surface chemistry as it happens.

X-ray source

- Up to 4 switchable X-ray excitation lines (Al K_α, Ag L_α, Ti K_α, Cr K_α)
- Spot sizes:
  Al K_α and Ag L_α: < 100 µm to 500 µm
  Ti K_α: < 150 µm to 500 µm
  Cr K_α: < 200 µm to 500 µm

Pressure

- UHV (< 5×10^{-10} mbar)
- Upgradable to NAP conditions (up to 50 mbar)

EnviroMETROS µLAB

The EnviroMETROS µLAB is equipped with a monochromatic multi-color X-ray source with a scannable small spot size. This level of spatial resolution enables chemical-state mapping and small-area analysis on heterogeneous samples, microstructured devices, and individual features that would be averaged out by a larger beam.

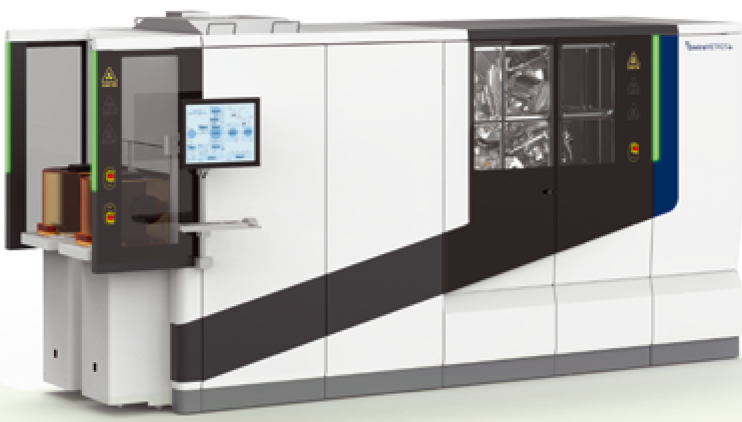
X-ray source

- Up to 3 switchable X-ray excitation lines (Al K_α, Ag L_α or Ti K_α, Cr K_α)
- Spot sizes:
  Al K_α and Ag L_α: < 10 µm to 300 µm
  Ti K_α and Cr K_α: < 25 µm to 300 µm
- Scannable: 2 × 2 mm

Pressure

- UHV (< 5×10^{-10} mbar)

Special versions for full-size wafer measurements



EnviroMETROS FAB connected to wafer handler system or with integrated FOUP / EFEM.

Technical data

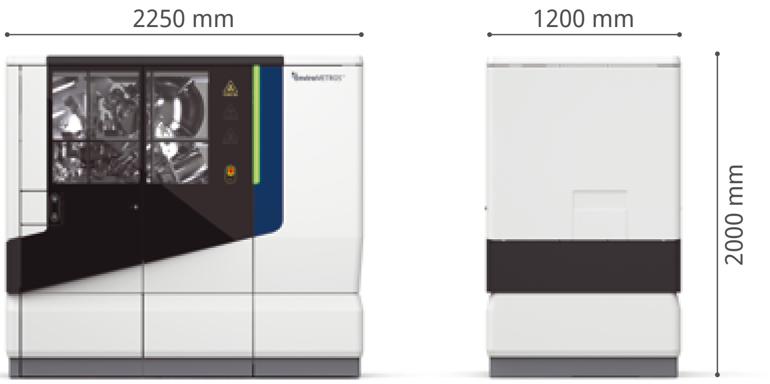
Summary

EnviroMETROS LAB / µLAB	
System	• Automated surface metrology system for (NAP-)XPS, (NAP-)HAXPES, LEISS, Ar_n^+-Sputter depth profiling, REELS, (NAP-)UPS, IPES, SEM / SAM, Raman and IRRAS • Clean room, CE, UL and SEMI compliant • Integrated Load Lock, sample distribution and sample storage chamber with automated sample transfer • Field-compensated analysis chamber • Two observation cameras (analysis chamber for navigation and storage chamber)
Sample holders	• 80 mm × 80 mm • Computer controlled fully motorized, non-magnetic three axis sample stage • 20 mm vertical motion • Sample holder for tilt, continuous rotation, Laser heating and Peltier cooling • Up to 4 electrical contacts on sample holder (more optional on request)
Electron spectrometer	• Hemispherical Electron Analyzer (150 mm) with wide angle lens (+/- 30°) for PARXPS • AD-CMOS Detector (< 1200 energy channels and < 12 angle channels)
X-ray source	• Different specifications depending on the version (EnviroMETROS LAB or µLAB) • Excitation Lines Al K_α (1487 eV), Ag L_α (2984 eV), Ti K_α (4511 eV), Cr K_α (5414 eV)
Charge neutralization	• Dual beam charge neutralization (UHV) • Environmental charge compensation (NAP)

SEM / SAM	• Imaging with 1 µm lateral resolution • Adjustable beam energy from 100 eV to 12 keV • Electron current up to 2 µA
Sputter depth profiling	• Monoatomic Ar^+ (0.2 – 5 keV) • Optional Ar-Cluster (up to 10 keV), selectable cluster sizes, up to Ar_{5000}
LEISS	• He^+ ion scattering spectroscopy (0.2 – 5 keV) • Bipolar operational mode for analyzer
(NAP-)UPS	• Small spot He I / He II UV source
IPES	• Low energy electron source (5 – 15 eV)
REELS	• Electron energies (0.1 – 5 keV)
Raman / IRRAS	• Integrated in measurement position
Vacuum	• Base pressure 5×10^{-10} mbar • Turbomolecular pumps • Oil-free backing pumps
NAP upgrade	• Only available for EnviroMETROS LAB • Automatic inlet for 3 gases
Software	• Keystone M for automatic vacuum control, sample transfer, sample data analysis and reporting • Control of most analytical techniques • ISQAR and ITFAP packages integrated for data evaluation and depth profiling • Possible remote access and control
Connections	• Connection from distribution chamber to other UHV or HV systems (optional) or sample introduction from a glovebox (optional)

Technical alterations reserved.

Dimensions



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