



## **Accreditation & Standards**

## Our XPS analyses are accredited according to ISO/IEC 17025:2017.

The RMS Foundation's management system is certified to ISO 9001:2015. In the standards ISO 10993-18 and ASTM F2847, XPS is expressly recommended for the *insitu* determination of the surface composition of medical devices—both for organic and inorganic substances as well as for insoluble particles.

ISO 9001 Quality management systems - Requirements

ISO/IEC 17025General requirements for the competence of testing and calibration laboratoriesISO 10993-18Biological evaluation of medical devices - Part 18: Chemical characterization of materialsASTM F2847Standard Practice for Reporting and Assessment of Residues on Single Use Implants

# **Sample requirements**

## Materials

Vacuum-compatible metals (including magnetic ones) and non-metallic solids as well as powders.

## Dimensions

- Maximum sample diameter: 80 mm
- Maximum sample height: 20 mm
- Larger samples can be crushed if necessary

### **Condition upon Delivery**

- Avoid touching the samples by hand whenever possible.
- For transport, wrap them dry in conventional aluminium foil.

## Contacts

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Discuss your questions with us – we are happy to advise you. For more information, please visit <u>www.rms-foundation.ch</u>.

#### XPS Flyer\_e\_V8

# **XPS Analysis**



# X-Ray Photoelectron Spectroscopy (XPS)

Chemical surface analysis for:

- Quality Control: Cleanliness
- Contaminants and residues
- Monitoring of surface modifications

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# How does XPS work?

In an X-ray photoelectron spectrometer, electrons are excited by X-rays so strongly that they leave their atoms and ultimately exit the sample surface. The energy of these photoelectrons is measured and used to calculate their binding energy, enabling a qualitative and quantitative determination of the chemical composition in the top 5 to 10 nm of the surface.

With this technique, all elements except hydrogen and helium can be detected, and their binding states can be analysed. The detection limit is approximately 0.1 at%, corresponding to about 1 ng/cm<sup>2</sup> on the sample surface.



# **Applications**

XPS is a non-destructive technique used to analyse:

- The cleanliness of surfaces for quality control
- The chemical composition of contaminants and residues
- Chemical modification after surface treatments

XPS analyses serve customers in the medical technology sector as well as in other industries such as watchmaking, coatings, electronics, and semiconductors.

## Equipment

## PHI Genesis by Physical Electronics / ULVAC-PHI

This spectrometer is suitable for all standard analyses and is particularly notable for its ability to investigate micrometre-sized structures from 5  $\mu$ m.

# **Analysis Types & Costs**

Depending on your needs, various types of analysis are available, all of which are accredited. In the basic package (XPS analysis incl. test certificate), high-resolution survey spectra are quantitatively evaluated. The option that includes a report allows for more detailed investigations. Special investigations such as measurements in very small areas, angle-resolved measurements, imaging XPS, or depth profiling are carried out in extended XPS analyses.

## Table: XPS Analysis Types, and their Capabilities

Service		XPS-Analysis incl. Test Cer- tificate	XPS-Analysis incl. Report	Extended XPS-Analysis
Measurement	High-resolution survey spectra <sup>1</sup> Quantification of all detected elements	yes	yes	yes
	Detailed spectra <sup>1</sup> Additional analysis of chemical and oxi- dation states	-	yes	yes
Area of analysis	large: Ø 200 μm, scanning possible	yes	yes	yes
	small: Ø 50–100 μm	-	yes	yes
	very small: Ø 5–20 μm	-	-	yes
Detection limit	0.1–0.3 at%, depending on element	yes	Yes	yes
Uncertainty	15 % for main elements, up to 100 % for trace elements	yes	Yes	yes
Special analyses	angle-dependent analysis to analyse surface depth distributions	_	-	yes
	<pre>imaging-XPS to chemically map the surface</pre>	-	-	yes
	depth profile using Ar-sputtering	-	-	yes
Report	Test Certificate (German or English)	yes	_	yes
	Report (German or English)	-	yes	yes

<sup>1</sup> In high-resolution survey spectra, the fwhm(Ag 3d<sub>5</sub>/<sub>2</sub>) is about 0.7 eV, while in detailed spectra it ranges between 0.4 and 0.5 eV, depending on the pass energy.

### Table: XPS Analysis Types, and associated Costs

Total Number of	Preis/Spot in CHF		
Analysed Spots <sup>2</sup>	XPS-Analysis incl.	XPS-Analysis	Extended
	Test Certificate	incl. Report	XPS-Analysis
1	450	600	
2	320	440	Prices
≥3	270	380	on
≥ 6	240	330	request
≥ 9	220	300	

<sup>2</sup> Sum of all analysed spots in an investigation (for example, 3 samples × 2 spots per sample results in a total of 6 analysed spots).