

Preset Values:

- **Materials** Vacuum-stable, metallic and non-metallic solids and powders. Magnetic materials can also be analyzed.
- **Dimension** Sample diameter of max. 100 mm; height of max. 18 mm, larger samples can be reduced to the maximum dimensions.
- **Sample Handling** Ideally, the samples are not touched by hand and packed in common aluminium foil under dry conditions for the transportation.

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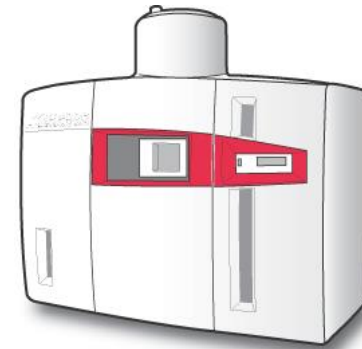
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Please discuss your aims and objectives with us! We will be happy to advise you.

Or ask for our service catalogue. You will find this and other information on www.rms-foundation.ch as well.

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 with X-rays so strongly that they leave their atom and eventually the sample surface as well. The energy of these photoelectrons is analysed and hence their binding energy is calculated. This permits to determine qualitatively and quantitatively 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 analysed. The detection limit is approximately 0.1 at%, which corresponds to about 1 ng/cm² on the sample surface.

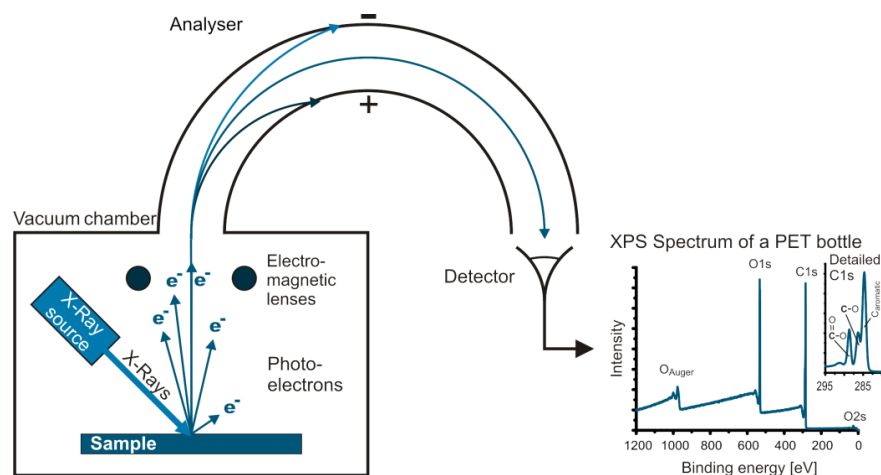


Figure: XPS principle.

Applications

XPS is a non-destructive technique to analyse the

- Cleanliness of surfaces for quality control
- Chemical composition of contaminants and residues
- Chemical modification after surface treatments (e.g. for research)

XPS Analyses serve our customers in the medical technology field and also in other industrial fields such as watchmaking, coatings, electronics & semiconductors.

Equipment

Axis Nova from Kratos Analytical, Manchester, UK.

Our spectrometer is equipped with a large sample holder, a monochromatic AlK α X-ray source, charge neutraliser, argon ion sputtering, a hemispherical analyser and a 2D-detector. This configuration allows for the acquisition of chemical maps with a lateral resolution of 20 μ m, which is the strength of our instrument!

Types of Analysis & Costs

XPS Cleanliness Analysis / Standard Surface Analysis

This type of analysis includes the acquisition of survey spectra, the data processing and a report (German or English). The report consists of spectra, the results of the quantitative analysis, information about the chemical state (e.g. distinction between sulphides and sulphates) and an interpretation of the results.

Table: Costs of an XPS Cleanliness Analysis / Standard Surface Analysis

Number of analysed spots	Costs in CHF
1	700
2	900
3	1095
4	1290
5	1480
6	1668
7	1855
8	2050
9	2250
10	2430
further spots	240/spot

Special XPS Investigations

- Small areas of diameters \varnothing 15, 27, 55 or 110 μ m to analyse small spots or features.
- Detailed spectra for a more accurate chemical analysis of selected elements (see detailed spectrum of C1s in Figure).
- Angle-resolved XPS Analysis of tilted samples in order to determine the depth distribution of the elements in the top 10 nm.
- Depth profiling Applying argon ion sputtering, the chemical composition between 10 nm and 1 μ m depth can be determined.
- Imaging XPS Chemical map of the distribution of elements or oxidation states with a lateral resolution of 20 μ m!

For these special investigations the actual expenses are charged. Please ask us for a quotation.

Accreditation & Standards

The management system of the RMS Foundation is certified according to ISO 9001:2015, and the XPS services are accredited according to ISO/IEC 17025:2017.

The standards ISO 10993-18 and ASTM F2847 recommend XPS for the *in-situ* analysis of the chemical surface composition of medical devices (for organics, inorganics and insoluble particulates).

ISO 9001	Quality management systems - Requirements
ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories
ISO 10993-18	Biological evaluation of medical devices - Part 18: Chemical characterization of materials
ASTM F2847	Standard Practice for Reporting and Assessment of Residues on Single Use Implants