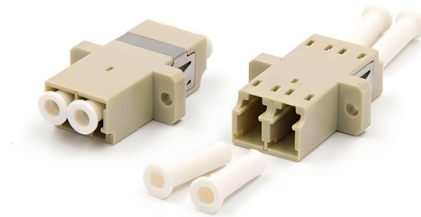


Surface Composition Spectrometer



Article Overview

A Surface Composition Spectrometer is an analytical instrument used to determine the elemental, chemical, and electronic composition of material surfaces with high sensitivity and spatial resolution.

Overview and Function

A Surface Composition Spectrometer primarily analyzes the topmost layers of a material, typically within a few nanometers, to provide detailed information about surface chemistry, contamination, and thin-film properties. It employs techniques such as X-ray photoelectron spectroscopy (XPS), also known as electron spectroscopy for chemical analysis (ESCA), which irradiates a surface with X-rays and measures the kinetic energy of emitted electrons to identify elements and their chemical states (e.g., metallic, oxidized, or polymeric bonding) (Thermo Fisher Scientific) . Other complementary techniques include:

- Ion Scattering Spectroscopy (ISS/LEIS): Uses noble gas ions to probe the first atomic layer, providing highly surface-sensitive elemental composition data, useful for studying surface segregation and layer growth (Thermo Fisher Scientific) .
- Reflected Electron Energy Loss Spectroscopy (REELS): Measures energy losses of scattered electrons to determine electronic structure, band gaps, and unoccupied molecular orbitals, with the added ability to detect hydrogen in some cases (Thermo Fisher Scientific) .
- Auger Electron Spectroscopy (AES): Detects electrons emitted from surface atoms to provide elemental and chemical information, often used alongside XPS for enhanced analysis (Fraunhofer IGB)

Article Content

Photoelectron Spectroscopy

Auger electron spectroscopy (AES): Uses a focused electron beam to measure the surface composition (ESCALAB

Surface analysis

Fraunhofer IPM develops measuring systems for the inspection and analysis of component surfaces. To this end, we use various

X-ray photoelectron spectroscopy of thin films

X-ray photoelectron spectroscopy (XPS) can be used to investigate chemical bonding and elemental composition.

Surface Chemical Analysis

Combining surface characterization techniques with ion milling permits scientists to

Uncertainty quantification for a global imaging spectroscopy surface ...

This experiment dealt with quantifying uncertainties in each step of the retrieval, including surface reflectance,

The next era of remote spectral imaging of the Earth's surface

Imaging spectroscopy technology is transforming the way Earth is viewed from space, with applications across

Auger electron spectroscopy

Auger electron spectroscopy A Hanford scientist uses an Auger electron spectrometer to determine the

Auger Electron Spectroscopy (AES) Surface Analysis

Auger Electron Spectroscopy (AES) provides quantitative elemental and chemical state information from

Selecting the best surface analysis method for your materials/samples

In this review, we group this information into the composition (elemental and chemical makeup), structure (physical

InSitu Composition Reservoir Fluid Composition | SLB

The foundation of downhole fluid analysis: Optical absorption spectroscopy The InSitu Composition reservoir fluid composition

Surface Analysis | Techniques | Thermo Fisher Scientific

Ion scattering spectroscopy (ISS) or low-energy ion scattering (LEIS) is a highly surface-sensitive technique that probes the

Unmasking the Secrets of Mercury

The Mercury Atmosphere and Surface Composition Spectrometer (MASCS) instrument aboard NASA's MESSENGER

Secondary-ion mass spectrometry

Dynamic secondary-ion mass spectrometry (DSIMS) is a powerful tool for characterizing surfaces, including the elemental,

Innovative Surface Science & UHV Systems | SPECS

We are specialized in customizable NAP & UHV surface analysis systems and components. Explore our innovations in surface

SUDA: A SURface Dust Analyser for Compositional Mapping of

The Surface Dust Analyser (SUDA) is a mass spectrometer onboard the Europa Clipper mission for investigating the

Messenger MASCS UVVS Archive

The Mercury Atmospheric and Surface Composition Spectrometer (MASCS) is comprised of a small Cassegrain

Surface analysis Technology | Thermo Fisher Scientific

XPS measures the elemental composition, chemical, and electronic state of atoms on a material's surface to analyze its surface

X-Ray Photoelectron Spectroscopy (XPS; aka Electron Spectroscopy

X-ray photoelectron spectroscopy (XPS) is a surface sensitive, non-destructive technique used routinely to analyze

Review on surface-characterization applications of X-ray photoelectron ...

X-ray photoelectron spectroscopy (XPS) is one of the most preferred tools that provides the chemical composition of

Surface Analysis | Mass Spectrometers | Supplier

The Hiden MAXIM is a complete quadrupole mass spectrometry system with high transmission optics and

21.2: Spectroscopic Surface Methods

Applications X-ray photoelectron spectroscopy is a particularly useful tool for determining the composition and

X-ray Photoelectron Spectroscopy | XPS-ESCA

X-Ray Photoelectron Spectroscopy (XPS) is also known as Electron Spectroscopy for Chemical Analysis

Understanding Surface Properties Using XPS

One such technique is X-ray photoelectron spectroscopy (XPS), also known as electron spectroscopy for chemical

Spectrometers – Visual Encyclopedia of Chemical Engineering

Spectrometers Spectrometers use light wavelengths to investigate the chemical composition of a sample. Atomic spectrometers use

Surface Composition

The surface composition of an alloy typically differs from its bulk composition (Figure 1). The equilibrium surface composition is a

The Mercury Atmospheric and Surface Composition Spectrometer for

Abstract The Mercury Atmospheric and Surface Composition Spectrometer (MASCS) is one of seven science instruments onboard

Surface Analytics

Innovative products are increasingly refined by customized surface design, whose processes and surface compositions must be

Contact Us

For more information, pricing, or custom solutions, please contact us:

Website: <https://www.thebucketlistbook.co.za>

Email: sales@thebucketlistbook.co.za

Phone: +33 1 42 78 39 16

Address: 10 Rue de la Paix, 75002 Paris, France

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