

Primary and Secondary Spectrometers



Overview

In 1910, British physicist observed a release of positive ions and neutral atoms from a solid surface induced by ion bombardment. Improved technology in the 1940s enabled the first prototype experiments on SIMS by Herzog and Viehböck in 1949, at the, Austria. In the mid-1950s, Honig constructed a SIMS instrument at in. Then in the early 1960s, two SIMS instruments were developed independently. One was an American proje.

AI Overview

A primary spectrometer generates the initial mass spectrum of ions, while a secondary spectrometer performs detailed analysis of selected ions to reveal structural information. Primary Spectrometer The primary spectrometer is the first stage in mass spectrometry, often referred to as first-order mass spectrometry. In this stage, the sample is ionized into charged particles and separated based on their mass-to-charge ratio (m/z). The resulting first-order mass spectrum displays the distribution of ions, showing their relative intensities and molecular weights, which provides a foundational overview of the sample's composition and ionic structure . In protein analysis, this stage is commonly used for peptide mass fingerprinting (PMF), where enzymatic fragments of proteins are measured and compared to databases for identification . Secondary Spectrometer The secondary spectrometer is used in second-order mass spectrometry, often as part of tandem mass spectrometry (MS/MS). Here, specific parent ions selected from the primary spectrum are further fragmented into daughter ions. These daughter ions are then separated and detected, producing a second-order mass spectrum that provides detailed information about the internal structure and sequence of the parent ion . In protein identification, secondary spectrometry allows for short peptide sequencing with higher reliability, validating...

Article Content

Quantification of primary and secondary organic aerosol sources by ...

Quantification of primary and secondary organic aerosol sources by combined factor analysis of extractive electrospray ionisation and aerosol mass spectrometer measurements (EESI-TOF and

O/C and OM/OC Ratios of Primary, Secondary, and Ambient Organic ...

A recently developed method to rapidly quantify the elemental composition of bulk organic aerosols (OA) using a high-resolution time-of-flight aerosol mass spectrometer (HR-ToF

SIMS Tutorial | Instrumentation and theory |EAG

In this SIMS Tutorial from EAG Laboratories, we present the history of Secondary Ion Mass Spectrometry, as well as the scientific principles behind the

How to change Primary and Secondary monitor on

You can change the Primary and Secondary monitors on Windows 11/10 using Settings. You can also make external monitor the primary display.

The Principle, Types, and Applications of Mass Spectrometry: A ...

These detectors analyze or detect secondary electrons produced after the primary ion particles strike the detector surface. The signal generated is solely dependent on the intensity of the

Secondary Ion Mass Spectrometry: Fundamentals,

Secondary ion mass spectrometry (SIMS) is a technique used to analyse the composition of solid surfaces and thin films by sputtering the surface

Secondary-ion mass spectrometry

OverviewHistoryInstrumentationDetection limits and sample degradationStatic and dynamic modesApplicationsGeneral bibliography

In 1910, British physicist J. J. Thomson observed a release of positive ions and neutral atoms from a solid surface induced by ion bombardment. Improved vacuum pump technology in the 1940s enabled the first prototype experiments on SIMS by Herzog and Viehböck in 1949, at the University of Vienna, Austria. In the mid-1950s, Honig constructed a SIMS instrument at RCA Laboratories in Princeton, New Jersey. Then in the early 1960s, two SIMS instruments were developed independently. One was an American proje

AMS releases new cosmic-ray measurements - Home | CERN

Primary cosmic rays mostly come from exploding stars, while secondary cosmic rays are produced by interactions between primary cosmic rays and the gas and radiation of space. Previous

Mass spectrometry

Each analyzer type has its strengths and weaknesses. Many mass spectrometers use two or more mass analyzers for tandem mass spectrometry (MS/MS). In

What Are Primary and Secondary Mass Spectrometry

Analyzing both first-order and second-order mass spectra allows researchers to perform detailed structural identification and quantitative analysis of molecular samples.

Secondary Ion Mass Spectrometry

Secondary ion mass spectrometry (SIMS) is defined as a technique that determines the elemental composition of a sample as a function of depth by sputtering the surface with a primary ion beam and

The Principle, Types, and Applications of Mass Spectrometry: A ...

he most common form of data representation in a sample using the mass spectrometer. A histogram is attached to the mass spectrometer, and this represents the graphical approximate distribution of the

Secondary ion mass spectrometry

This PrimeView highlights how different primary ion beams can be used to sample different surface species.

Introductory Chapter | Secondary Ion Mass

This chapter will discuss the Secondary Ion Mass Spectrometry (SIMS) technique for the new SIMS user, illustrating how SIMS fits in with other common surface analytical techniques.

Back-to-basics tutorial: Secondary ion mass spectrometry ...

Secondary ion mass spectrometry (SIMS) is a sophisticated and powerful analytical technique to characterise the surface and sub-surface of materials. It has been widely used in

Secondary ion mass spectrometry using cluster primary ion beams

The use of energetic cluster primary ion beams for secondary ion mass spectrometry (SIMS) has several advantages over analysis with more conventional monoatomic primary ion

Difference between Primary Secondary and Tertiary Amines Via FTIR

In FTIR (Fourier Transform Infrared) spectroscopy, primary, secondary, and tertiary amines can be distinguished based on the characteristic infrared absorption bands associated with

Secondary ion mass spectrometry

The secondary ions are atomic or molecular in nature, depending on the chemistry of the surface and the characteristics of the primary ions, which are themselves atomic, molecular or polyatomic.

Introductory Chapter | Secondary Ion Mass

Eqn (1.1) shows that improved detection limits (higher signals) will be obtained from materials with high sputter yields, secondary ions with high ion yields, mass spectrometers with high

Mass Spectrometry: Definition, Principle, and Applications

A mass spectrometer is the instrument used to perform mass spectrometry. It works by ionizing chemical compounds to generate charged particles (ions) and

Secondary ion mass spectrometry

This Primer describes the secondary ion mass spectrometry experimental setup, in which a primary ion beam sputters secondary ions that

Spectrometers and Signal Processing Basics

In practical applications spectrometers have a finite frequency / wavelength resolution and a finite range of frequencies / wavelengths over which they operate
Most astronomers are introduced to

Secondary Ion Mass Spectrometry

Secondary ion mass spectrometry is based on sputtering a few atomic layers from the surface of a sample using a primary ion beam and analyzing the emitted secondary ions, distinguished by their

Secondary-ion mass spectrometry

Secondary-ion mass spectrometry (SIMS) is a technique used to analyze the composition of solid surfaces and thin films by sputtering the surface of the

Contact Us

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

Website: <https://sphplantsales.co.za>

Email: info@sphplantsales.co.za

Phone: +27 64 827 3915

Address: Unit 9, Highveld Technopark, 43 Atlas Road, Johannesburg, 2196,
South Africa

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