

Secondary Spectrometer Construction Process



Overview

Secondary Ion Mass Spectrometry (SIMS) uses an energetic (typically 250 eV to 30 kV) primary ion beam to sputter ions (both positive and negative) and neutral atoms from a sample surface, as shown in Figure 1. The sputtered ions are then extracted and filtered with respect to. Secondary Ion mass Spectroscopy (SIMS), as the name suggests, involves characterizing metallic and other materials through the spectroscopic analysis of secondary ions emanating from the surface of the material to be characterized by the impact of the high energy primary ions. It will cover the physical principles of the technique, data obtained, quantification methods, SIMS instrumentation. The technique of Secondary Ion Mass Spectrometry (SIMS) is the most sensitive of all the commonly-employed surface analytical techniques - capable of detecting impurity elements present in a surface layer at < 1 ppm concentration, and bulk concentrations of impurities of around 1 ppb. This guide provides some simple and easy to use design guidelines and formulas for designing, evaluating and comparing various diode array, diffraction grating based spectrometers designs. The input to the design process is the wavelength range you want to cover and the optical resolution by which. When a solid sample is sputtered by primary ions of few keV energy, a fraction of the particles emitted from the target is ionized.



Article Content

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Secondary Ion Mass Spectroscopy

In a Tandem Mass Spectrometer, the secondary ions (generally, high mass fragments) are further broken down (fragmentation) by one of several techniques, and the resultant fragments are detected ...

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SIMS Tutorial | Instrumentation and theory |EAG Laboratories

The first inklings of the SIMS process came when early mass spectroscopists noticed that ions from instrument construction materials were produced by ion sources.

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Back-to-basics tutorial: Secondary ion mass spectrometry (SIMS) in ...

To summarise here, two essential steps are involved during secondary ion formation: the first process where species are displaced/desorbed and the second process where part of the ...

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Introduction to Secondary Ion Mass Spectrometry (SIMS) technique

Secondary Ion Mass Spectrometry consists of analyzing these secondary ions with a mass spectrometer. Secondary ion emission by a solid surface under ion bombardment supplies ...

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This not only covers the process of sputtering and ionization (those responsible for secondary ion formation/survival) but also presents a brief description of solids, atoms, and molecules as well as ...

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5.5: Secondary Ion Mass Spectrometry

In SIMS the surface of the sample is subjected to bombardment by high energy ions - this leads to the ejection (or sputtering) of both neutral and charged (+/-) species from the surface. The ejected ...

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Spectrometer Design Guide

On the following pages are shown two common spectrometer geometries; the transmission grating based and the crossed Czerny-Turner. Also, the figures defines the key design parameters of a ...

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Secondary Ion Mass Spectrometer (SIMS)

Ions generated by this process form the secondary beam and are subsequently transmitted within a continuous high vacuum environment to a mass spectrometer.

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Introduction to Secondary Ion Mass Spectrometry ...

Secondary Ion Mass Spectrometry consists of analyzing these secondary ions with a mass spectrometer. Secondary ion emission by a solid surface under ion ...

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Secondary Ion Mass Spectroscopy

Secondary ion mass spectrometry (SIMS) is based on the use of an accelerated primary ion beam, under ultra-high vacuum (UHV) conditions, which bombards the surface and generates secondary ...

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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.

Contact Us

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