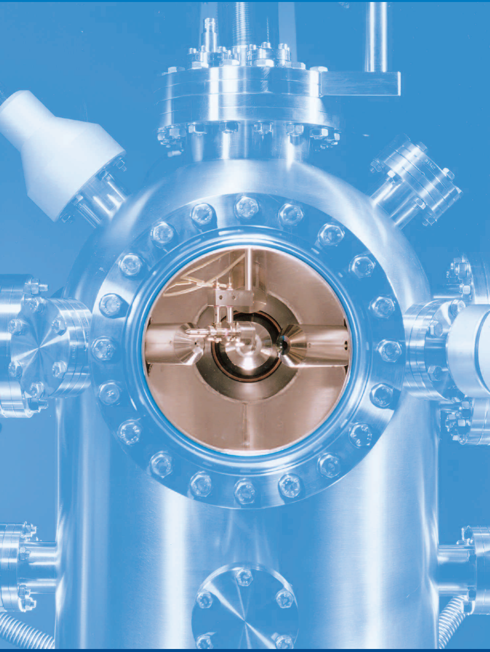
Hiden *SIMS*
Secondary Ion Mass Spectrometers

Analysers for surface, elemental and molecular analysis



vacuum analysis

surface science

plasma diagnostics

gas analysis

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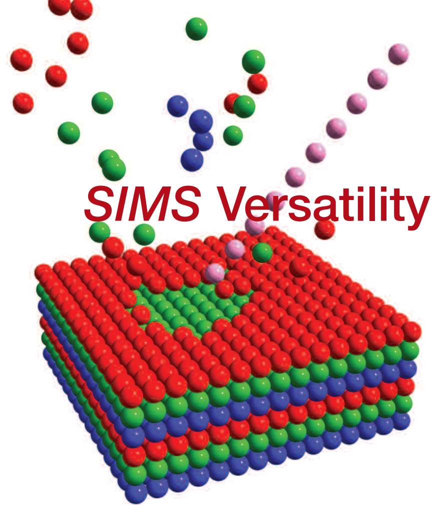
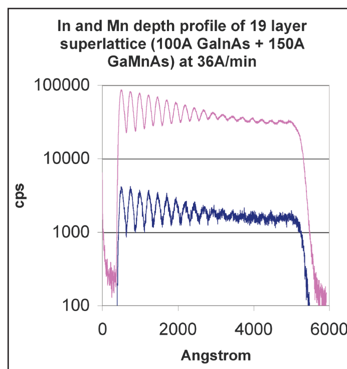
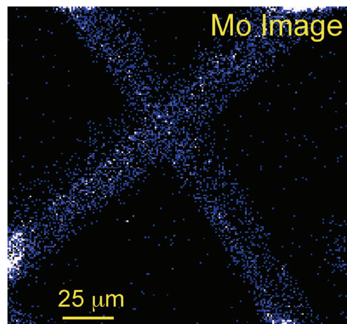


SIMS is a high sensitivity surface analysis technique for the determination of surface composition, contaminant analysis and for depth profiling in a sample's uppermost surface layers.



Applied to analysis within the first few microns of a surface, Hiden's **SIMS** systems provide depth profiles with depth resolution to 5 nanometres.



The Hiden **SIMS** workstation provides for high performance static and dynamic **SIMS** applications for detailed surface composition analysis and depth profiling.

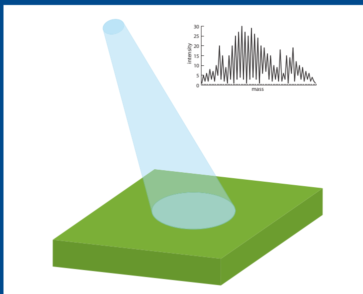
The Hiden elemental **SIMS** imaging facility provides for high resolution surface chemical mapping.

Hiden Bolt-On Components enable existing surface analysis equipment to be upgraded for high performance **SIMS**.

SIMS technology... at a glance

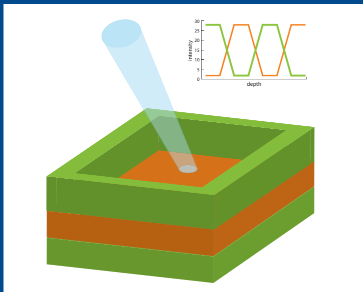
Applications
- Microelectronics
- Polymers
- Coatings
- Glass
- Paper
- Materials Research
- Metallurgical thin films

- Surface analysis
- Detection of all elements
- Organic species analysis
- Sensitivity - > 10^6 counts/second per nanoamp
- Chemical imaging- elemental SIMS surface mapping
- Depth profiling of thin film multilayers.
- Ion energy analysis capability for advanced surface science studies.
- SNMS for neutrals analysis
- High precision raster with up to 4000 x 4000 pixels
- Ion induced secondary electron imaging option.
- Real-time sample observation
- Wide range of ion sources: Ion- O_2, Ar. LMIG- Ga and fast atom source
- Charge compensation by electron flood gun



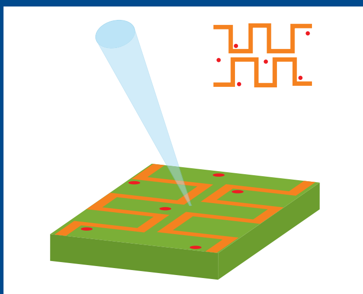
Surface analysis

Broad mass scan analysis of the surface provides detailed information relating to surface composition in terms of elemental and molecular composition.



Depth profiling

High primary ion densities are employed to give successive removal (sputtering) of the respective top surface layers. By acquiring spectra during the sputtering the in-depth distribution of elements and small clusters, oxides for example are monitored. The resulting depth profile fully characterises a thin film multilayer structure.



Imaging

By rastering a focussed ion beam over the surface, mass resolved secondary ion images (chemical maps) are obtained.

Hiden **SIMS** includes two imaging modes:
- low resolution-wide area imaging
- high resolution imaging over a fine focus region
- a colour CCD camera provides optical sample images.

SIMS

SIMS technical specifications

SIMS Workstation

The Hiden SIMS Workstation is a versatile high performance SIMS system for surface analysis and depth profiling applications for a wide range of materials including polymers, superconductors, semiconductors, alloys and dielectric, with measurement of trace components to sub-ppm levels.

A stainless steel UHV multi- port chamber with liquid nitrogen cryopanel, and fully integrated turbomolecular pumping system provides the UHV surface science platform required for high performance SIMS applications. A colour CCD camera provides optical sample images for overlay with SIMS elemental image maps.

A vacuum load lock/sample holder that accommodates single or multiple samples for rapid sample throughput is included.

Software: MASsoft PC SIMS software and ESM SIMS imaging.

Sample size: to 50mm dia and to 10mm depth.

Mass range: 1000 AMU for elemental, organics, and cluster analysis.

Sensitivity: >10^6 counts/second per nA.
System sensitivity is dependant on system configuration options

Dimensions: 2000mm x 1200mm x 1500mm high

SIMS Analysers

- with positive ion SIMS, negative ion SIMS, and SNMS capability.

Analysers include: ion extraction optics, an energy analyser and triple filter quadrupole mass spectrometer, power supply/interface unit, MASsoft PC SIMS software and connecting cables.

	SIM	EQS	EQS1000	MAXIM
Energy Analyser	Bessel box	45° sector field	45° sector field	parallel plate
Ion Acceptance	in-line	in-line	in-line	30°
Pole diameter	6mm	6mm	9mm	9mm
Mass range:	300 AMU or 510 AMU	300 AMU or 510 AMU	510 AMU or 1000 AMU	510 AMU or 1000 AMU
Sensitivity:	>5 x 10^3 cps/nA	>1 x 10^4 cps/nA	3 x 10^4 cps/nA	>1 x 10^6 cps/nA

SIMS Excitation sources

IG-20 Ion gun - Argon or Oxygen - Spot size: 100 um. Energy to 5KeV

T25 Liquid metal gallium ion gun - spot size: 1 micron - Energy to 20KeV

IFG-200 Primary fast atom source - Argon or Oxygen - Spot size: 2mm.

SIMS Excitation sources include power supplies/interfaces and differential pumping. Acquired data integrated with beam raster for surface mapping.

SIMS Applications

Applications range from the improvement of high technology products such as, integrated circuits, hard coatings and self-cleaning window glass to the manufacture of hard disk read write heads and the identification of fake gemstones.

SIMS is used in universities, corporate research centres and government agencies in the analysis of:

Metallurgical thin films

Nano films

Hard coatings

Gemstones

Paper

Glass coatings

Polymers

Semiconductors

with information relating to:

Surface compostion

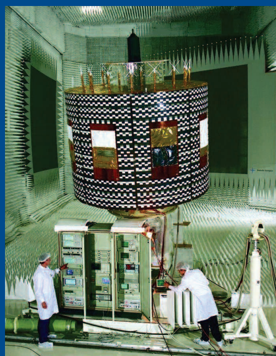
Depth profile

Elemental surface images

Thin film interfaces

Surface contamination

Corrosion



Providing:

The vital chemical information required via analysis of the cluster and molecular ions, isotopic abundances, and the detection of all elements.

SIMS

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It is Hiden Analytical's policy to continually improve product performance and therefore specifications are subject to change.