Hiden *MAXIM*
Quadrupole SIMS Analyser

vacuum analysis

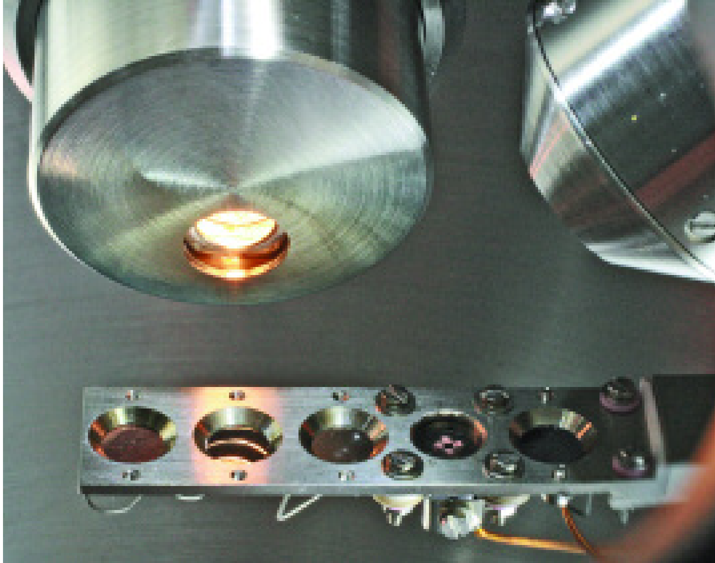
surface science

plasma diagnostics

gas analysis

HIDEN ANALYTICAL

MAXIM Overview



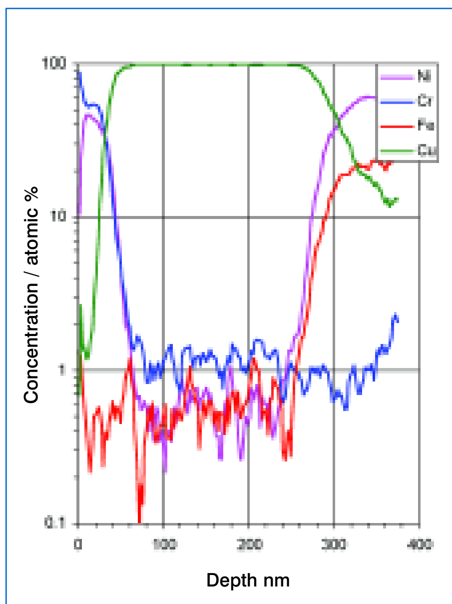
The Hiden MAXIM quadrupole SIMS analyser is a state of the art secondary ion mass spectrometer for static and dynamic SIMS applications.

The MAXIM analyser system includes an integral energy filter for ion acceptance at 30˚ to the probe axis, high transmission SIMS extraction ion optics, triple mass filter, pulse ion counting detector, and control electronics with Windows MASsoft PC software.

SNMS

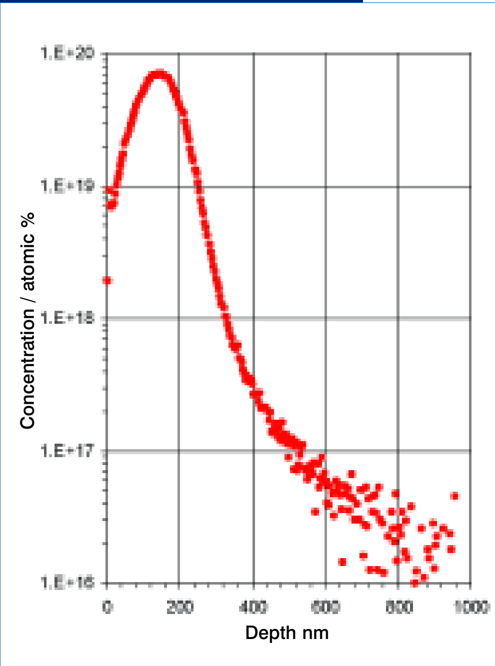
Sputtered Neutral Mass Spectrometry

At the front of the MAXIM is an electron bombardment ionizer which is used to ionize neutral species. The separation of sputtering and ionization processes means that matrix effects are minimised which results in easy quantification of alloys and high concentration impurities, without the need of matrix matched reference materials.



The example shows a quantified depth profile through a NiCr/Cu/NiFe layer structure. The primary ions were 5 keV Ar^+ from the Hiden IG20 gas ion gun.

MAXIM technology… at a glance



SIMS

Secondary Ion Mass Spectrometry

SIMS is the most sensitive surface analysis technique and possesses a very high dynamic range. It is ideally suited to the analysis of impurities and dopants to well below ppm concentration. Ions generated by the sputtering process are collected by the extraction field and transferred to the MAXIM's triple filter for mass analysis.

Depth Profiling

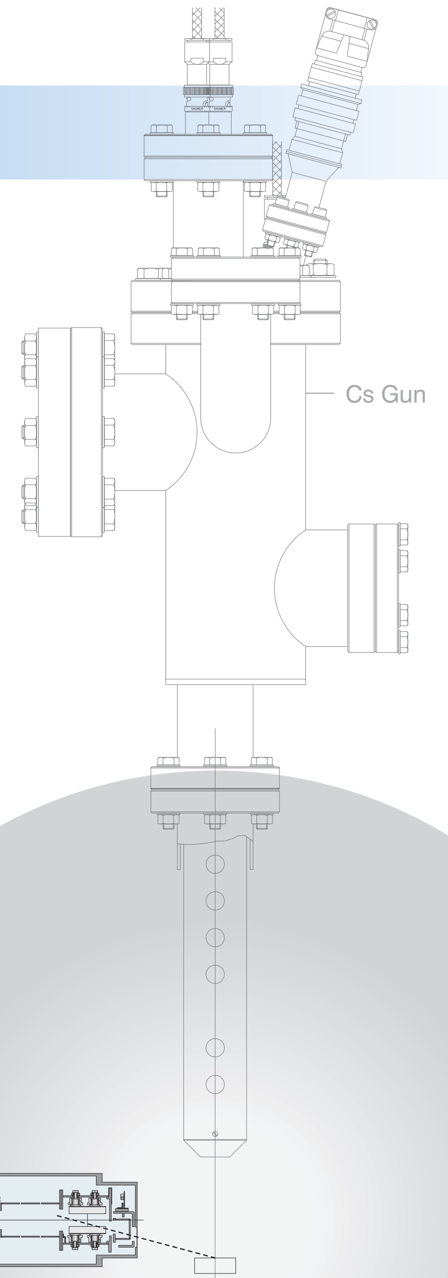
As SIMS simultaneously sputter erodes and detects the ion signal, it is an ideal technique to rapidly produce depth profiles of species of interest. Here Mg^+ secondary ions were detected from a 100keV Mg implant into silicon. The primary ions were 5keV oxygen from the Hiden IG20 gas ion gun.

Surface Contamination

Using a very low ion dose, such that sputter erosion is minimal, the detected material is characteristic of only the uppermost monolayers – static SIMS.

The spectrum below was taken from a silicon wafer that had been processed in a chamber previously contaminated with gold and silver. Low levels of these metals are detected in negative ion mode, together with hydrocarbons and residues of a chlorinated cleaning agent. The primary ions were 3 keV Cs^+ from the Hiden Caesium ion gun.

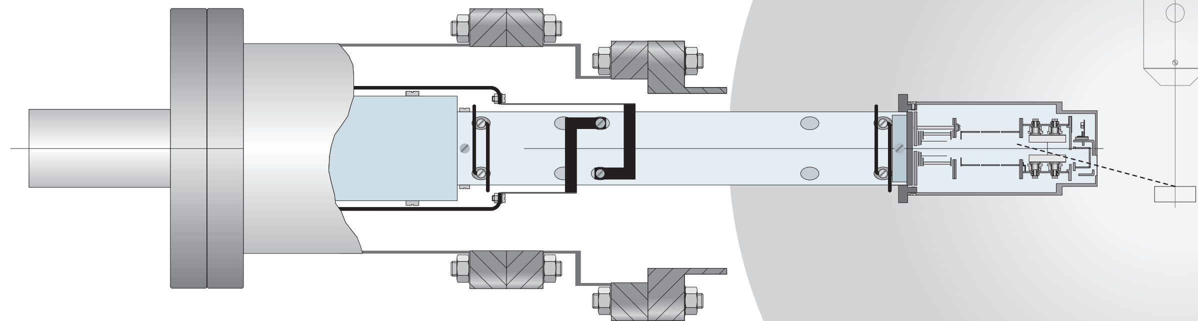
MAXIM technical specifications

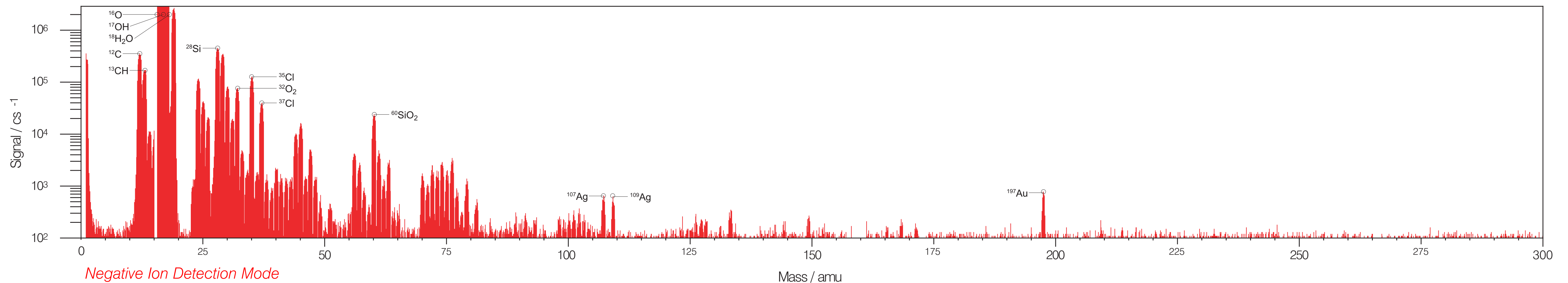


MAXIM the most sensitive quadrupole SIMS analyser for the most sensitive elemental analysis technique.

Secondary ion intensity – greater than $3x10^6$ cps/nA for $^{27}Al^+$ with 5keV argon primary ions.

Useful yield – 0.02% Boron in Silicon 5kev Oxygen primary.





software control

MASsoft Windows PC based software with:

- Pre-set modes for positive and negative ion SIMS and SNMS
- Raster control of primary ion gun to define ion beam scan area

Optional:

- SIMS Imaging software
- Acquires, displays and stores SIMS elemental maps

MAXIM

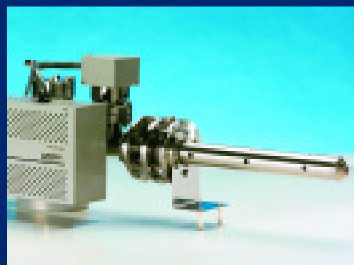
specifications

Mass range	300amu, 500amu or 1000amu.
Detector	Ion counting detector Positive and Negative ion detection Max count rate 10^7 cps
Mass filter	Triple filter
Pole diameter	9mm
Bakeout	250˚C
Ion energy filter	30˚ angular acceptance
Ioniser	Electron bombardment, single filament for SNMS and RGA

Other products for Surface Technologies

SIMS
on a Flange

IG20
Gas Ion Gun



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