WESTERN SYDNEY
UNIVERSITY

REDI

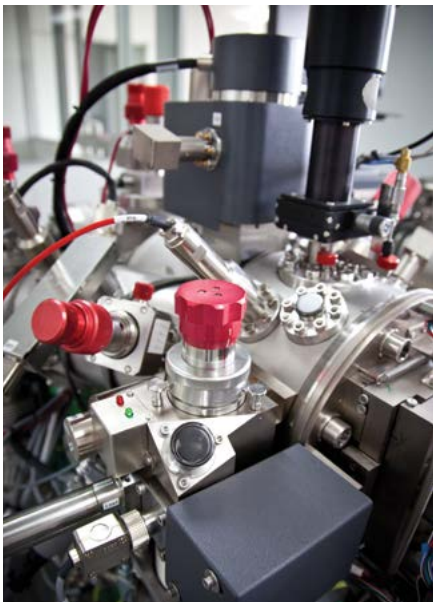
RESEARCH ENGAGEMENT | DEVELOPMENT | INNOVATION

SECONDARY ION MASS SPECTROMETRY (SIMS)

MATERIALS

PRECISION ISOTOPIC ANALYSIS AND ELEMENTAL DETECTION

With capabilities ranging from interface depth profiling to elemental imaging, SIMS is able to provide answers to material analysis questions.



MATERIALS CHARACTERISATION

The Cameca 5FE7 SIMS instrument has the capability to analyse a wide range of materials, including metals, alloys, stainless steels, ceramics, plastics, glass and more. The diverse applications of the instrument include: depth profiling of coatings, analysis of implantation depth, impurity detection, diffusion studies, layer thickness and composition determination. Fields of use include medical, industrial, electronic, environmental and engineering applications.

CAPABILITIES

- → depth resolution of 2-5nm with sputter rates down to a few nm/hour
- → profiling to a depth of 8µm
- → excellent detection sensitivity with wide dynamic range
- → complete coverage of the periodic table (apart from noble gases)
- → quantification with appropriate standards
- → ability to perform imaging to determine the spatial distribution of species or map devices on a 2.5mm scale
- → isotopic measurements.

APPLICATIONS AND EXAMPLES:

- → Thin film depositions TiOxNy, Si films
- → surface and near-surface characterisation – chemical sensors
- → implantation and diffusion profiling nitrogen in stainless steel
- → Corrosion analysis and layer deposition in copper tubing
- → interface layer analysis bonded Si wafers (see case study)
- → quality control for production processes
- → species segregation and spatial distribution

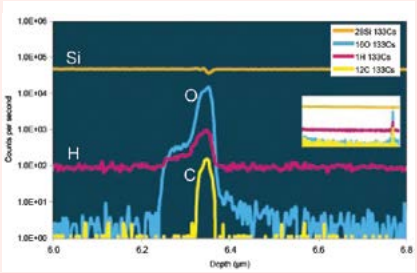


Image courtesy of ANSTO

CASE STUDY: SI BONDED WAFERS

Analysis below shows a depth profile through the bonded region of two Si wafers. The presence of impurities introduced to the interface region during the bonding process, such as carbon and oxygen, affects the bond strength between the two wafers.

The analysis clearly establishes the presence of both carbon and oxygen at the interface. Following further refinement to the bonding procedure, later analyses show much reduced interfacial carbon and oxygen.

FOR FURTHER INFORMATION PLEASE CONTACT:

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