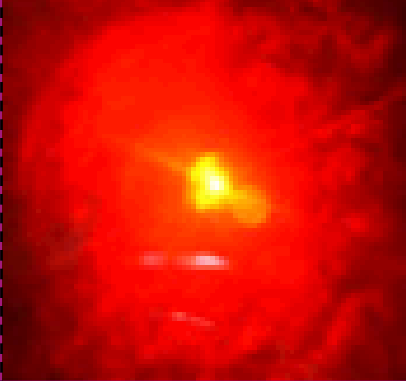


SARIS™ Material Analysis



Laser Ablation ICP-MS: Rapid Analysis of any Solid or Film

SARIS™ Laser Ablation ICP-MS is a unique analytical technique developed by Balazs™ NanoAnalysis that combines high-power laser beam technology to ablate a sample with the high mass resolution capability of the ICP-MS to perform elemental survey, depth profiling and quantitative analysis of the material.

The key advantage of SARIS is its ability to perform quantitative composition, surface and failure analysis without surface charging that causes problems for traditional electron and ion beam technologies. This makes SARIS an ideal quick “first look” technique for major, minor, and trace constituents in any solid material, including conductive and non-conductive, homogeneous and heterogeneous, inorganic and organic, transparent and non-transparent, as well as refractory materials.

Highlights

Survey analysis	Depth profiling	Line scan	Compositional quantitative
Small analytical area	Surface and bulk	Trace	

Key Applications

Protocol development at Balazs™ has culminated in diverse applications to monitor and identify impurities that may be introduced purposely or through contamination sources during manufacturing, packaging, and handling. Characterizing these defects is critical to identify the root cause for yield optimization.

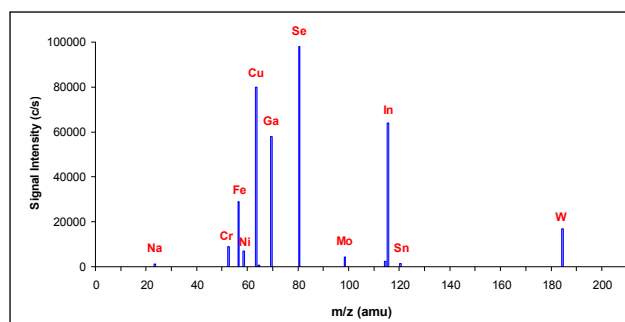
Back-End Materials	Bonding Wires	Components	Fiberglass
Films	Graphite	Insulators and Ceramics	Polymeric Materials
Solar Cells	LEDs	TCO	Disks
Sputtering Targets	Nano Crystals	Low-k Materials	Medical Devices
Mirrors/Optics/Detectors	Nanomaterials	Silicon Carbide (SiC)	Particles
Refractory Crystals	Powders	Quartz	Wafers (Films)

Technical Parameters

- Qualitative 85 elements analysis with a DL of 0.0001% (w/w)
- Quantitative 30 or 68 elements analysis with a DL of 0.005-1 ppm ($\mu\text{g/g}$)
- Deep depth profiling with 0.1 μm resolution
- Localized analysis with 5 μm spatial resolution
- Line scan with 5 – 110 μm spatial resolution

Identification – CIGS PV Solar Thin Film

Survey analysis of a CIGS film on glass revealed that the thin film contains stainless steel components and W, which may be caused by arcing in the deposition chamber.



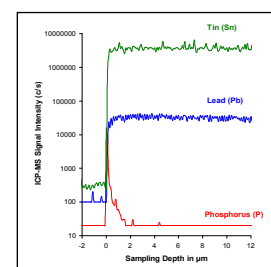
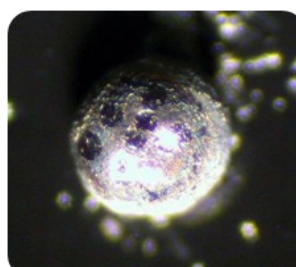
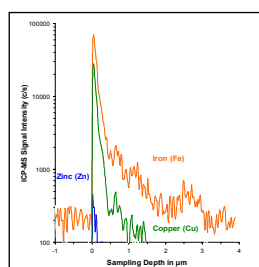
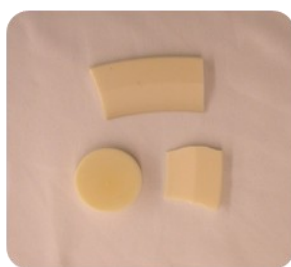
Quantitation – Sputtering Targets

SARIS provides accurate 68 elements quantitative analyses for quality control of various sputtering targets. The table below shows partial analytical results of indium targets from three different vendors.

Analyte	Indium Target #1	Indium Target #2	Indium Target #3
	PPM ($\mu\text{g/g}$)	PPM ($\mu\text{g/g}$)	PPM ($\mu\text{g/g}$)
Li	< 0.1	< 0.1	0.3
Na	< 0.05	0.43	6.7
Mg	<0.1	0.20	2.4
Al	<0.1	0.82	17
Cd	<0.05	0.32	12
Sn	<0.02	0.97	6.3
Sb	< 0.01	< 0.01	< 0.01
Ba	< 0.01	< 0.01	< 0.01
Pb	< 0.02	0.19	8.1

Depth Profiling – Ceramic Material and Solder Bump

Depth profiling of an insulating alumina (left) and a solder bump with a spherical surface (right) is straightforward. Further, SARIS LA ICP-MS is the most cost effective option for bulk material profiling (e.g. >100 μm). Its typical sputtering rate of 10 nm/s or microns/min makes it ideal to investigate vertical distributions of trace contaminants in bulk materials.



APP0313 SARIS™ Material Analysis

Balazs™ NanoAnalysis operates ISO 17025 certified laboratories that identify, analyze and resolve contamination issues for high-tech industries around the world. The Microcontamination Experts™ at Balazs provide rapid and accurate analyses and expertise for water, air, chemicals, process gases, components, wafers, consumables and any other contamination sources.