

## **High Sensitivity, Fast Scanning, Sector Field ICP-MS – Improving Sensitivity for Laser Ablation with the Jet Interface**

NICHOLAS S. LLOYD<sup>1\*</sup>, GRANT CRAIG<sup>1</sup>, TORSTEN  
LINDEMANN<sup>1</sup>, JOACHIM HINRICHS<sup>1</sup>, AND JOHANNES B.  
SCHWIETERS<sup>1</sup>

<sup>1</sup> Thermo Fisher Scientific (Bremen) GmbH, Hanna-Kunath  
Str. 11, 28199 Bremen, Germany.

\*nicholas.lloyd@thermofisher.com

In order to significantly improve the sensitivity of ICP-MS instrumentation, a high capacity interface pump may be used together with specially optimized sampler and skimmer cone geometries. In this contribution we will provide benchmark figures for sensitivity expressed as sample ion yield (number of ions detected / number atoms consumed for the analysis).

For elemental quantification, a higher sensitivity can be advantageous with respect to quantification limits, and for isotopic measurements better counting statistics can be achieved for a given sample amount.

For laser ablation applications, sensitivity is advantageous with respect to: decreasing ablation depths and hence downhole fractionation, use of smaller spot sizes to increase spatial resolution, quantification of trace elements, and/or improved isotope ratio precision through counting statistics.

The sensitivity of modern ICP-MS instrumentation is compared; namely between Thermo Scientific™ iCAP TQ™ ICP-MS, Thermo Scientific™ Element XR™ HR-ICP-MS and Thermo Scientific™ Neptune XT™ MC-ICP-MS. Sector field instruments are inherently more sensitive than quadrupole instruments, especially when they are equipped with the Thermo Scientific™ Jet Interface™. The sensitivity advantage is demonstrated through the performance with respect to precision of U/Pb ages determined from the spot ablation of zircon reference materials.