

LASS: Laser ablation simultaneous sampling with ICP-Q-MS and ICP-SF-MS detection for isotopic and elemental mapping

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In situ analysis by laser ablation offers significant advantages to users in a range of applications including elemental mapping. However, interrogating the sample for all of the information required may not be possible in a single measurement. Laser ablation is a destructive sampling technique and while many samples are large enough to allow for multiple analyses on a range of instruments, some are so small as to preclude multiple analyses. These samples may be unique and once sampled by laser ablation, they are lost and no further information can be extracted.

In this presentation, a combined system for the simultaneous isotopic and elemental mapping in of various minerals is described. A high performance 193nm excimer laser (Photon Machines Analyte G2) is used to sample <40 μm diameter pits and the He carrier gas containing the entrained sample is split between ICP-Q-MS and ICP-SF-MS systems. A high performance ICP-Q-MS system (Thermo Scientific iCAP Q) is used for the quantification of trace elements and ICP-SF-MS (Thermo Scientific ELEMENT 2 with JET interface) is used for U/Pb age determination. Data from the two mass spectrometers are post processed in a specialized software package (Iolite/CellSpace) to produce combined maps.

The advantages afforded by such combined, simultaneous isotopic and elemental mapping of minerals will be highlighted in the presentation