

CAMECA IMS 1300-HR³: The New Generation Ion Microprobe

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The success of secondary ion mass spectrometry (SIMS) in Geo- and Cosmo-chemistry relies on its performance in terms of: 1) very high sensitivity (mandatory for high precision measurements or to achieve low detection limits); 2) a broad mass range of elemental and isotopic species, from low mass (H) to high mass (U and above); 3) in-situ analysis of any solid flat polished surface; and 4) high spatial resolution from tens of microns down to sub-micron scale.

The IMS 1300-HR³ (High Reproducibility, High spatial Resolution, High mass Resolution) is the latest generation of CAMECA's large geometry magnetic sector SIMS (or ion microprobe), successor to the internationally recognized IMS 1280-HR. The 1300-HR³ delivers unmatched analytical performance for a wide range of applications (stable isotopes, geochronology, trace elements, nuclear safeguards and environmental studies...) due to:

- High brightness RF-plasma oxygen ion source with enhanced beam density and current stability, dramatically improving spatial resolution, data reproducibility, and throughput
- Automated sample loading system with motorized sample height (Z) adjustment, significantly increasing analysis precision, ease-of-use, and productivity
- UV-light microscope for enhanced optical image resolution, together with dedicated software for easy sample navigation (developed by University of Wisconsin, USA)
- Low noise $10^{12} \Omega$ resistor Faraday cup preamplifier boards for measuring low signal intensities (down to 10^5 c/s range) with high analytical precision

In addition, improvements in electronics and software have been integrated into the new instrument.

In order to meet a growing demand from geochronologists, CAMECA also introduces the KLEORA, which is a fully optimized ion microprobe for advanced mineral dating derived from the IMS 1300-HR³.

Instrumental developments, as well as data obtained for stable isotope and U-Pb dating applications, will be presented in detail.