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NENIMF: IMS 1280

Introduction

The IMS 1280 is a high mass resolution high transmission SIMS instrument with direct ion imaging and ion microprobe analysis capabilities. The CAMECA IMS 1280 is the newest version of a double focusing mass spectrometer with a large radius magnetic sector produced by CAMECA Instruments (France). The Cameca IMS 1280 ion probe has mostly the same ion optics as IMS 1270 but optimized to attain a mass resolving power (M/?M) of up to 6,000 without significant loss of secondary ion intensity.

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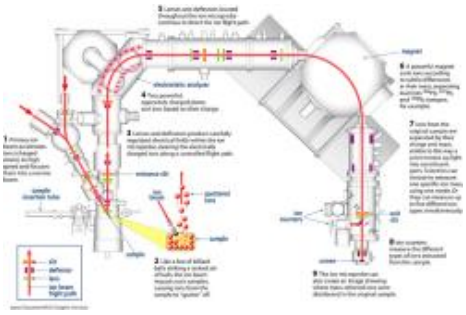
The IMS 1280 Secondary Ion Mass Spectrometer - the latest addition to NENIMF

The IMS 1280 consists of:

Primary ion column with:

- High brightness duoplasmatron and surface ionization cesium sources delivering microbeam of O_2^+, O^-, O_2^- and Cs^+ ions;
- Primary beam mass filtering allowing (i) simultaneous mounting of duoplasmatron source and cesium microbeam source, (ii) rapid switching between sources for analysis of electropositive or electronegative elements, and (iii) removal of parasitic primary ion species.
- Isolation valve for separation of the ion sources from primary column vacuum to enable cleaning and maintenance without breaking the primary column vacuum.
- Ion optical system consisting of 4 lenses, stigmator, double deflector for primary beam rastering and Faraday cup for accurate primary ion current measurement.



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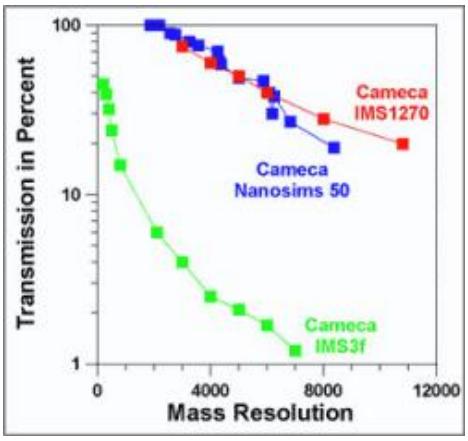
Schematic diagram of the IMS 1280

Specimen chamber with:

- Fast entry load lock equipped with turbomolecular pump;
- Storage of two sample holders;
- Heating facilities for sample outgassing;
- Fully computer controlled high precision sample stage with 1 µm resolution and 20 mm travel in both X and Y directions, Z-stage for adjusting the height of sample;
- Sample position storage and recall facilities;
- Direct optical viewing of the analyzed area with color TV camera;
- Immersion lens with high ion extraction efficiency;
- UHV baking facilities.



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Relative transmission (ratio of detected to produced secondary ions) as a function of mass resolution.

Secondary ion optical system with:

- Dynamic transfer optical system with optimized transmission area up to 500 × 500 µm;
- Double focusing mass spectrometer with spherical electrostatic analyzer and large radius (585 mm) electromagnet analyzer;
- Energy pass band continuously adjustable from 0 to 260 eV at 10 kV;
- All slits and apertures are motorized and computer controlled;
- Monocollection detection mode with electron multiplier and two Faraday cups;
- Channel plate, fluorescent screen and TV camera.

Last updated: June 10, 2011

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