

Isotopic analysis of dissolved samples by TIMS and MC-ICP-MS

Specific protocols for geochemistry and geochronology:

Isotopic ratios measured for geochemical characterisation:

$^{87}\text{Sr}/^{86}\text{Sr}$
 $\delta^{88}\text{Sr}$ ($^{88}\text{Sr}/^{86}\text{Sr}$)
 Pb/Pb

Isotopic ratios and element concentrations for radiometric dating and/or geochemical characterization of whole rock or mineral concentrates:

Rb-Sr
 Sm-Nd
 Lu-Hf



Scientific-Technical Head of the Facility:

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Technical staff:

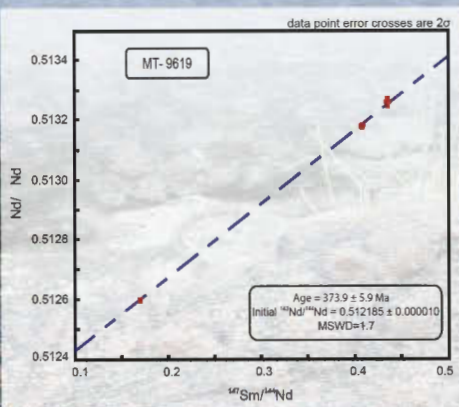
Elemental and isotopic analysis in solution and solid samples (ICP-OES, Q-ICP-MS, MC-ICP-MS, LA):

Dr. Sonia García de Madinabeitia
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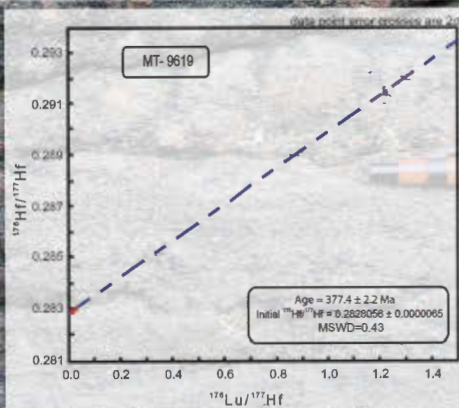
Isotopic and elemental analysis after chemical isolation (ID-TIMS, MC-ICP-MS):

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<http://www.ehu.es/sgiker/es/ibercron>



Example of scientific production: Petrofabric, petrochronology and calculated seismic properties of eclogite inclusions from subducted metigneous continental crust (Malpica-Tui Allochthonous Complex, NW Spain). Puelles et al. (in press). Tectonics.



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 Basque Government. Department of Education, Universities and Research.
 Scientific Policy Division.



IBERCRON

Geochronology and Isotope
 Geochemistry Research Facility

University of the Basque Country
 UPV/EHU

www.ehu.es/sgiker

The Facility carries out elemental and isotopic analyses of natural and synthetic products for R+D+i work in public and private institutions.

Equipment

The Facility is equipped for:

Analysis of radiogenic and stable isotopes

- Thermal ionization mass spectrometer (TIMS) Finnigan-Spectromat MAT262 RPO+, with 8 Faraday cups equipped with 100 GΩ and 1 TΩ resistors, and 2 SEM.

- Multi collector, high-resolution inductively coupled mass spectrometer (MC-ICP-MS) Neptune, with dry plasma and double desolvation (Apex+Spiro) sample introduction system.

Elemental analysis

- Inductively coupled plasma atomic emission spectrometer (ICP-AES) Optima 8300.

- Inductively coupled plasma quadrupole mass spectrometers (Q-ICPMS) XSeries 2 and iCAP Qc, with collision cell, FAST system for sample uptake, gas dilution and ion exchange kits for speciation (As, Se, Cr)

Elemental and isotopic microanalysis

- UP213 (New Wave) laser ablation system for microanalysis of solid samples coupled to Q-ICP-MS or MC-ICP-MS spectrometers.



Elemental analysis

Methods designed for multielemental analysis including REE and HFSE.

Appropriate CRMs from international suppliers (NIST, USGS, JGS, IRMM, IAEA, ...) for a wide range of sample types.

Analysis in dissolution by ICP-AES and Q-ICP-MS

Sample preparation is adapted to each requirement: fusion-dissolution or different acid digestions.

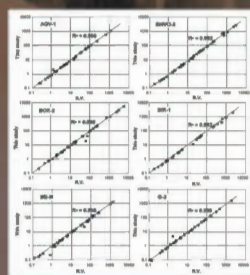
Calibration protocols adapted to different sample types.



Microanalysis of solid samples by LA-Q-ICP-MS

Analysis on petrographic thin sections or epoxy mounts.

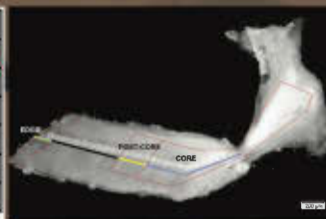
Simultaneous analysis of a large range of trace elements.



Simultaneous determination of major to ultratrace elements in geological samples by fusion-dissolution and inductively coupled plasma mass spectrometry techniques. García de Madinabeitia et al., 2008. *Anal. Chim. Acta* 625: 117–130.



Characterization of complex Fe-Mn phosphates by LA-ICP-MS methods. García de Madinabeitia et al., 2013. *Goldschmidt2013 Conference Abstracts*, p. 1142.

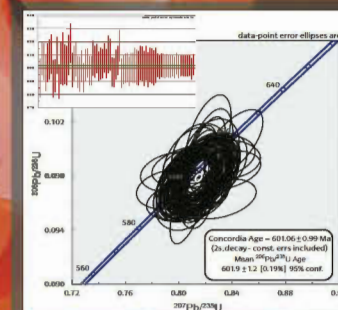
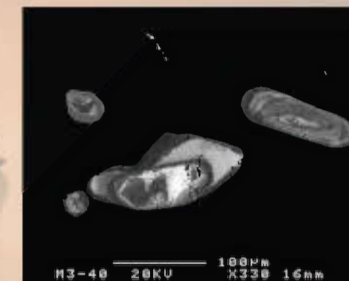


Otolith chemistry as an indicator of movements of albacore (*Thunnus alalunga*) in the North Atlantic Ocean. Fraile et al., 2016. *Marine and Freshwater Research* <http://dx.doi.org/10.1071/MF1509>.

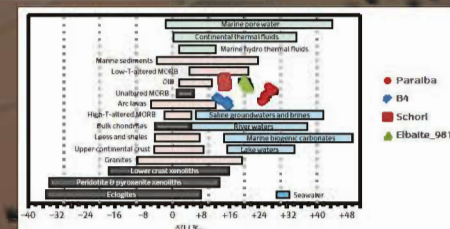
Isotopic microanalysis of solid samples

Laser ablation (LA) coupled to Q-ICP-MS and MC-ICP-MS for the analysis of different isotopic systems, either for dating or geochemical characterization purposes:

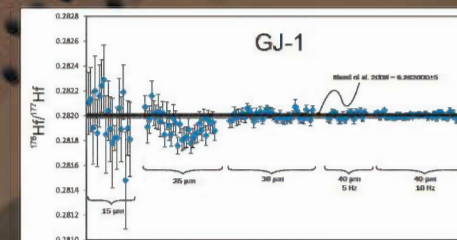
- U-Th-Pb
- Hf/Hf
- Sr/Sr
- Li/Li
- B/B
- Fe/Fe



Analyses of GJ-1 measured in 2016 during April and May. Spot diameter used is 30 μm.



Determinación de $\delta^{11}\text{B}$ y $\delta^{17}\text{O}$ en muestras geológicas mediante ablación láser y MC-ICP-MS. García de Madinabeitia et al., 2015. *Macla* n° 20, 53–54.



Development of new analytical procedures of isotope geochemistry by mass spectrometry. Application to the study of high-pressure metamorphic rocks from the Iberian Massif. Beranoaguirre, 2016. PhD thesis, UPV-EHU, 230 pp.