

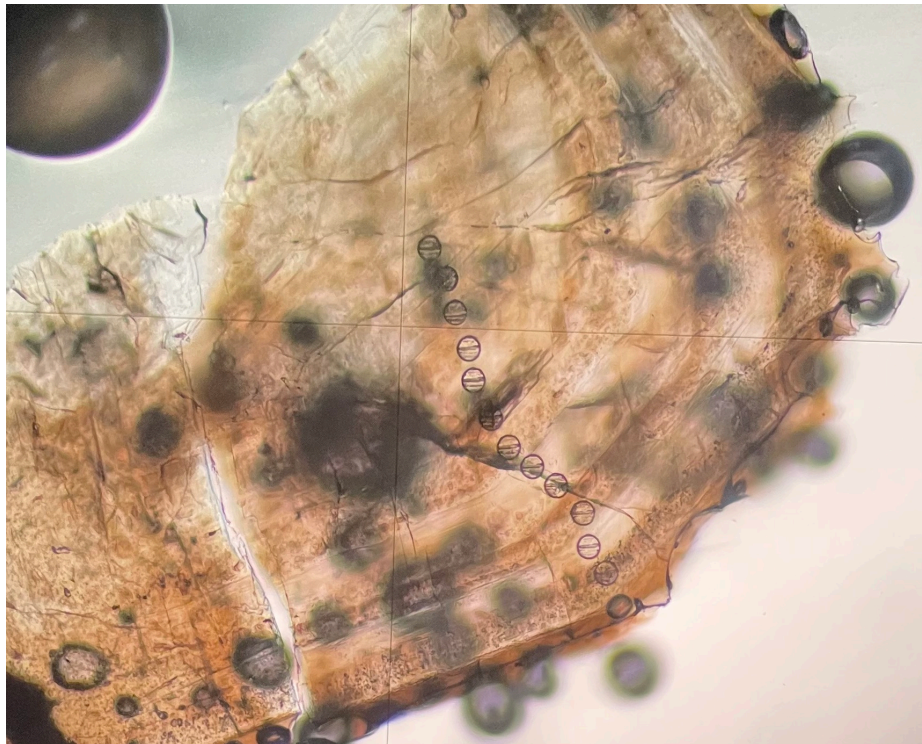
## LA-ICP-MS Laboratory Report 2022

### Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry

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*Plane polarized light microscope image of a plagioclase crystal with circular laser ablation pits.*

Laboratory webpage: <https://cisup.unipi.it/labs/laicpms-nw193nm-penexion2000/>

## LA-ICP-MS Laboratory - Activity report for Year 2022

### Introduction

This report serves to inform the UniPi community on the activities carried out yearly by the CISUP LA-ICP-MS laboratory. The Laser Ablation (LA) system ESI NWR-193 (Ar-F Excimer Laser) and the Inductively Coupled Plasma-Mass Spectrometer (ICP-MS) PerkinElmer NexION 2000 were installed between November and December 2020. The first year of activity of the LA-ICP-MS laboratory has been entirely dedicated to the setup and tuning of the two instruments for the different types of analyses that are currently performed. The laboratory is currently operative for the following types of analyses:

- U-Pb-Th geochronology (using zircon, monazite, allanite and calcite)
- Trace element analysis in silicate matrixes (glasses and silicate minerals)
- Trace element analysis in sulfide matrixes (sulfide liquids and minerals)
- Trace element analysis in metals and oxides
- Trace element analysis in carbonate and phosphate matrixes
- Paleothermometry (Ca-Mg isotopic ratio of foraminifera)

This report includes a brief summary of the ongoing research projects, technical implementations, educational activities and laboratory budget.

### 1. Ongoing research projects

- 1) *U-Pb-Th Geochronology*: two scientific projects by internal users and one scientific project by an external user have been carried out, for a total of 8 analytical shifts. The LA-ICP-MS laboratory performed geochronological analyses on detrital zircons from Corsica (France) and Elba island (Italy), calcite crystals from Corsica (France) and epidotes from Tuscany.
- 2) *Trace element in silicates*: three scientific projects by internal users and one scientific project by an external user have been carried out, for a total of 8 analytical shifts. The LA-ICP-MS laboratory performed trace element analyses on silicate minerals from difference provenances.
- 3) *Trace element in sulfides*: two scientific projects by internal users have been carried out, for a total of 6 analytical shifts. The LA-ICP-MS laboratory performed trace element analyses on sulfide minerals and glasses from difference provenances and on synthetic materials.
- 4) *Trace element in metal and oxides*: one scientific project by an internal user has been carried out, for a total of 2 analytical shifts. The LA-ICP-MS laboratory performed trace element analyses on metal meteorites and micrometeorites from Antarctica.

## 2. Maintenance and implementations

A total of 14 analytical shifts have been dedicated to the maintenance of the instruments, which is regularly performed every 3-4 months. A 5 years maintenance contract for ICP-MS has been activated in October 2022 with the company PerkinElmer. Technical implementations carried out in the laboratory include the installation of:

- 1) *New Ar and He gas lines*: a more inert steel tubing line has been installed in place of the copper tubing line, in order to reduce the background level of Cu, Zn and Pb during ICP-MS analyses.
- 2) *New air extractor for ICP-MS*: a new and more powerful air extractor has been installed on the ICP-MS in order to improve the stability of the plasma during analytical sessions.

## 3. Education and Outreach

The LA-ICP-MS laboratory was involved in laboratory practicals for MSc and PhD courses, as well as in demonstration activities carried out for high school students visiting the DST.

## 4. Budget of the laboratory

The total income of the LA-ICP-MS laboratory for the year 2022 amount to approximately 9 k€ and derive from both internal (UniPi - CISUP) and external users. Laboratory expenses for analytical gases (Ar, N<sub>2</sub>, He, Ar-F) and consumables (replacement parts for ICP-MS) amount to 4 k€.

## Citing the Laboratory

We are grateful that the papers which benefited of the work carried out in the LA-ICP-MS laboratory do acknowledge the laboratory correctly in their methodology chapters. Please check our laboratory web page, how to correctly cite our laboratory/instrument. For instance, a sentence like the following one: “*Laser ablation-ICP-MS analyses were performed using a PerkinElmer NexION 2000 ICP-MS coupled with a NWR-193 Ar-F 193 nm excimer laser at the Centro per la Integrazione della Strumentazione della Università di Pisa (CISUP)*”