

FIXLAB

PetroLab. Analyses and studies for heritage science

Description



Micro-hardness tester



Spectrophotometer



Ultrasound velocity analyzer

PetroLab is a laboratory for the study of the characteristics, causes and decay degree, and behavior of the stone materials of heritage assets, including both natural (rocks) and artificial (mortars, ceramics), alteration or salt crusts (e.g. black crusts) and historical patinas (*scialbatura*), by means of a multi-approaching techniques protocol: portable and non-destructive/non-invasive techniques (NDT), and laboratory traditional methods. Several conventional or advanced analytical techniques are available in PetroLab for the petrological and chemical characterization of the stone material, their surface properties and some other bulk characteristics. This information can be complementary to that obtained by techniques offered by other MOLABs. The uniqueness of the access offer is based on the number of techniques at the same time to be used on stone heritage objects; and the expertise of the group in the study of stone heritage, assuring the respect for the object and a meaningful interpretation of the data in this specific field.

Fields of application

Cultural heritage

Building materials, archaeological objects, small sculptures, cultural/museum objects, rocks from natural/geological heritage

Materials

inorganic

stone/rocks, mortars, ceramics, by-products (salts)

organic

organic coatings, historical patinas

Equipment

The available infrastructure is following listed:

- Optical digital microscopy. Edge Digital Microscope DinoLite
- X ray fluorescence spectrometer. Niton, ThermoFischer Scientific
- Raman spectrometer. i-Pro. BWTEK
- Fourier Transform Infrared Spectroscopy (FTIR+ATR). ALPHA II, Bruker
- Spectrophotometer (color measurements). Minolta Cm 700d
- Gloss/brightness meter. Multigloss 268; BYK Gardner
- Optical roughness-meter. TRACEit; Innowep
- Micro-hardness-meter. Equotip 3D
- Micro contact angle tester (able to measure, besides horizontal surfaces, vertical ones). MSA, Krüss

- Ultrasound velocity analyzer. Pundit LAB+ CNS Electronics
- Drilling resistance measuring system (DRMS). Sint Technology (moderately destructive technique)
- Magnetometer (metal detector). Profotometer 4
- Air-permeameter. Tiny-Perm-II; Vindum Engineering
- Infrared camera. Thermacam B4 Flir system
- Moisture/damp meter. Protimeter Surveymaster; General Electric
- Karsten tube test (water absorption).

PetroLab uses the resources of the Petrophysics Laboratory, with its quality management system certified by AENOR (Spanish Association for Standardisation and Certification) according to the UNE EN ISO 9001:2015 standard.

Potential Results

By means of the results obtained with these techniques, we are able to characterize the material in terms of its chemical, physical and hydric characteristics, as well as its surface characteristics and some bulk ones. Some by-products such as salts are also possible to be analyzed. A deep knowledge of the properties and behavior of stone materials (both natural and artificial ones) is required and absolutely necessary to plan future strategies for their conservation and restoration.

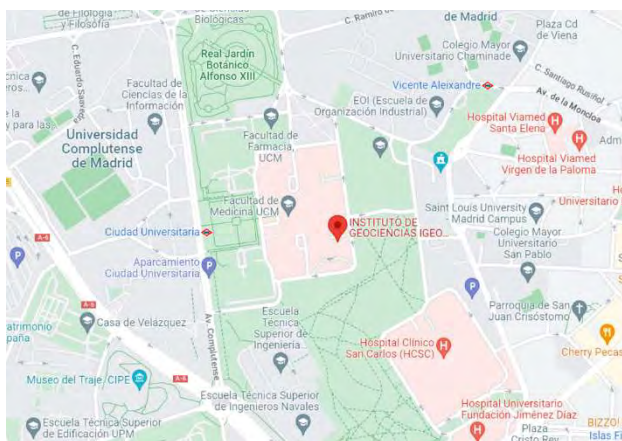
References

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- D. Ergenc, R. Fort, M.J. Varas-Muriel, M. Alvarez de Buergo, *Mortars and plasters-How to characterize aerial mortars and plasters*, Archaeological and Anthropological Sciences 13/11, 2021, 197
- R. Fort, M. Álvarez de Buergo, M.J. Varas-Muriel, M. Gómez-Heras, M.C. Vázquez-Calvo et al., *Petrología aplicada a la Conservación del Patrimonio*, Ciencia y Tecnología para la Conservación del Patrimonio Cultural, TechnoHeritage. Ed. MA. Rogerio y C. Saiz. 2011.

Requisites/needs for the service

- Some techniques/methods require previous sample preparation

Provider



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