

**LABORATORIES: CNR ISPC Stone LAB; Heritage Materials Science**

**NAME OF THE INSTRUMENT**

FT-IR microscope and FT-IR macro

**GENERAL DESCRIPTION:**

The instrument consists of two distinct integrated modules:

- FT-IR LUMOS II microscope equipped with a Focal Plane Array (FPA) detector, which allows the acquisition of chemical images in ATR, reflection and transmission mode;
- FT-IR INVENIO® macro unit, which allows transmission and ATR spectral analyses on organic and inorganic compounds.

The infrared microscopy instrument complete with FT-IR macro unit is used for the chemical characterization of organic and inorganic materials and conservation products used in the Cultural Heritage field, the detection of degradation products, the study of degradation processes, the identification of coatings and surface coatings and the study of archaeological finds.

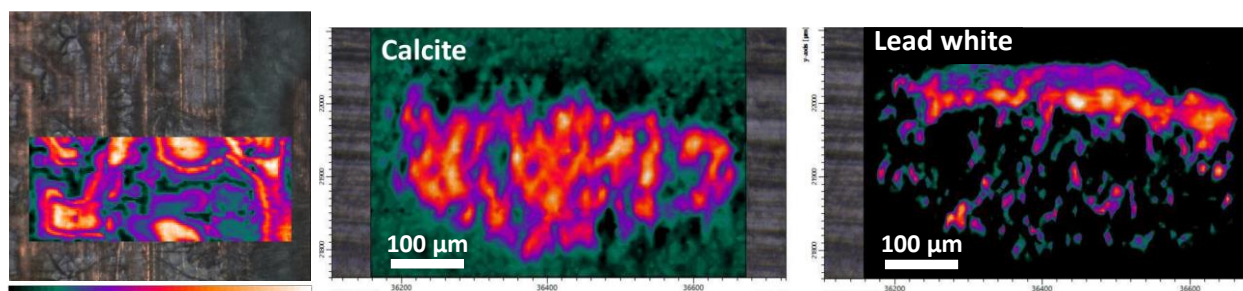
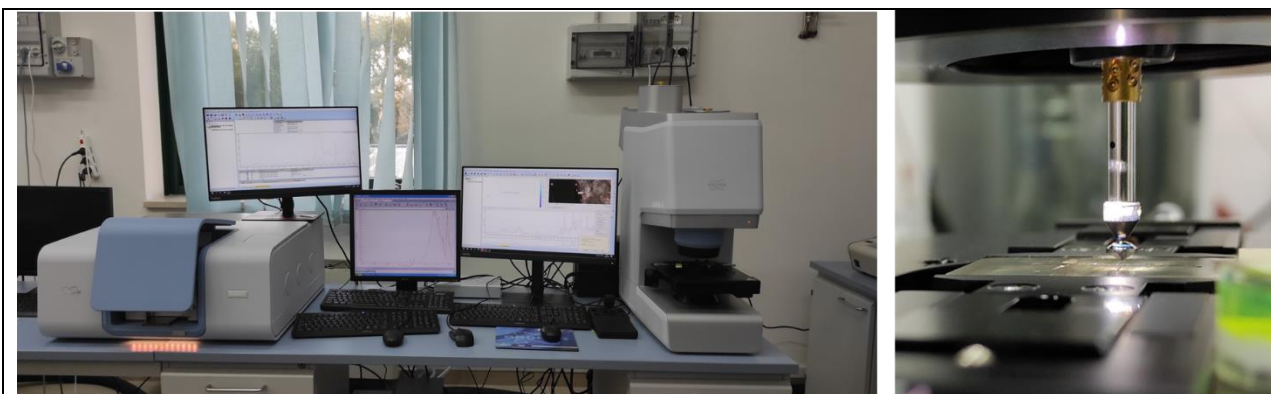
The chemical imaging obtained with the FPA detector allows to characterize and visualize the distribution of compounds in a given sample, with high spatial resolution, speed (more than a thousand spectra in one second) and sensitivity. This allows, for example, to reconstruct the stratigraphy of even very small samples and with very thin paint layers (up to 5  $\mu\text{m}$  thick), and thus highlight the execution technique.

**TECHNICAL DESCRIPTION OF MICRO FT-IR LUMOS II:**

- Spectral range: 650- 4000  $\text{cm}^{-1}$
- Maximum thickness of the samples that can be housed: 40 mm
- 8x Cassegrain lens/condenser
- Transmission analysis mode
- Reflection analysis mode
- ATR Analysis mode (Germanium crystal)
- Integrated room temperature detector (TE-MCT)
- Nitrogen-cooled single-point detector (LN-MCT)
- FPA nitrogen-cooled detector dedicated to analysis in integrated imaging mode
- Automations of the sample stage along the three spatial axes with software interface, for Chemical Imaging and Mapping applications
- Motorized condenser, with automatic focusing, both in the visible and in the IR
- Polarizer and analyzer for visible light

**TECHNICAL DESCRIPTION OF MACRO FT-IR INVENIO®:**

- FIR and MIR spectral range: 80-4000  $\text{cm}^{-1}$
- Transmission analysis mode
- ATR Analysis mode (Diamond crystal)



Corrosion products on copper    Pictorial layers in the cross section (sample size <0,5 mm)

#### FURTHER INFORMATION:

- <https://www.bruker.com/en/products-and-solutions/infrared-and-raman/ft-ir-microscopes/lumos-ii-ft-ir-microscope.html>
- <https://www.bruker.com/en/products-and-solutions/infrared-and-raman/ft-ir-research-spectrometers/invenio-ft-ir-spectrometer.html>

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