

## **ID21: A synchrotron multi-modal platform for micro-spectroscopic analyses in Earth, Environmental and Geo-Sciences**

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ID21 offers a multimodal set of state-of-the-art techniques for micro-spectroscopic analyses in the tender X-ray (2-9.2KeV) and mid-infrared domains.

The scanning X-ray microscope offers sub-micron resolution ( $0.2 \times 0.7 \mu\text{m}^2$ ) and ppm detection limits for micro-X-ray fluorescence ( $\mu$ -XRF) and micro X-ray absorption spectroscopy ( $\mu$ -XANES). It operates in vacuum and samples can be studied under cryogenic conditions, allowing the study of frozen hydrated biological specimens (cryosectioned tissues) [1]. Typical applications are mapping and speciation of nanoparticles and metal pollutants in soils and organic matrices (e.g plants) [2-5]. The full-field XANES end-station is extremely powerful for elemental speciation in samples compatible with the transmission detection mode. It offers large field of view (up to  $2\text{mm}^2$ ) and lateral resolution between  $1.5$ - $0.7 \mu\text{m}^2$  resulting in millions of XANES spectra from one specimen [6] [7]. In complement to the above techniques, the  $\mu$ -XRD branch is now available to perform crystalline phase mapping ( $1 \times 2 \mu\text{m}^2$  beam). The  $\mu$ -Infrared end-station completes the tool box offering molecular group mapping ( $5$ - $12 \mu\text{m}^2$  beam) (e.g dissolved water concentration in glasses and microstructure of mollusc shells) [8] [9]. The synergy of the available techniques offers a unique platform for applications in Earth, Environmental and Geo-Sciences.

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