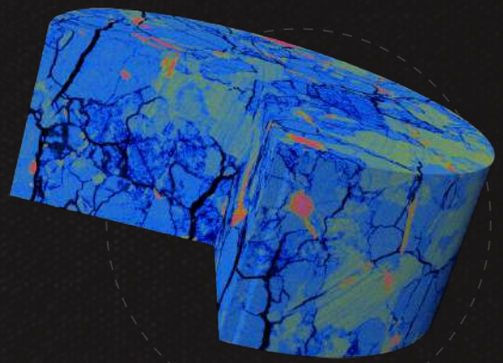
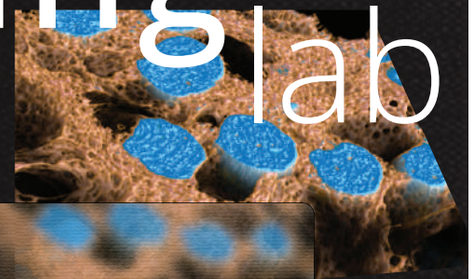


multiscale imaging lab

nano-CT



Contacts

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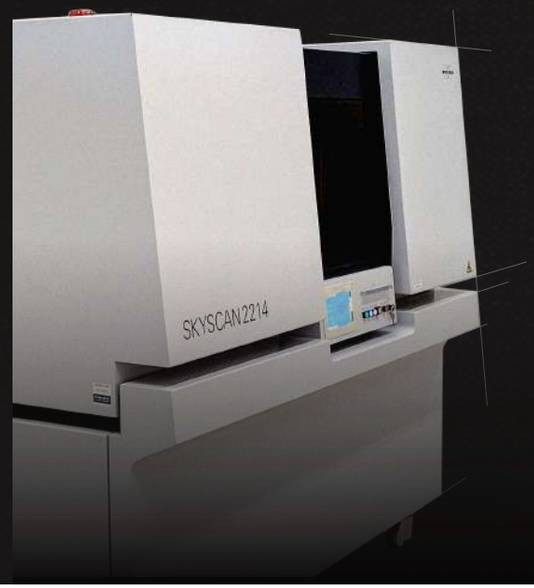
FCT-UIDP/04028/2020

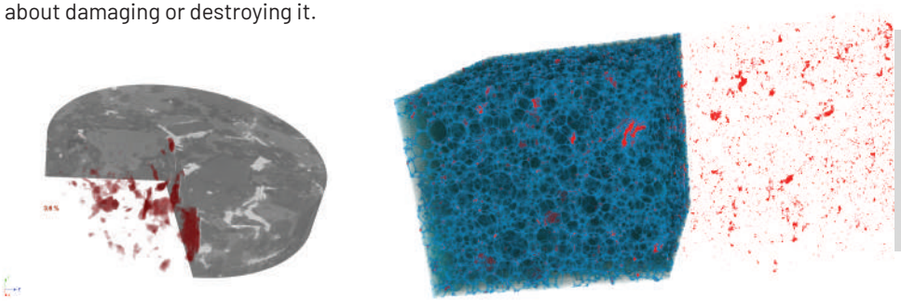


CERENA
Centro de Recursos Naturais e Ambiente

Unveiling the Nanoscale

If you are looking to analyze the internal or external structure of a solid material without destroying the sample, CT scanning is the perfect solution.

This technique is non-destructive, meaning you can explore and analyze the details of your sample as many times as needed without having to worry about damaging or destroying it.



Segmentation of a granite revealing the denser mineral and a composite foam showing the distribution of the additive (images from our laboratory)

Is possible to create a computational 3D model of your sample, which may be 3D printed, allowing you to perform additional analysis or use it for product design and prototyping.

It is a powerful technique with numerous applications in both scientific research and industrial settings. Anyone working in fields such as geoscience, mineralogy, material and life sciences, food and pharmaceuticals, batteries, fuel cells, semiconductors, paleontology, and anthropology will take advantage of this technique.

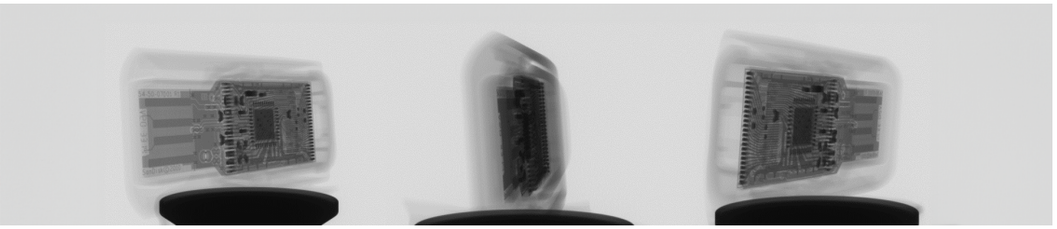
ScienceDirect
https://doi.org/10.1016/j.resconrec.2022.106801

Frontiers
https://doi.org/10.3389/feart.2022.1054276

Frontiers
https://doi.org/10.3389/fmed.2022.1028377

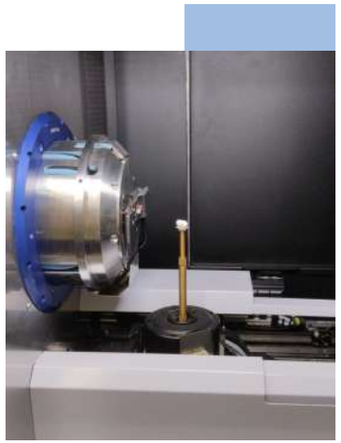
What is nano-CT scan?

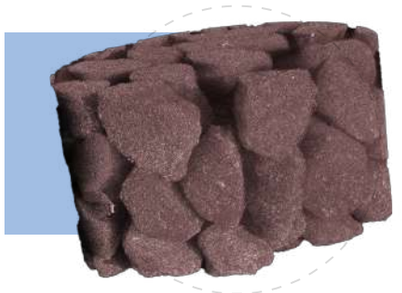
Nano-CT-scan is a 3D imaging technique that provides high-resolution images of natural and non-natural materials. Like the medical concept of computed axial tomography (CAT) scan, this technique acquires several 2D X-ray images at multiple angular positions, which are then reconstructed to develop a 3D model using advanced software.



What information can I get?

X-rays in CT are sensitive to variations in the density of the material. Whether you are looking to identify pests inside a piece of fruit, diagnose broken circuits in packaged electronics, uncover defects such as cracks, porosities, or inclusions in a material's structure, or the very fine structure of objects such as foams and membranes, CT scanning may give you much information about your sample. It allows for detailed analysis of the internal structure of materials and components at the micro- and sub-micro scale.
It has even revolutionized the fields of paleontology and anthropology.





Reconstructed 3D image of a limestone at 500 nm voxel size (images from our laboratory)

Sample sizes and resolution

The maximum scan window is about 14 cm high, yet the sample chamber can fit larger samples. The spatial resolution of the scan is linked to the sample size and characteristics. CERENA's CT scan allows a 3D spatial resolution of 500 nm for samples with a few millimeters.