

SEND YOUR SAMPLE DAY – THE TECHNICAL BIT!

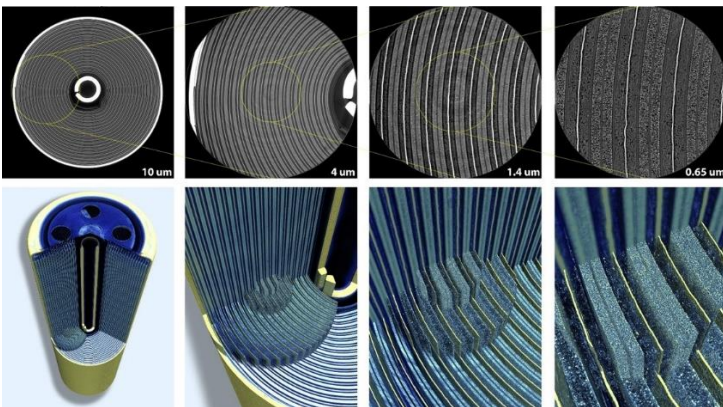
Tomography is a 3D imaging technique which reveals microstructure of materials. Based on radiography and like a medical scanner, thousands of radiographs are recorded during 360 degrees sample rotation. A reconstruction algorithm is then used to obtain virtual slices, forming a 3D volume.

At ESRF, we designed different optics with range of pixel size from 50 microns down to 10 nanometers and we benefit from a large range of X-ray energies that permit to study various samples from different domains such as metallurgy, composite, fibrous materials, pharmaceutical, ... The coherence of our X-rays allows to obtain classical absorption contrast but also phase contrast for non-absorbing sample or with close density materials.

Five X-ray beamlines at ESRF primarily propose non-destructive X-ray imaging using micro- and nano-synchrotron computed tomography (CT), allowing the 3D microstructure of your sample to be visualised. A mail-in service is available for industry for clients to simply send us samples for scanning - we scan them and send back the 3D reconstructed X-ray volume as an electronic file.

Our beamlines are very flexible thanks to the very wide energy range (20-250 keV) available which allows different types and sizes of samples to be scanned with regions of interest in a larger object from several centimetres (for microCT) to a few microns (for nanoCT). A large range of pixel sizes is available from 0.3-40 microns for microCT and 10-100 nanometres for nanoCT.

Multi-resolution imaging of Lithium-Ion battery:



Our X-ray beamlines detect absorption contrast (like on a hospital X-ray – but with much finer spatial resolution) but, thanks to the special coherence of synchrotron radiation, we also record phase contrast imaging which gives the possibility to distinguish product or material components even if they have similar or very low X-ray absorptions – making synchrotron tomography very sensitive.