PLORAYTION

X-ray nano-analysis and scientific consulting

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WHO WE ARE

We are a company facilitating access to non-destructive X-ray based analytics at the highest sensitivities and spatial resolutions. Bridging the gap between highly advanced laboratory and synchrotron-based analytics and R&D demand, we offer not just consulting services but a comprehensive all-round package. Through us, you gain access to state-of-the-art X-ray sources for the highly sensitive assessment of material composition in both 1D and 2D.

You also benefit from our strong partnership and extensive experience with synchrotron radiation facilities such as the European Synchrotron Radiation Facility (ESRF) - one of the leading X-ray sources in the world. The ESRF's extremely intense X-ray beam and high-end focussing optics enable unique analyses such as nano-scale investigation of elemental distributions in 2D or in 3D.

We support our customers with the preparation of beamtime proposals, carry out the actual measurements and then conduct data treatment and analysis. Our main areas of expertise cover synchrotron µCT, nanoCT, µXRF and nanoXRF experiments, and our strong scientific network makes it easy to provide other measuring techniques as well.

MAIN ACTIVITIES

- Synchrotron and laboratory based micro and nanoCT and the related data processing such as image reconstruction, segmentation, quantification of morphological properties (e.g. pore size distribution, fibre orientation, ...)
- Synchrotron and laboratory X-ray fluorescence analysis from the mm to nm scales in 1D and 2D including the normalization and fitting of the spectra and further data post processing
- X-ray absorption spectroscopy for chemical speciation
- Access to most of the standard laboratory analytical equipment (SEM, FTIR, TXRF, ICP-MS, ...)
- Sample preparation (especially for nanoCT)
- Scientific consultancy on measurement strategies and whole research projects including support in preparing beamtime proposals
- Training and education on X-ray based micro- and nano-analytics

APPLICATIONS

material science, life science, pharmaceutics, medical chemistry, cosmetics

WHO WE WORK WITH

TU Berlin · NOVITOM · OpTecBB · CHARITÉ · ESRF The European Synchrotron

3D SynchrotronCT

µCT (phase and absorption contrast):
energy range 10 - 250 keV (monochromatic):
Field-of-view: 0.1 - 100 mm
Pixel size: 0.2 - 30 µm

nanoCT (phase contrast):
energy: 17 or 34 keV
Field-of-view: 100 µm at highest resolution
Pixel size: down to 50 nm

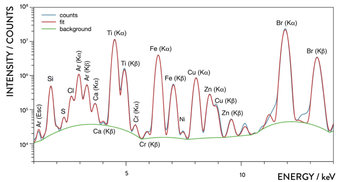
main application field: **material science**

XRF for highest resolution elemental mappings and chemical speciation

µXRF:
energy range 2 - 21 keV (monochromatic):
Beam size: > 300 nm
sensitivity: down to ppm

nanoXRF:
energy: 8 to 34 keV
Beam size: > 50 nm
sensitivity: down to ppm

main application fields: detection of trace elements and chemical speciation; life science - nanoparticles in toxicology, contrast agents, pharmaceuticals, tissue



nanoXRF spectrum corresponding to the elemental maps (bottom left); monochromatic excitation at 17.5 keV and flux 10^{12} photons/s

Figure captions (top to bottom):

1. Carbon fibres in a compound material (synchrotron phase-contrast µCT at 0.7 µm isotropic voxel size)

2. Tattooed human skin tissue section. Synchrotron µXRF mapping reveals presence of Br (organic pigments) and Ti (inorganic pigments) in the dermis. Epidermal cells are clearly visualized through the X-ray fluorescence intensity of phosphorus (phosphorus in blue; titanium in red; bromine in green).

3. Synchrotron nanoXRF map of the region of the human skin section containing pigments, at 50 nm beam size (fig.2). Shows titanium (red) nano-particles (NP) with average sizes of approx. 200 nm diameter. Br (green) and Fe (black) NPs are also visible in the same region.