X-ray Computed Micro-Tomography Principles and Applications

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In this workshop I will describe the working principles and good laboratory practices of the lab-based X-ray Computed Micro-Tomography (μ-XCT) including but not limited to:

- Formation of the projection image.
- Concept of 3D image reconstruction.
- Basic configuration of x-ray computed tomography instrument.
- Sample alignment.
- Optimization of transmission through the sample.
- Magnification versus field-of-view.
- Sample size and field-of-view.
- Meaning of a resolution.
- Correction of image artefacts.

Relevant datasets will be presented and discussed including batteries, teeth samples, etc. The aim of the workshop is to give potential users a head start on planning for the experiments and choosing the appropriate sample preparation and mounting. It is intended to help researchers understand what is achievable and what might be difficult to accomplish by the lab-based μ-XCT.

At the end we will have an informal discussion about the applications of μ-XCT technique related to the specific research needs from the audience.

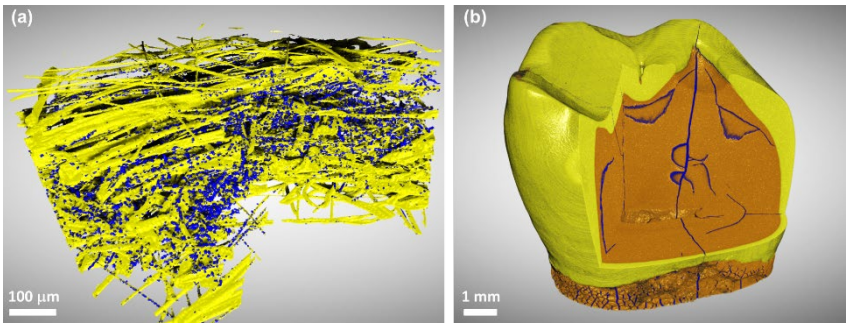

Figure 1. Application examples of the μ-XCT: (a) Segmented 3D dataset of a filter from the N95 respirator showing contaminant NaCl particles (blue) and polypropylene fibers (yellow). (b) 3D virtual cut through segmented tooth showing cracks (blue) inside the enamel (yellow) and dentine (brown).