

1 Three-dimensional microscopy of electro-spun polymeric fibers; approximated resolution: 500 nm.

NANOSCALE X-RAY MICROSCOPY

Fraunhofer Institute for Microstructure of Materials and Systems IMWS

Walter-Huelse-Str. 1
06120 Halle (Saale)
Germany

Contact:

Dr. Christian Schmelzer
Telephone +49 345 5589-116
christian.schmelzer@imws.fraunhofer.de

www.imws.fraunhofer.de



Background

The visualization of the morphology and the characterization of the microstructure of materials are crucial for the design and fabrication of tailored and application-optimized materials.

Technology

In our institute, we have a ZEISS Xradia 810 Ultra X-ray microscope that enables to achieve the highest resolution available among lab-based X-ray imaging systems. It delivers high image contrast and makes tomographic imaging viable for a variety of difficult-to-image materials, composed of high- and low-electron dense elements, with resolution better than 100 nm.

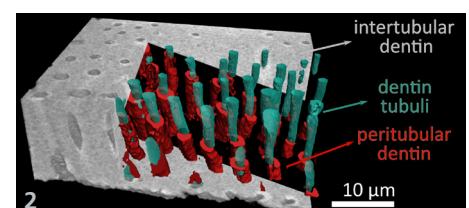
By using either absorption- or Zernike phase-contrast imaging, we can produce 3D images where features in the nanometric range can be easily seen along any virtual plane.

We can identify and virtually separate parts of the sample, as shown in the example in Figure 2. We can visualize cracks, and estimate, for example, specimens porosity, and pore shape, and the size distribution of features of interest.

Technical specifications

- X-ray source: chromium rotating anode (5.4 keV)
- Contrast modes: absorption- and Zernike phase-contrast
- Imaging modes:

Field-of-view	16x16 μm^2	64x64 μm^2
Pixel size	16 nm	64 nm



2 Identification and virtual separation of different parts composing a tooth specimen.