Contribution ID: **17** Type: **Oral**

Scanning Transmission and Fluorescence X-Ray Microscope for P04 –First Results

Wednesday 24 February 2016 14:00 (30 minutes)

We present a scanning X-Ray Microscope, which uses a zone plate to focus the beam to a roughly 100 nm spot size onto the sample. Images are taken by scanning the sample through the focus and detecting the transmission signal with an area detector (CCD) and the fluorescence signal with a SDD detector.
X-Ray microscopy, especially in the tender energy region of several hundreds of eV to some thousands of eV provides a powerful tool for the analysis of biological and biomedicine samples. Hence, it is widely used to gain more insight in health issues like transport mechanisms of lipids or toxicity and clearance properties of nanoparticles.
The advantages of a scanning mode in comparison to the common full-field mode are the different possible imaging options in combination with an array detector (CCD) for transmission and the possibility of detecting the fluorescence radiation laterally resolved. The imaging options for scanning mode in transmission are not only the overall absorption, but phase contrast and dark-field images can be extracted from the data of the area detector as well. The image-contrast of a phase contrast image is much higher compared to a simple absorption image, so that not only the difference between high (bone) and low (tissue) absorption can be distinguished, but also structures in tissue itself can be revealed.
The advantage of the fluorescence mode is the access of the elemental distribution. For some biomedical application it is not only of interest where certain particles settle, but also how the elemental distribution within the particles look like. Or the distribution of elements within certain big cells become of more and more interest in the biomedicine.
Within our project we implemented the scanning option together with a fluorescence detector in a full-field microscope and we will present first results done at the P04 beamline of PETRA III. In our first experiments we were able to resolve 200 nm structures from a sine star in transmission and fluorescence mode. First experiments on biological samples were performed afterwards.
The present status of the project will be presented.

Primary author: Dr LÜHL, Lars (Technische Universität Berlin)

Co-authors: HAIDL, Andreas (Hochschule Koblenz); Prof. KANNGIESSER, Birgit (Technische Universität Berlin); GRÖTZSCH, Daniel (Technische Universität Berlin); ABBATI, Gennaro (Hochschule Koblenz); ANDRIANOV, Konstantin (Hochschule Koblenz); GNEWKOW, Richard (Technische Universität Berlin); NISIUS, Thomas (Hochschule Koblenz); Prof. WILHEIN, Thomas (Hochschule Koblenz); LACHMANN, Tim (Technische Universität Berlin); MALZER, Wolfgang (Technische Universität Berlin)

Presenter: Dr LÜHL, Lars (Technische Universität Berlin)

Session Classification: User reports