Towards 2D/3D Micro-XAS at the DUBBLE Beamline of the ESRF


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X-ray absorption spectroscopy (XAS) based methodology such as XANES and EXAFS is a powerful tool that is known for structural characterization. In conventional mode of operation, at the ESRF DUBBLE beamline, millimeter sized x-ray beams are used to irradiate the selected area on a sample. As a result of the macroscopic nature of this analyzing x-ray beam, an average spectrum over the illuminated area/volume is recorded in which the information on the local microscopic structure of the possibly heterogeneous sample is lost. Therefore, in order to obtain spatially resolved spectra of such inhomogeneous samples, there is the request to implement specialized 2D/3D methodology at the DUBBLE beamline.

This work presents the current status of the DUBBLE beamline concerning the extension of the methodology towards microscopic 2D/3D XAS analysis. Next to the establishment of the confocal set-up for direct 3D analysis based on polycapillary optics, results of a very recent exploratory experiment for which the DUBBLE spectrometer was coupled with a full-field energy-dispersive CCD detector, the SLcam, allowing the simultaneous recording of 69,696 pixel/voxel XRF spectra representing the imaging of a typically 2 by 2 mm² sample area, will be shown.