

Spatially resolved XRF and XRD at once with a new X-ray Color Camera

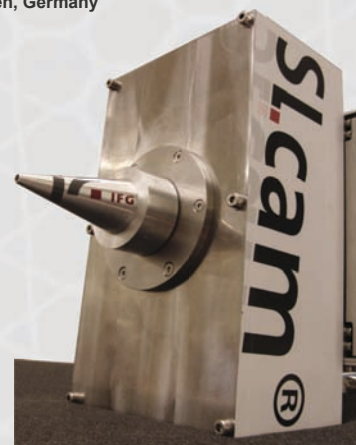
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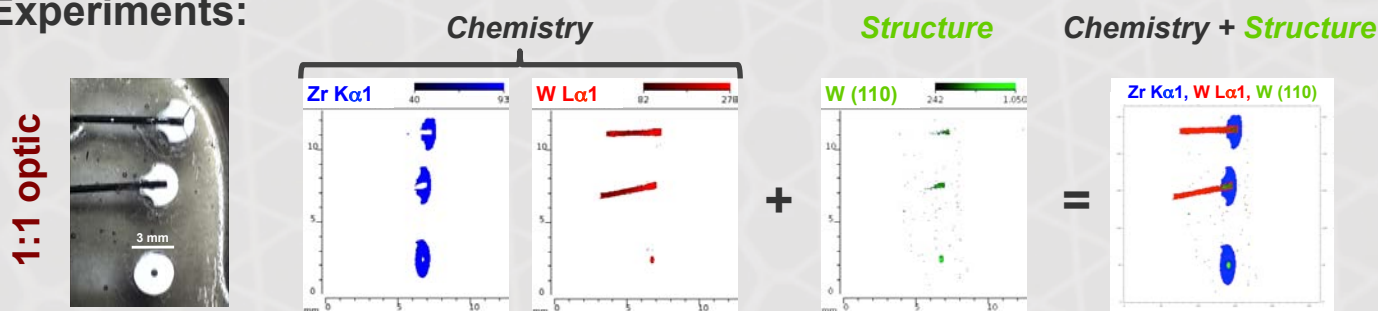


Image area	11.9 x 12.3 mm ²
Pixel size	(48 x 48) μm ²
Number of pixels	69696
Pixel readout speed	28 MPixels/s
Frame rate	400 Hz
Sensitive thickness	450 μm
Quantum efficiency	>95% @ 3-10keV >30% @ 20keV
Readout noise	<3e ⁻ /Pixel
Charge transport efficiency	>0.9999

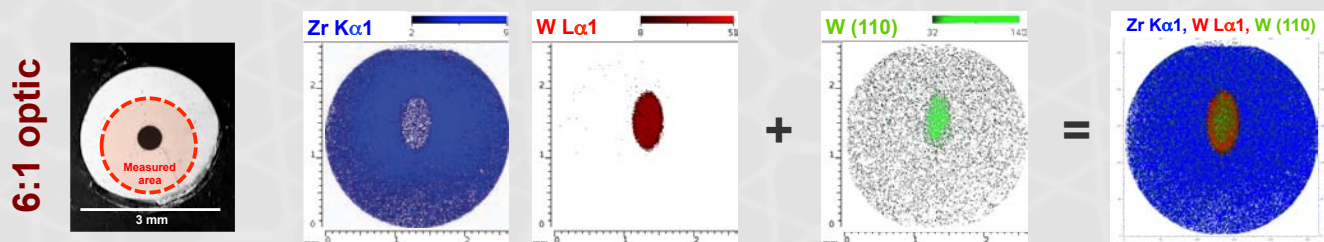


Experimental setup of the X-ray color camera with 1:1 optic combined with a laboratory Mo-sealed tube, technical data of the detector chip and X-ray color camera with a magnifying 6:1 polycapillary optic.

Experiments:



Tungsten (W) wire in Zirconia (ZrO₂) matrix with 1:1 optic
Horizontal geometric distortion of sample information in the pictures due to viewing angle of X-ray color camera.



Tungsten (W) wire in Zirconia (ZrO₂) matrix (inner part) with 6:1 optic
Only inner part (app. 2mm diameter) of the sample (3mm diameter) is visible due to the magnification and aperture of the 6:1 optic.
Horizontal geometric distortion of sample information in the pictures due to viewing angle of X-ray color camera.

Resumee:

- For the first time simultaneous chemical and phase distribution mappings are possible with one detector.
- Measurements are possible with standard laboratory X-ray sources, no synchrotron radiation necessary.
- Local resolution simply adjustable by changing optics.

Literature:

- (1) Scharf, O. et al., (2011) Compact pnCCD-Based X-ray Camera with High Spatial and Energy Resolution: A Color X-ray Camera, Anal. Chem., Vol. 83(7), pp. 2532-2538
- (2) Ordavo, I. et al., (2011) A new pnCCD-based color X-ray camera for fast spatial and energy-resolved measurements, Nucl. Instrum. Methods Phys. Res. Sec. A 654(1) pp. 250 – 257



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