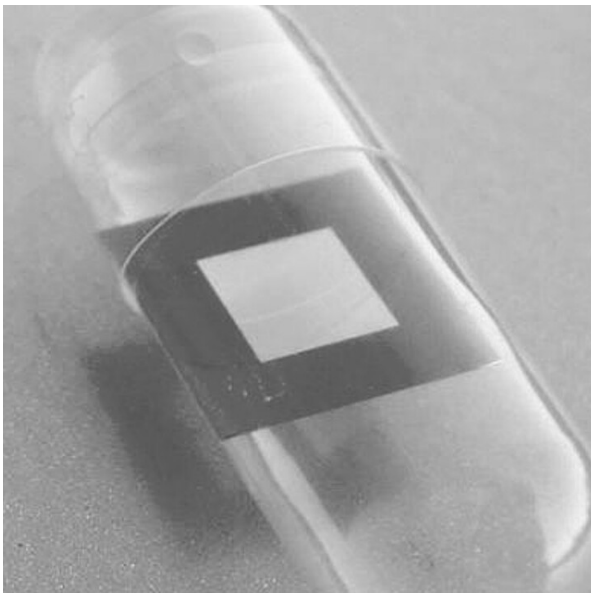


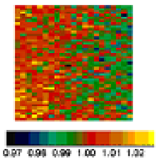
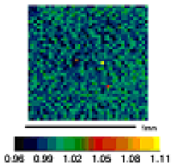
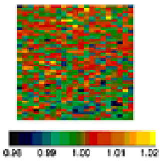
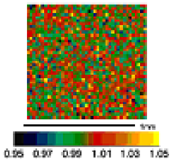
Reference samples for X-ray fluorescence

Defined reference samples are necessary for the quantification of (micro) X-ray fluorescence measurements. Material quantity in the range of ng/mm² can be identified credibly with this thin film reference samples.

Advantages and applications:

- absorption free standard, no matrix adjustment necessary
- transmission measurements and extremely low background signal through the substrate thanks to a substrate thickness of only 200nm
- mass depositions in the range of ng/mm^2 (1 to 3 atom layers) allow for a quantification in this region without an extrapolation of higher values
- mass loss in the range of 1 ng/mm^2 (1 atom layer)
- great variety of non-overlapping fluorescence lines makes an exact calibration curve with many values across a broad energy field possible
- signal strength is adjustable through the film thickness and comparable for all elements (no signal saturation of the detector through a particularly strong line)
- high uniformity and homogeneity (more than 1% across the whole sample surface)
- usage for the adjustment of confocal µ-XRF mounts possible
- great variety of available elements (standard version and customised configurations)

Homogeneity:

	Large area map SF1	µ beam "mapping" S10
Energy	26 keV	9.5 keV
Area	15 x 15 mm²	1.2 x 1.2 mm²
Beam size	0.8 x 0.4 mm²	2.8 x 12 µm²
Step size	0.8 x 0.4 mm²	~ 30 x 30 µm²
Cu Kα	 	
La Lα	 	

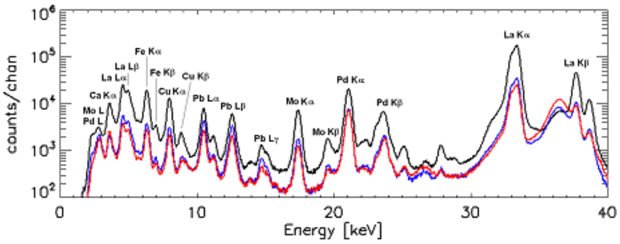
[Translate to English:] my-xrf

A homogeneity of better than 1% across the whole surface even for different beam sizes and step sizes is shown when measuring the lateral homogeneity of the elements with µ-XRF-Mappings (see table).

Energy spectrum and configuration of elements:

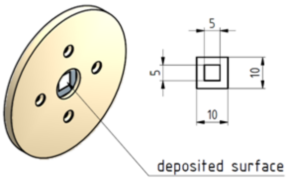
The reference samples contain seven different elements in a membrane with characteristic fluorescence lines in the energy spectrum of ~2 keV to ~40 keV (peaks of comparable intensity), like shown in the picture.

The table shows the typical mass configuration (sample types RF7 and RF8, others available) and photon energies of the characteristic fluorescence lines. There is also a sample series with a mass configuration which is 10 times higher.



	Mass (ng/mm²)		Emission Lines (eV)		
	RF7	RF8	Kα	Lα	Mα
Pb	7.7±1.3	5.9±0.5	85335	10541	2346
La	9.0±1.9	10.3±2.0	33298	4649	833
Pd	1.9±0.8	1.2±0.6	21123	2838	
Mo	0.9±0.1	0.7±0.1	17444	2293	
Cu	2.4±0.5	2.4±0.2	8040	930	
Fe	4.0±0.4	3.9±0.4	6401	747	
Ca	11.4±5.5	20.3±0.9	3691	341	
Si	substrate		1740		

Dimensions:



[Translate to English:]
Abmessungen der

Referenzprobe

The XRF reference samples are available in two different dimensions (others on request):

Dimension:	S	L
Membrane [mm²]:	2 x 2	5 x 5
Frame [mm²]:	5 x 5	10 x 10

The useful coated surface is the dimension of the membrane (thickness 200nm, others on request). It is arranged in a silicium frame (thickness 200-400µm).

The reference sample is also available in a PEEK support. Standard diameter 49mm, smaller diameter (min. 30mm) on request.