

Thin Film XRF Reference Samples

Thin film X-ray fluorescence reference samples by AXO DRESDEN combine the possibility of multi-element mass quantification with very low background signal, even at normal incidence and in transmission geometry. Two sets are available to cover different energy ranges and element selections. Depending on customers' setup and beam dimensions, different sample sizes and optional holders for easier handling can be chosen.

Thin Film XRF Reference Samples

Advantages:

- Absorption free standard: no matrix correction
- Substrate thickness of 200 nm permits transmission measurements, low background from substrate
- Mass depositions in the range of ng/mm² (few atomic layers) permit quantification without the need to interpolate from higher values
- Uncertainty ≤ 1 ng/mm² (1 atomic layer)
- Wide selection of non-overlapping XRF lines, exact calibration curve, many points over large energy range
- Signal strength easily adjustable by thickness, similar intensity for all elements
- High degree of uniformity & homogeneity (better than 1% for the full sample area)
- Application for adjustment of confocal μ-XRF is possible
- Wide range of available elements (2 standard and tailored compilations)

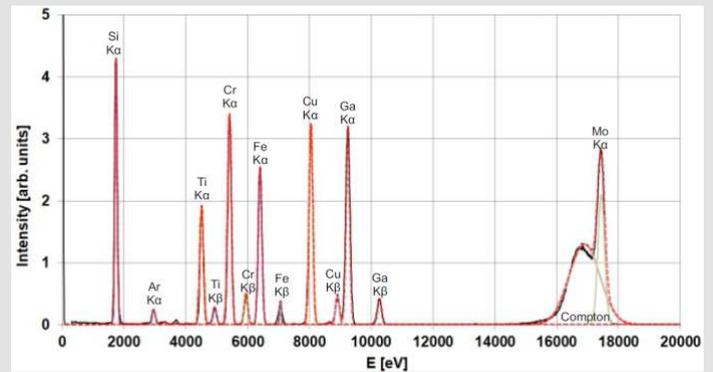
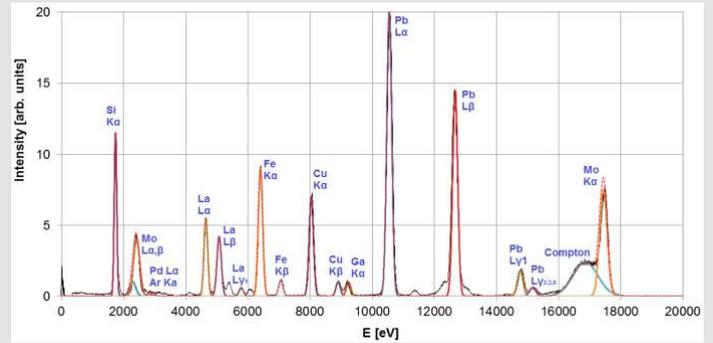
Element content and mass deposition:

The reference samples contain the 6 elements Pb, La, Pd, Mo, Cu, Fe (RF type) or 4 elements Ti, Cr, Fe, Cu (RG type), plus Si and N from the silicon nitride membrane. Further, they may contain traces of C, Ar, Kr or other contents of ambient air that are not important for most XRF measurements. Different element depositions may be available on request.

Mass depositions range from ~1 ng/mm² (for standard mass version C0) to ~100 ng/mm² (high mass version C10). Masses listed here are average values measured by AAS, ICP-OES and XRF. A data sheet with actual values is delivered with each individual reference sample. Despite the very precise measurements these reference samples are no "Certified Reference Materials (CRMs)".

Sample dimensions:

The reference samples are available in different designs: Glued into a circular PEEK holder for easier handling or as a small silicon frame. Available sizes are 5×5 mm² or 10×10 mm² Si frame with a of 2×2 mm² or 5×5 mm² thin usable area in the center (200 nm thick). PEEK holders are 3 mm thick with an outer diameter of 30 mm or 49 mm. Other sizes are available on request.



Energy spectra of a 6-element reference sample RF (top) and RG (bottom) measured with a lab TXRF using Mo-K radiation (50 kV excitation). The energy range is covered with peaks of comparable intensity. (*Ga signal from the internal TXRF standard.*)

RF type	Mass dep. c ₀ /c ₁₀ [ng/mm ²]	Emission lines [eV]		
		Kα	Lα	Mα
Pb	7.6 / 84.9	74163	10541	2346
La	11.7 / 121.4	33298	4649	833
Pd	1.5 / 23.3	21123	2838	
Mo	0.8 / 8.6	17444	2293	
Cu	2.0 / 22.2	8040	930	
Fe	3.9 / 43.9	6401	705	
Si	substrate	1740		

RG type	Mass dep. c ₀ /c ₁₀ [ng/mm ²]	Emission lines [eV]		
		Kα	Lα	Mα
Cu	2.4 / 23.7	8040	930	
Fe	3.1 / 31.3	6401	705	
Cr	5.4 / 65.6	5412	572	
Ti	6.2 / 54.5	4510	452	
Si	substrate	1740		