

## X-RAY FLUORESCENCE CALIBRATION STANDARDS

**nanoXRF** offers a full range of thin film standards of the elements and compounds listed below for use in calibration of x-ray fluorescence equipment. These standards are most often used for instrument calibration and quality control in the fields of air pollution and thin coatings. They are also useful as a source of pure element spectra for use in background subtraction routines, and as a routine check of x-ray detector resolution and overall system performance. **nanoXRF** standards are prepared by high vacuum deposition under precisely controlled environment resulting in highly accurate standards. In most cases, the standards present an element free of interferences and thin enough to ignore thickness effects. The backings available are chosen for minimum thickness and contamination. Where it is necessary to use compounds or semi-compounds, the companion elements are chosen to minimize interference and provide stability. Raw materials used are 99.9% pure or better. The areal density is determined by precision weighing and masking techniques. Certification is provided for each standard. A blank backing is provided at no charge. Additional blanks may be purchased for an additional charge. The prices listed below are for standards of nominal **SL** (0.5-1.5 $\mu\text{g}/\text{cm}^2$ ), **VL** (3-5 $\mu\text{g}/\text{cm}^2$ ), **L** (15-25 $\mu\text{g}/\text{cm}^2$ ), **R** (40-60 $\mu\text{g}/\text{cm}^2$ ) and **H** (80-120 $\mu\text{g}/\text{cm}^2$ ) thickness. For other options, please refer to ordering information. Other elements and compounds are available by special request.

ELEMENT	PRICE (US\$)					ELEMENT	PRICE (US\$)					ELEMENT	PRICE (US\$)				
	SL	VL	L	R	H		SL	VL	L	R	H		SL	VL	L	R	H
Li (LiF)	210	160	105	105	189	As (GaAs)**	300	225	150	150	270	Pr (PrF3)	210	160	105	105	189
Na (NaCl)*	210	160	105	105	189	Se	270	200	135	135	243	Nd (NdF3)	210	160	105	105	189
Mg (MgF2)	210	160	105	105	189	Br (CsBr)*	270	200	135	135	243	Sm (SmF3)	210	160	105	105	189
Al	270	200	135	135	243	Rb (RbI)*	210	160	105	105	189	Eu (EuF3)	210	160	105	105	189
Si (SiO)	270	200	135	135	243	Sr (SrF2)	210	160	105	105	189	Gd (GdF3)	210	160	105	105	189
P (GaP)*,**	300	225	150	150	270	Zr (ZrF4)	300	225	150	150	270	Tb (TbF3)	210	160	105	105	189
S (CuSx)	300	225	150	150	270	Y (YF3)	210	160	105	105	189	Dy (DyF3)	210	160	105	105	189
Cl (NaCl,KCl)*	210	160	105	105	189	Nb (Nb2O3)	300	225	150	150	270	Ho (HoF3)	210	160	105	105	189
K (KCl,KI)*	210	160	105	105	189	Mo (MoO3)	210	160	105	105	189	Er (ErF3)	210	160	105	105	189
Ca (CaF2)	210	160	105	105	189	Rh	390	295	195	195	345	Tm (TmF3)	210	160	105	105	189
Sc (ScF3)	210	160	105	105	189	Pd	220	165	110	110	198	Yb (YbF3)	210	160	105	105	189
Ti	270	200	135	135	243	Ag	210	160	105	105	189	Lu (LuF3)	210	160	105	105	189
V	270	200	135	135	243	Cd (CdSe)**	270	200	135	135	243	W (WO3)	270	200	135	135	243
Cr	270	200	135	135	243	In	210	160	105	105	189	Pt	260	195	130	130	234
Mn	270	200	135	135	243	Sn	210	160	105	105	189	Au	270	200	135	135	243
Fe	270	200	135	135	243	Sb	270	200	135	135	243	Tl (TlCl)	300	225	150	150	270
Co	270	200	135	135	243	Te	270	200	135	135	243	Pb	270	200	135	135	243
Ni	270	200	135	135	243	I (RbI, KI)*	270	200	135	135	243	Bi	210	160	105	105	189
Cu	210	160	105	105	189	Cs (CsBr)*	270	200	135	135	243	Th (ThF4)***	390	295	195	195	345
Zn (ZnTe)**	270	200	135	135	243	Ba (BaF2)	210	160	105	105	189	U (UF4)***	390	295	195	195	345
Ga (GaP)*,**	300	225	150	150	270	La (LaF3)	210	160	105	105	189	Hg (AgHg)**	525	360	240	240	450
Ge	210	160	105	105	189	Ce (CeF3)	210	160	105	105	189						

\* dual element standards, beware of duplication \*\* variable stoichiometry (thickness certified for TOTAL of both elements)

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### MINIMUM ORDER \$200

**TERMS** (including instructions for international customers): F.O.B. Fort Worth, TX, U.S.A. Shipping costs prepaid and added to invoice. Net 30 days payment of invoice on approval of credit. Payment must be made in U.S. funds by check drawn on a U.S. bank, bank wire transfer, VISA, MasterCard or American Express.

## ORDERING INFORMATION for *nanoXRF* STANDARDS

Orders for **nanoXRF** x-ray fluorescence calibration standards must specify the following:

### 1) BACKING MATERIAL AND THICKNESS OPTIONS:

- 25, 37 or 47 mm diameter Nuclepore Polycarbonate Aerosol Membranes (0.4 micron pore size approximately 1mg/cm<sup>2</sup> thick).
- 2.5, 3.5 or 6.3 micron thick Mylar polyester film (6.3 micron = approx. 1mg/cm<sup>2</sup> thick). **Add 10% to price for 2.5 and 3.5 micron Mylar backed standards.**
- Other backings by specific inquiry only.

### 2) MOUNTING OPTIONS

- nanoXRF** 2" x 2" (5cm x 5 cm) polystyrene mounts with circular apertures to accommodate 25, 37 or 47 mm dia. backings. Open areas are 23, 32 and 42mm dia. respectively.
- Acrylic rings with nominal O.D.s of 25, 32, 36 or 47 mm and nominal I.D.s of 19, 25, 29 or 39 mm respectively. Thickness is approx 1.5 mm.
- User supplied mounts.
- Unmounted and shipped in covered plastic dishes (not recommended as many are curled due to stresses and require special handling).
- Add 10% total for 47mm rings and 2" x 2" mounts with 41mm open area.**

### 3) ELEMENTS OF INTEREST FROM LIST of AVAILABLE STANDARDS

For those elements with more than one compound listed, a choice must be specified, or nanoXRF will make the choice.

### 4) THICKNESS OF DEPOSIT

Our normal thickness is 15-25, 40-60 and 80-120µg/cm<sup>2</sup> nominal. Thicker and thinner deposits may be available but must be individually quoted. Standards are fabricated to  $\pm 20\%$  of the specified thickness with the actual thickness determined to  $\pm 5\%$  where possible.

### 5) EXTRA BLANKS (one furnished free each order)

- 2.5, 3.5, and 6.3 micron Mylar mounted blanks are \$10.00 each
- Nuclepore polycarbonate aerosol membrane mounted blanks are \$10.00 each

### 6) SPECIAL MOUNTING AND OTHER INSTRUCTIONS

For acrylic ring mounts, the direction the deposit faces must be clearly specified. We prefer mounting with the deposit facing the ring (option "A" below) to protect it from abrasion. The 2" x 2" mounts are symmetric about the plane of the backing and therefore need no specification.

