



# Amptek K and L Emission Line Lookup Chart

XR-100CR / XR-100T-CdTe / GAMMA-8000 / X-123  
X-Ray and Gamma Ray Detectors

Key to Energy Values in keV

$K_{\alpha 1}$	$K_{\beta 1}$
Au	79
$L_{\alpha 1}$	$L_{\beta 1}$

Group IA																		Group VIIIA
H 1											He 2							
IIA												IIIA	IVA	VA	VIA	VIIA		
0.052 Li 3	0.110 Be 4											0.185 B 5	0.282 C 6	0.392 N 7	0.526 O 8	0.677 F 9	0.851 Ne 10	
1.04 1.07 Na 11	1.25 1.30 Mg 12											1.49 1.55 Al 13	1.74 1.83 Si 14	2.02 2.14 P 15	2.31 2.46 S 16	2.62 2.82 Cl 17	2.96 3.19 Ar 18	
		IIIB	IVB	VB	VIB	VIIB	Group VIII			IB	IIB							
3.31 3.59 K 19	3.69 4.01 Ca 20	4.09 4.46 Sc 21	4.51 4.93 Ti 22	4.95 5.43 V 23	5.41 5.95 Cr 24	5.90 6.49 Mn 25	6.40 7.06 Fe 26	6.93 7.65 Co 27	7.48 8.26 Ni 28	8.05 8.90 Cu 29	8.64 9.57 Zn 30	9.25 10.26 Ga 31	9.89 10.98 Ge 32	10.54 11.73 As 33	11.22 12.50 Se 34	11.92 13.29 Br 35	12.65 14.11 Kr 36	
13.39 14.96 Rb 37	14.16 15.83 Sr 38	14.96 16.74 Y 39	15.77 17.67 Zr 40	16.61 18.62 Nb 41	17.48 19.61 Mo 42	18.41 19.61 Tc 43	19.28 21.66 Ru 44	20.21 22.72 Rh 45	21.18 23.82 Pd 46	22.16 24.94 Ag 47	23.17 26.09 Cd 48	24.21 27.27 In 49	25.27 28.48 Sn 50	26.36 29.72 Sb 51	27.47 30.99 Te 52	28.61 32.29 I 53	29.80 33.64 Xe 54	
30.97 34.98 Cs 55	32.19 36.38 Ba 56	57 - 71	55.76 63.21 Hf 72	57.52 65.21 Ta 73	59.31 67.23 W 74	61.13 69.30 Re 75	62.99 71.40 Os 76	64.89 73.55 Ir 77	66.82 75.74 Pt 78	68.79 77.97 Au 79	70.82 80.26 Hg 80	72.86 82.56 Tl 81	74.96 84.92 Pb 82	77.10 87.34 Bi 83	79.30 89.81 Po 84	81.53 92.32 At 85	83.80 94.88 Rn 86	
86.12 97.48 Fr 87	88.46 100.14 Ra 88	90.89 102.85 Ac 89	93.33 105.59 Th 90	95.85 108.41 Pa 91	98.43 111.29 U 92	101.00 114.18 Np 93	103.65 117.15 Pu 94	106.35 120.16 Am 95	109.10 123.24 Cm 96	111.90 126.36 Bk 97	114.75 129.54 Cf 98	117.65 132.78 Es 99	120.60 136.08 Fm 100	Md 101	No 102	Lr 103	Actinides 89-103	
Lanthanides 57-71		33.44 37.80 La 57	34.72 39.26 Ce 58	36.02 40.75 Pr 59	37.36 42.27 Nd 60	38.65 43.96 Pm 61	40.12 45.40 Sm 62	41.53 47.03 Eu 63	42.98 48.72 Gd 64	44.47 50.39 Tb 65	45.99 52.18 Dy 66	47.53 53.93 Ho 67	49.10 55.69 Er 68	50.73 57.58 Tm 69	52.36 59.35 Yb 70	54.06 61.28 Lu 71		

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|---------------------------|-------------------------------|---------------------------|----------------------------|----------------------------|-----------------------------------|--------------------------|---------------------------|---------------------------------------|
| Actinium - Ac 89 (10.07)  | Bromine - Br 35 (0.007139)    | Dysprosium - Dy 66 (8.55) | Helium - He 2 (0.0001785)  | Lutetium - Lu 71 (9.84)    | Nobelium - No 102                 | Radium - Ra 88 (5.0)     | Strontium - Sr 38 (2.56)  | Uranium - U 92 (18.7)                 |
| Aluminum - Al 13 (2.70)   | Cadmium - Cd 48 (8.65)        | Einsteinium - Es 99       | Holmium - Ho 67 (8.795)    | Magnesium - Mg 12 (1.74)   | Osmium - Os 76 (22.5)             | Radon - Rn 86 (4.4)      | Sulphur - S 16 (1.92)     | Vanadium - V 23 (5.98)                |
| Americium - Am 95 (11.87) | Calcium - Ca 20 (1.55)        | Erbium - Er 68 (9.066)    | Hydrogen - H 1 (0.0000899) | Manganese - Mn 25 (7.41)   | Oxygen - O 8 (0.001429)           | Rhenium - Rn 75 (21.0)   | Tantalum - Ta 73 (16.6)   | Xenon - Xe 54 (0.00585)               |
| Antimony - Sb 51 (6.62)   | Californium - Cf 98           | Europium - Eu 63 (5.234)  | Indium - In 49 (7.28)      | Mendelevium - Md 101       | Palladium - Pd 46 (12.16)         | Rhodium - Rh 45 (12.44)  | Technetium - Tc 43 (11.5) | Ytterbium - Yb 70 (6.965)             |
| Argon - Ar 18 (0.001783)  | Carbon - C 6 (2.25-G; 3.51-D) | Fermium - Fm 100          | Iodine - I 53 (4.94)       | Mercury - Hg 80 (13.55)    | Phosphorus - P 15 (1.83-Y 2.20-R) | Rubidium - Rb 37 (1.53)  | Tellurium - Te 52 (6.25)  | Yttrium - Y 39 (3.8)                  |
| Arsenic - As 33 (5.73)    | Cerium - Ce 58 (6.90)         | Fluorine - F 9 (0.00169)  | Indium - Ir 77 (22.42)     | Molybdenum - Mo 42 (10.22) | Platinum - Pt 78 (21.45)          | Ruthenium - Ru 44 (12.1) | Terbium - Tb 65 (8.229)   | Zinc - Zn 30 (7.1)                    |
| Astatine - At 85          | Cesium - Cs 55 (1.87)         | Francium - Fr 87          | Iron - Fe 26 (7.88)        | Neodymium - Nd 60 (6.96)   | Plutonium - Pu 94 (19.8)          | Samarium - Sm 62 (7.75)  | Thallium - Tl 81 (11.86)  | Zirconium - Zr 40 (6.4)               |
| Barium - Ba 56 (3.5)      | Chlorine - Cl 17 (0.003220)   | Gadolinium - Gd 64 (7.90) | Krypton - Kr 36 (0.00368)  | Neon - Ne 10 (0.000900)    | Polonium - Po 84 (9.27)           | Scandium - Sc 21 (3.02)  | Thorium - Th 90 (11.3)    |                                       |
| Berkelium - Bk 97         | Chromium - Cr 24 (7.14)       | Gallium - Ga 31 (5.93)    | Lanthanum - La 57 (6.15)   | Neptunium - Np 93 (20.4)   | Potassium - K 19 (0.86)           | Selenium - Se 34 (4.82)  | Thulium - Tm 69 (9.321)   |                                       |
| Beryllium - Be 4 (1.85)   | Cobalt - Co 27 (8.71)         | Germanium - Ge 32 (5.46)  | Lawrencium - Lr 103        | Nickel - Ni 28 (8.88)      | Praseodymium - Pr 59 (6.48)       | Silicon - Si 14 (2.42)   | Tin - Sn 50 (7.3)         |                                       |
| Bismuth - Bi 83 (9.78)    | Copper - Cu 29 (8.96)         | Gold - Au 79 (19.32)      | Lead - Pb 82 (11.34)       | Niobium - Nb 41 (8.57)     | Promethium - Pm 61                | Silver - Ag 47 (10.49)   | Titanium - Ti 22 (4.5)    |                                       |
| Boron - B 5 (2.53)        | Curium - Cm 96                | Hafnium - Hf - 72 (13.3)  | Lithium - Li 3 (0.534)     | Nitrogen - N 7 (0.001251)  | Protactinium - Pa 91 (15.4)       | Sodium - Na 11 (0.97)    | Tungsten - W 74 (19.3)    | (density in g/cm <sup>3</sup> at NTP) |