

X-Ray Energy Reference



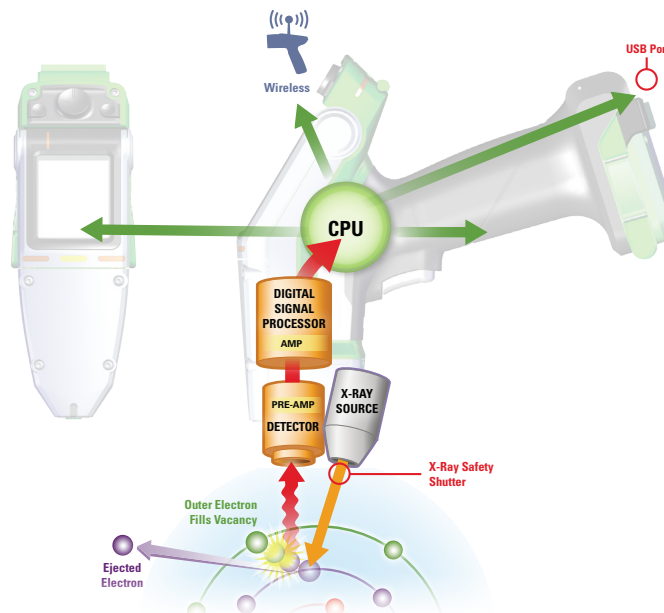
H Hydrogen 1		X-Ray Energy Reference																He Helium 2					
Li Lithium 3	Be Beryllium 4																	B Boron 5	C Carbon 6	N Nitrogen 7	O Oxygen 8	F Fluorine 9	Ne Neon 10
1.04 1.07 Na Sodium 11	1.25 1.30 Mg Magnesium 12																	1.49 1.55 Al Aluminum 13	1.74 1.83 Si Silicon 14	2.02 2.14 P Phosphorus 15	2.31 2.46 S Sulfur 16	2.62 2.82 Cl Chlorine 17	2.96 3.19 Ar Argon 18
3.31 3.59 K Potassium 19	3.69 4.01 Ca Calcium 20	4.09 4.46 Sc Scandium 21	4.51 4.93 Ti Titanium 22	4.95 5.43 V Vanadium 23	5.41 5.95 Cr Chromium 24	5.90 6.49 Mn Manganese 25	6.40 7.06 Fe Iron 26	6.93 7.65 Co Cobalt 27	7.48 8.26 Ni Nickel 28	8.05 8.90 Cu Copper 29	8.64 9.57 Zn Zinc 30	9.25 10.26 Ga Gallium 31	9.89 10.98 Ge Germanium 32	10.54 11.73 As Arsenic 33	11.22 12.50 Se Selenium 34	11.92 13.29 Br Bromine 35	12.65 14.11 Kr Krypton 36						
13.39 14.96 Rb Rubidium 37	14.16 15.83 Sr Strontium 38	14.96 16.74 Y Yttrium 39	15.77 17.67 Zr Zirconium 40	16.61 18.62 Nb Niobium 41	17.48 19.61 Mo Molybdenum 42	18.41 20.59 Tc Technetium 43	19.28 21.66 Ru Ruthenium 44	20.21 22.72 Rh Rhodium 45	21.18 23.82 Pd Palladium 46	22.16 24.94 Ag Silver 47	23.17 26.09 Cd Cadmium 48	24.21 27.27 In Indium 49	25.27 28.48 Sn Tin 50	26.36 29.72 Sb Antimony 51	27.47 30.99 Te Tellurium 52	28.61 32.29 I Iodine 53	29.80 33.64 Xe Xenon 54						
1.69 1.75 Cs Cesium 55	1.81 1.87 Ba Barium 56			2.04 2.12 Hf Hafnium 72	2.17 2.26 Ta Tantalum 73	2.29 2.40 W Tungsten 74	2.42 2.54 Re Rhenium 75	2.56 2.68 Os Osmium 76	2.70 2.83 Ir Iridium 77	2.84 2.99 Pt Platinum 78	2.98 3.15 Au Gold 79	3.13 3.32 Hg Mercury 80	3.29 3.49 Tl Thallium 81	3.44 3.66 Pb Lead 82	3.61 3.84 Bi Bismuth 83	3.77 4.03 Po Polonium 84	3.94 4.22 At Astatine 85	4.11 4.42 Rn Radon 86					
30.97 34.98 Fr Francium 87	32.19 36.38 Ra Radium 88	57- 71																					
4.29 4.62 La Lanthanum 57	4.47 4.83 Ce Cerium 58	4.65 5.04 Pr Praseodymium 59	4.84 5.26 Nd Neodymium 60	5.03 5.49 Pm Promethium 61	5.23 5.72 Sm Samarium 62	5.43 5.96 Eu Europium 63	5.64 6.21 Gd Gadolinium 64	5.85 6.46 Tb Terbium 65	6.06 6.71 Dy Dysprosium 66	6.28 6.98 Ho Holmium 67	6.50 7.25 Er Erbium 68	6.72 7.53 Tm Thulium 69	6.86 7.61 Yb Ytterbium 70	7.18 8.10 Lu Lutetium 71									
90.89 102.8 Ac Actinium 89	93.35 105.6 Th Thorium 90	95.86 108.4 Pa Protactinium 91	98.43 111.3 U Uranium 92	101.1 114.2 Np Neptunium 93	103.7 117.2 Pu Plutonium 94	106.5 120.3 Am Americium 95	109.3 123.4 Cm Curium 96	112.1 126.6 Bk Berkelium 97	115.0 129.8 Cf Californium 98	118.0 133.1 Es Einsteinium 99	121.1 136.5 Fm Fermium 100	125.2 141.0 Md Mendelevium 101	127.4 143.5 No Nobelium 102	130.6 147.1 Lr Lawrencium 103									
12.65 15.71 Th Thorium 90	12.97 16.20 Pa Protactinium 91	13.29 16.70 U Uranium 92	13.61 17.22 Np Neptunium 93	13.95 17.74 Pu Plutonium 94	14.28 18.28 Am Americium 95	14.62 18.83 Cm Curium 96	14.96 19.39 Bk Berkelium 97	15.31 19.97 Cf Californium 98	15.66 20.56 Es Einsteinium 99	16.02 21.17 Fm Fermium 100	16.38 21.79 Md Mendelevium 101	16.74 22.55 No Nobelium 102	17.11 23.23 Lr Lawrencium 103										
89-103																							

Thermo Scientific™ Niton™ XRF Portable Analyzers

How XRF analysis works

- 1 X-rays are produced by the analyzer and pointed at a sample surface.
- 2 The energy causes inner-shell electrons to be ejected.
- 3 Outer-shell electrons fill the vacancies left by the ejected electrons and fluorescent x-rays are emitted.
- 4 The fluorescent x-rays enter the detector and send electronic pulses to the preamp.
- 5 The preamp amplifies the signals and sends them to the Digital Signal Processor (DSP).
- 6 The DSP collects and digitizes the x-ray events and sends the spectral data to the main CPU for processing.
- 7 The CPU analyzes the spectral data to produce detailed composition analysis.
The resulting data is compared against a preloaded, internal library to determine physical composition.
- 8 Composition data and other grade or value identification are displayed and stored in memory for later recall or download to an external PC.

For more detailed information on how XRF works, visit www.thermofisher.com/niton



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- Rapid identification of contaminants with analytical range from Mg through U
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