

# X-Supreme8000 – Supreme technology for high performance and flexibility in XRF analysis



## Benefits of analysis by XRF include:

- Minimal or no sample preparation
- Non-destructive analysis
- Na<sup>11</sup> to U<sup>92</sup> analysis, ppm to high % concentration range
- No wet chemistry – no acids, no reagents
- Analysis of solids, liquids, powders, films, granules etc.
- Rapid analysis – results available in minutes
- Qualitative, semi-quantitative, to full quantitative analysis
- For routine quality control analysis instrument can be 'used by anyone'

Relative X-ray intensities		Key		Energy to wavelength conversion	
K $\alpha$ = 100	K $\beta$ = 20	Symbol	<b>Ru</b> 44	Atomic number	Wavelength (Å) = $\frac{12.3983}{\text{Energy (keV)}}$
L $\alpha$ = 100	L $\beta$ = 70	Principal lines keV	101.07	Atomic weight	
L $\gamma$ = 10		Density $\rho$ g/cm <sup>3</sup>	Ruthenium		
			K $\alpha$ 19.2365		
			L $\alpha$ 2.5586		
			$\rho$ 12.20		

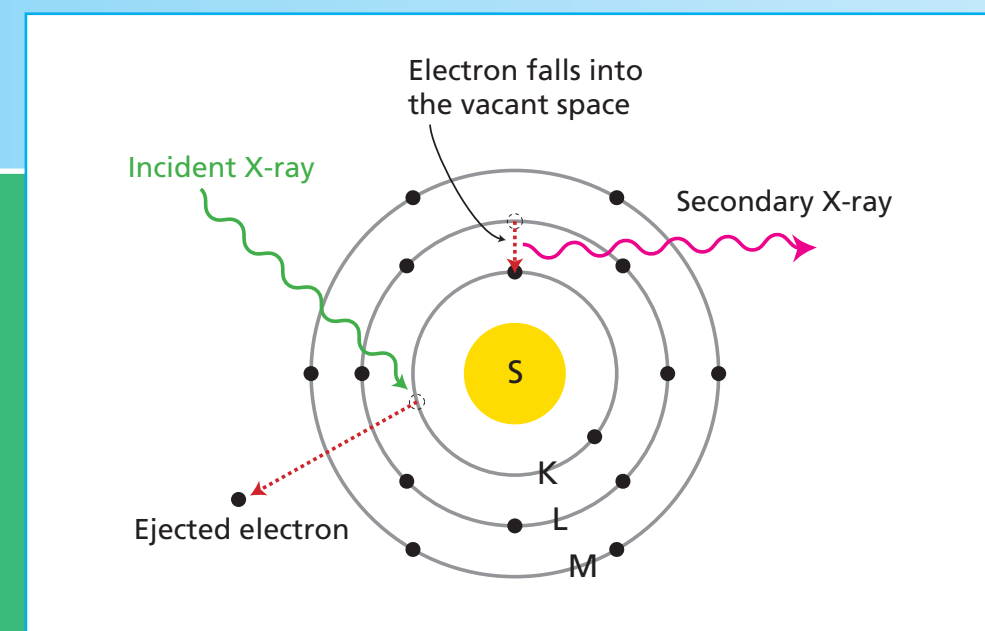
<b>H</b> 1 Hydrogen	<b>He</b> 2 Helium
<b>Li</b> 3 Lithium	<b>Be</b> 4 Beryllium
<b>B</b> 5 Boron	<b>C</b> 6 Carbon
<b>N</b> 7 Nitrogen	<b>O</b> 8 Oxygen
<b>F</b> 9 Fluorine	<b>Ne</b> 10 Neon
<b>Na</b> 11 Sodium	<b>Mg</b> 12 Magnesium
<b>Al</b> 13 Aluminum	<b>Si</b> 14 Silicon
<b>P</b> 15 Phosphorus	<b>S</b> 16 Sulfur
<b>Cl</b> 17 Chlorine	<b>Ar</b> 18 Argon
<b>K</b> 19 Potassium	<b>Ca</b> 20 Calcium
<b>Sc</b> 21 Scandium	<b>Ti</b> 22 Titanium
<b>V</b> 23 Vanadium	<b>Cr</b> 24 Chromium
<b>Mn</b> 25 Manganese	<b>Fe</b> 26 Iron
<b>Co</b> 27 Cobalt	<b>Ni</b> 28 Nickel
<b>Cu</b> 29 Copper	<b>Zn</b> 30 Zinc
<b>Ga</b> 31 Gallium	<b>Ge</b> 32 Germanium
<b>As</b> 33 Arsenic	<b>Se</b> 34 Selenium
<b>Br</b> 35 Bromine	<b>Kr</b> 36 Krypton
<b>Rb</b> 37 Rubidium	<b>Sr</b> 38 Strontium
<b>Y</b> 39 Yttrium	<b>Zr</b> 40 Zirconium
<b>Nb</b> 41 Niobium	<b>Mo</b> 42 Molybdenum
<b>Tc</b> 43 Technetium	<b>Ru</b> 44 Ruthenium
<b>Rh</b> 45 Rhodium	<b>Pd</b> 46 Palladium
<b>Ag</b> 47 Silver	<b>Cd</b> 48 Cadmium
<b>In</b> 49 Indium	<b>Sn</b> 50 Tin
<b>Sb</b> 51 Antimony	<b>Te</b> 52 Tellurium
<b>I</b> 53 Iodine	<b>Xe</b> 54 Xenon
<b>Cs</b> 55 Caesium	<b>Ba</b> 56 Barium
<b>La</b> 57 Lanthanum	<b>Hf</b> 72 Hafnium
<b>Ta</b> 73 Tantalum	<b>W</b> 74 Tungsten
<b>Re</b> 75 Rhenium	<b>Os</b> 76 Osmium
<b>Ir</b> 77 Iridium	<b>Pt</b> 78 Platinum
<b>Au</b> 79 Gold	<b>Hg</b> 80 Mercury
<b>Tl</b> 81 Thallium	<b>Pb</b> 82 Lead
<b>Bi</b> 83 Bismuth	<b>Po</b> 84 Polonium
<b>At</b> 85 Astatine	<b>Rn</b> 86 Radon
<b>Fr</b> 87 Francium	<b>Ra</b> 88 Radium
<b>Ac</b> 89 Actinium	<b>Ce</b> 58 Cerium
<b>Pr</b> 59 Praseodymium	<b>Nd</b> 60 Neodymium
<b>Pm</b> 61 Promethium	<b>Sm</b> 62 Samarium
<b>Eu</b> 63 Europium	<b>Gd</b> 64 Gadolinium
<b>Tb</b> 65 Terbium	<b>Dy</b> 66 Dysprosium
<b>Ho</b> 67 Holmium	<b>Er</b> 68 Erbium
<b>Tm</b> 69 Thulium	<b>Yb</b> 70 Ytterbium
<b>Lu</b> 71 Lutetium	<b>Th</b> 90 Thorium
<b>Pa</b> 91 Protactinium	<b>U</b> 92 Uranium
<b>Np</b> 93 Neptunium	<b>Pu</b> 94 Plutonium
<b>Am</b> 95 Americium	<b>Cm</b> 96 Curium
<b>Bk</b> 97 Berkelium	<b>Cf</b> 98 Californium
<b>Es</b> 99 Einsteinium	<b>Fm</b> 100 Fermium
<b>Md</b> 101 Mendelevium	<b>No</b> 102 Nobelium
<b>Lr</b> 103 Lawrencium	



Portable XRF;  
X-MET series



Coating thickness;  
X-Strata



### X-ray fluorescence

X-rays form part of the electromagnetic spectrum and are expressed in terms of their energy (kilo electron volts – keV) or wavelength (nanometers – nm).

X-ray fluorescence is a consequence of changes that take place within an atom. A stable atom comprises a nucleus and the electrons orbiting it. Orbiting electrons are organised into shells: each shell is made up of electrons with the same energy. When a high energy incident

(primary) X-ray collides with an atom it disturbs this stability. An electron is ejected from a low energy level (eg K shell: see diagram) and a space is created. As a result an electron from a higher energy level (eg L shell) falls into this space.

The difference in energy produced as the electron moves between these levels is released as secondary X-rays which are characteristic of the element. This process is called X-ray fluorescence.

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