

**Australian
Microbeam
Analysis
Society**

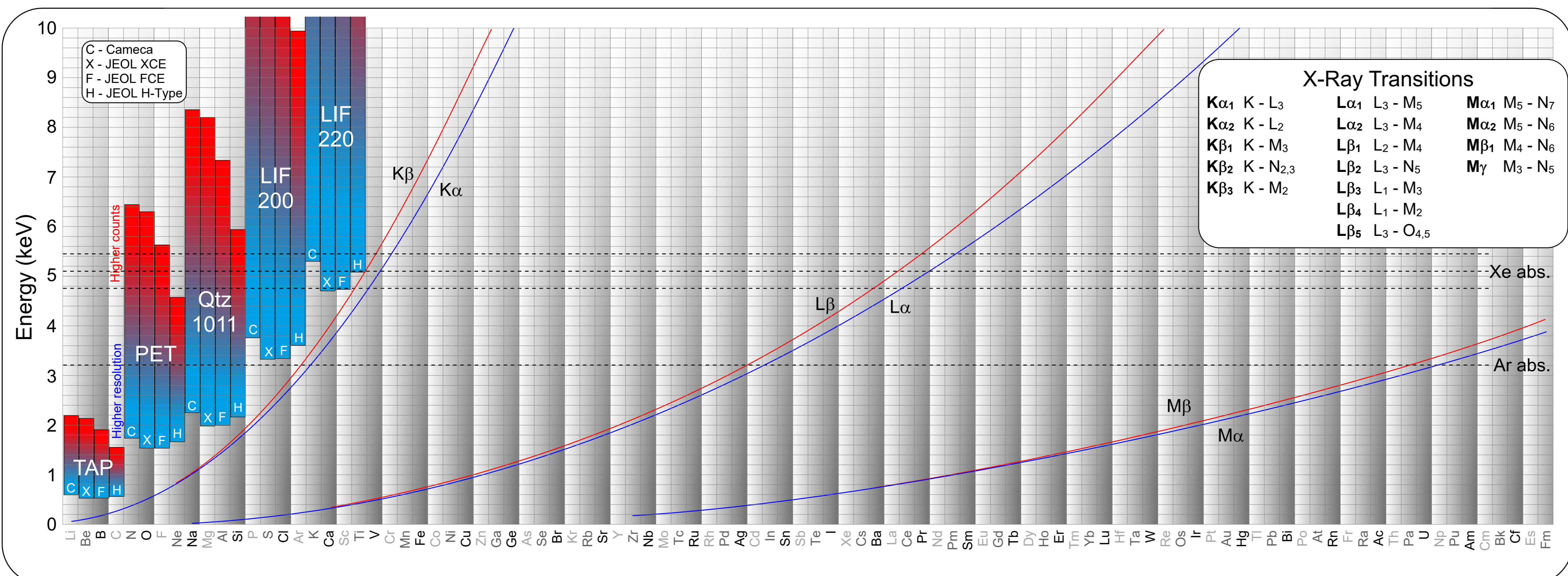


<https://microscopy.org.au/amas>

www.microbeamanalysis.eu

<https://the-mas.org>

1 1.00794 Hydrogen H	3 6.941 Lithium Li	4 9.012182 Beryllium Be
11 22.989769 Sodium Na	12 24.3050 Magnesium Mg	



WD Spectrometer Equations		JEOL	
$E = 12.396 / \lambda$	WD Spectrometer Units	$E = X\text{-ray energy in KeV}$	Crystal
$\lambda = 12.396 / E$	JEOL units = $24.792 \times R / (2d \times E)$	$R = WDS \text{ Rowland circle in mm}$	$2d \text{ (Å)}$
	Cameca units = $\sin(\theta) \times 100,000$	$d = \text{Diffracting crystal lattice spacing in Å}$	Be B C N O F Ne Na
		$\lambda = X\text{-ray wavelength in Å}$	

5 10.811 Boron B	6 12.01115 Carbon C	7 14.0067 Nitrogen N	8 15.9994 Oxygen O	9 18.9984032 Fluorine F	10 20.1797 Neon Ne
13 26.9815386 Aluminium Al	14 28.0855 Silicon Si	15 30.973762 Phosphorus P	16 32.065 Sulphur S	17 35.453 Chlorine Cl	18 39.948 Argon Ar

19 39.0983 Potassium K	20 40.078 Calcium Ca	21 44.955912 Scandium Sc	22 47.867 Titanium Ti	23 50.9415 Vanadium V	24 51.9961 Chromium Cr	25 54.938045 Manganese Mn	26 55.845 Iron Fe	27 58.933195 Cobalt Co	28 58.6934 Nickel Ni	29 63.546 Copper Cu	30 65.38 Zinc Zn	31 69.723 Gallium Ga	32 72.64 Germanium Ge	33 74.92160 Arsenic As	34 78.96 Selenium Se	35 79.904 Bromine Br	36 83.798 Krypton Kr
37 85.4678 Rubidium Rb	38 87.62 Strontium Sr	39 88.90585 Yttrium Y	40 91.224 Zirconium Zr	41 92.90638 Niobium Nb	42 95.96 Molybdenum Mo	43 97.9072 Technetium Tc	44 101.07 Ruthenium Ru	45 102.90550 Rhodium Rh	46 106.42 Palladium Pd	47 107.8682 Silver Ag	48 112.411 Cadmium Cd	49 114.818 Indium In	50 118.710 Tin Sn	51 121.760 Antimony Sb	52 127.60 Tellurium Te	53 126.90447 Iodine I	54 131.293 Xenon Xe
55 132.905452 Caesium Cs	56 137.327 Barium Ba	72 178.49 Hafnium Hf	73 180.94788 Tantalum Ta	74 183.84 Tungsten W	75 186.207 Rhenium Re	76 190.23 Osmium Os	77 192.217 Iridium Ir	78 195.084 Platinum Pt	79 196.966569 Gold Au	80 200.59 Mercury Hg	81 204.3833 Thallium Tl	82 207.2 Lead Pb	83 208.98040 Bismuth Bi	84 208.9824 Polonium Po	85 209.9871 Astatine At	86 222.0176 Radon Rn	

87 223.0197 Francium Fr	88 226.0254 Radium Ra
---	---------------------------------------

57 138.90547 Lanthanum La	58 140.116 Cerium Ce	59 140.90765 Praseodymium Pr	60 144.242 Neodymium Nd	61 144.9127 Promethium Pm	62 150.36 Samarium Sm	63 151.964 Europium Eu	64 157.25 Gadolinium Gd	65 158.92535 Terbium Tb	66 162.500 Dysprosium Dy	67 164.93032 Holmium Ho	68 167.259 Erbium Er	69 168.93421 Thulium Tm	70 173.054 Ytterbium Yb	71 174.9668 Lutetium Lu
89 227.0278 Actinium Ac	90 232.03806 Thorium Th	91 231.03588 Protactinium Pa	92 238.02891 Uranium U	93 237.0482 Neptunium Np	94 244.0642 Plutonium Pu	95 243.0614 Americium Am	96 247.0704 Curium Cm	97 247.0703 Berkelium Bk	98 251.0796 Californium Cf	99 252.0830 Einsteinium Es	100 257.0951 Fermium Fm	101 258.0984 Mendelevium Md	102 259.1010 Nobelium No	103 262.1096 Lawrencium Lr

Key

Z [5] At. mass
Element
El

Xtal - Crystal structure :-
 bcc - Body centred cubic
 fcc - Face centred cubic
 hcp - Hexagonal close packed
 rhomb - Rhombohedral
 tetrag - Tetragonal

Electron shell occupancy

val - Valencies, common valency in bold
 m - Melting point (°C)
 b - Boiling Point (°C)
 d - Density (g·cm⁻³)
 r - Ionic radius in common valence state (nm)

Notes:-
 [1] - Crystal structure for element at room temperature and pressure for solids or at melting point for gases and liquids.
 [2] - Density at room temperature and pressure for solid or liquid elements, or at boiling point of liquid state for gaseous elements.
 [3] - Shannon ionic radius for common valence state and co-ordination number 6 (R. D. Shannon, *Acta Cryst.* (1976) A32, 751-767; Electronic Table of Shannon Ionic Radii, J. David Van Horn, 2001, downloaded 5th-July-2008).
 [4] - Values in brackets are interpolated and are denoted in the graph above by dotted lines.