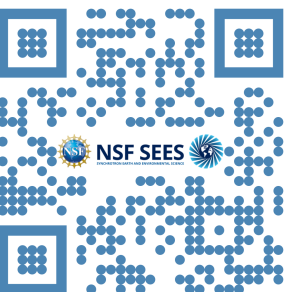


X-ray Absorption and Emission Energies of the Elements

H hydrogen 1 1.0078 +1	He helium 2 4.0026
Li lithium 3 6.94 +1	Be beryllium 4 9.0122 +2
Na sodium 11 22.9898 +1	Mg magnesium 12 24.305 +2
K potassium 19 39.0983 +1	Ca calcium 20 40.078 +2
Rb rubidium 37 85.4678 +1	Sr strontium 38 87.62 +2
Cs cesium 55 132.905 +1	Ba barium 56 137.327 +2
Fr francium 87 223.0 +1	Ra radium 88 226.0 +2



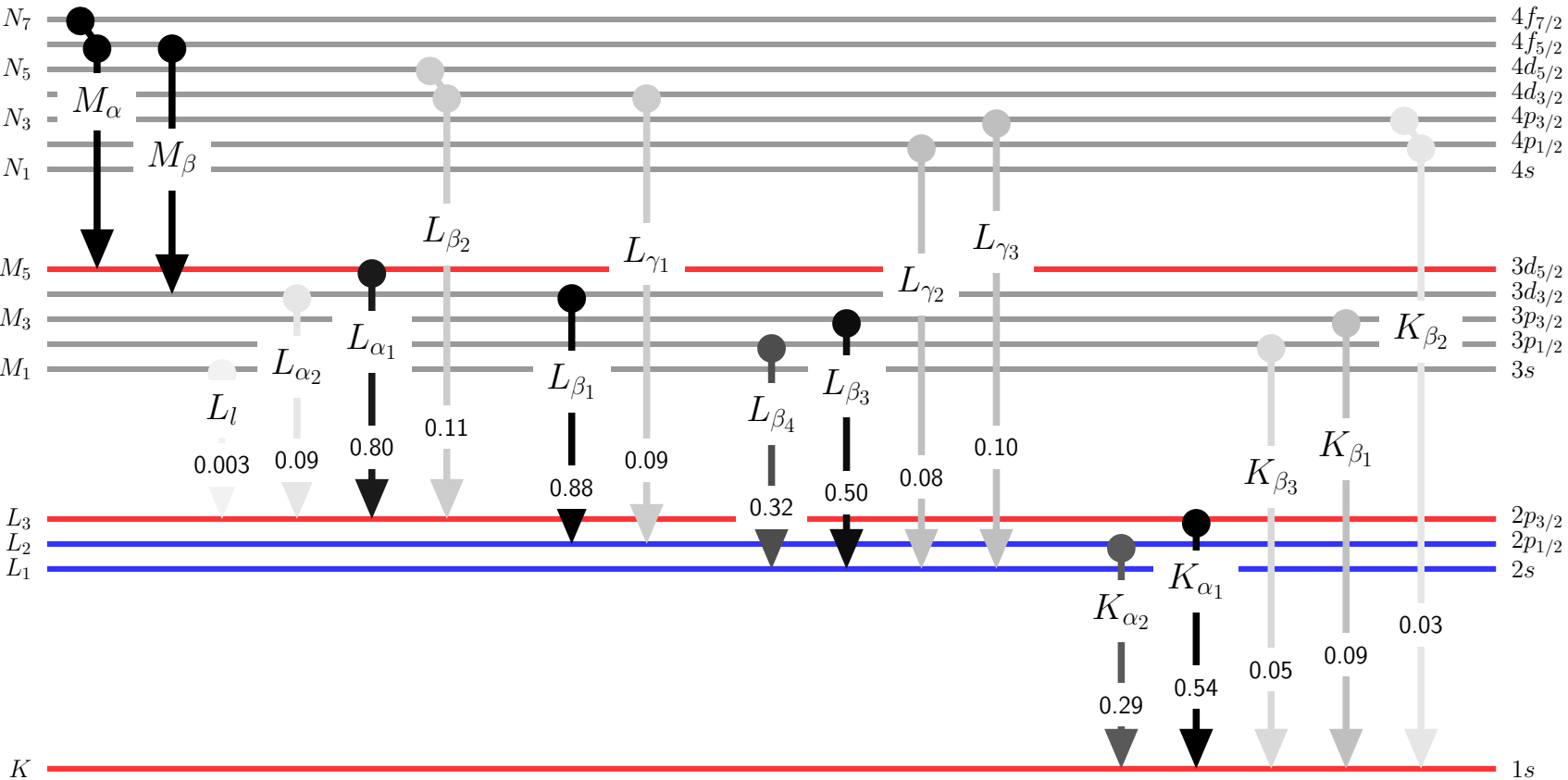
https://seescience.org

Version 6, 2025-September-22
https://xraydb.seescience.org

Atomic Data and Energies from
W. T. Elam, B. D. Ravel and J. R. Sieber,
Radiation Physics and Chemistry **63**, pp 121-128 (2002)

Common oxidation states from wikipedia.org, after
N. N. Greenwood and A. Earnshaw,
Chemistry of the Elements, 2nd ed. (1997).

All energies in eV.
Emission line strengths are approximate, and vary with element.



B boron 5 10.81 +3	C carbon 6 12.011 -4, -3, ..., +2, +3, +4	N nitrogen 7 14.007 -3, +3, +5	O oxygen 8 15.999 -2	F fluorine 9 18.9984 -1	Ne neon 10 20.1797
Al aluminum 13 26.9815 +3	Si silicon 14 28.085 -4, +4	P phosphorus 15 30.9738 -3, +3, +5	S sulfur 16 32.06 -2, +2, +4, +6	Cl chlorine 17 35.453 -1, +1, +3, +5, +7	Ar argon 18 39.948
Ga gallium 31 69.72 +3	Ge germanium 32 72.63 -4, +2, +4	As arsenic 33 74.9216 -3, +3, +5	Se selenium 34 78.971 -2, +2, +4, +6	Br bromine 35 79.904 -1, +1, +3, +5	Kr krypton 36 83.798
In indium 49 114.818 +3	Sn tin 50 118.71 -4, +2, +4	Sb antimony 51 121.76 -3, +3, +5	Te tellurium 52 127.6 -2, +2, +4, +6	I iodine 53 126.905 -1, +1, +3, +5, +7	Xe xenon 54 131.293
Tl thallium 81 204.383 +1, +3	Pb lead 82 207.2 +2, +4	Bi bismuth 83 208.98 +3, +5	Po polonium 84 209.0 -2, +2, +4	At astatine 85 210.0 -1, +1	Rn radon 86 222.0

Ce cerium 58 140.116 +3, +4	Pr praseodymium 59 140.908 +3, +4	Nd neodymium 60 144.242 +3	Pm promethium 61 145.0 +3	Sm samarium 62 150.36 +3, +4	Eu europium 63 151.96 +2, +3	Gd gadolinium 64 157.25 +3	Tb terbium 65 158.925 +3, +4	Dy dysprosium 66 162.5 +3	Ho holmium 67 164.93 +3	Er erbium 68 167.259 +3	Tm thulium 69 168.934 +3	Yb ytterbium 70 173.045 +3	Lu lutetium 71 174.967 +3
Th thorium 90 232.038 +4	Pa protactinium 91 231.036 +5	U uranium 92 238.029 +4, +6	Np neptunium 93 237.048 +3, +4, +5	Pu plutonium 94 239.052 +3, +4, +5	Am americium 95 243.0 +3, +4, +5	Cm curium 96 247.0 +3	Bk berkelium 97 247.0 +3, +4	Cf californium 98 251.0 +3	Es einsteinium 99	Fm fermium 100	Md mendelevium 101	No nobelium 102	Lr lawrencium 103