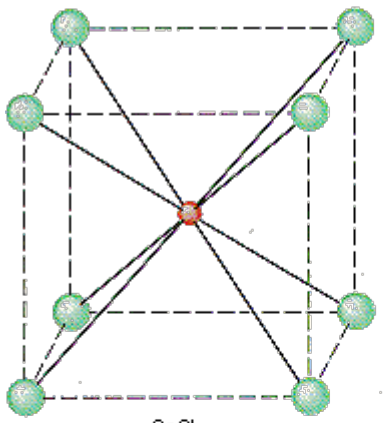
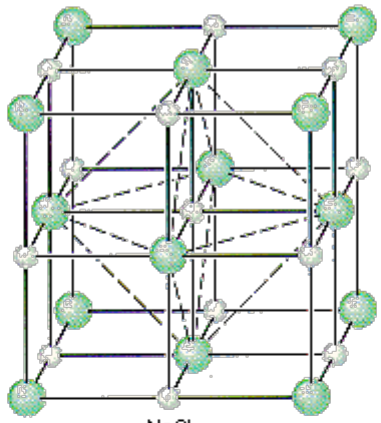
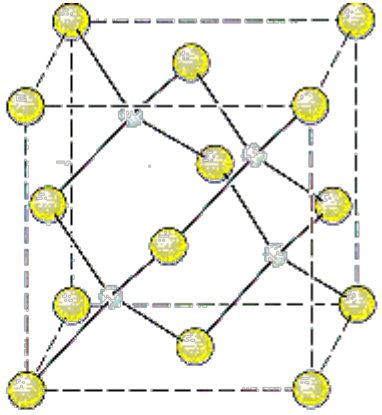
Crystal Structures



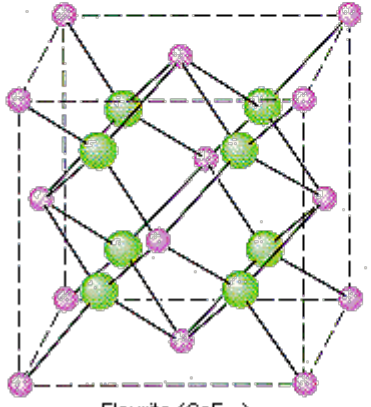
CsCl



NaCl

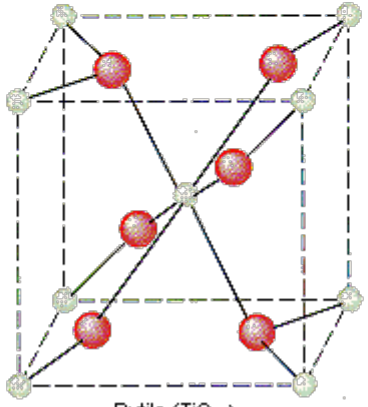


Zinc blende (cubic ZnS)



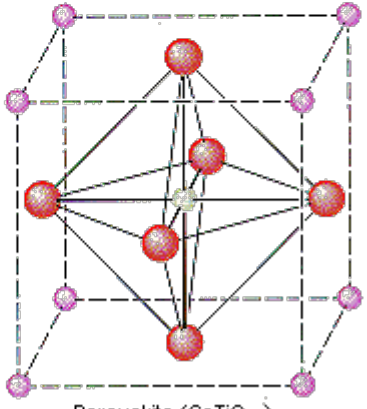
Flourite (CaF_2)

= Ca^{2+}



Rutile (TiO_2)

= Ti^{iv}

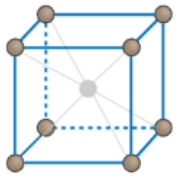


Perovskite ($CaTiO_3$)

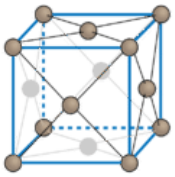
= Ti^{iv} = Ca^{2+} = O^{2-}

Crystal Structures

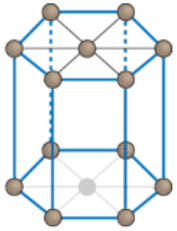
Simple Metals



Cubic body centered (bcc)
Fe, V, Nb, Cr

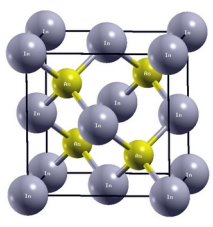


Cubic face centered (fcc)
Al, Ni, Ag, Cu, Au

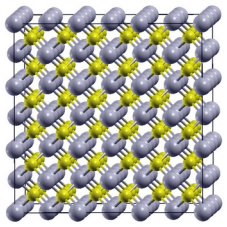


Hexagonal
Ti, Zn, Mg, Cd

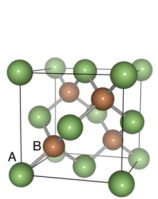
Dielectrics

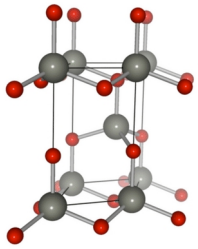


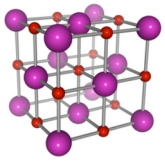
(a)



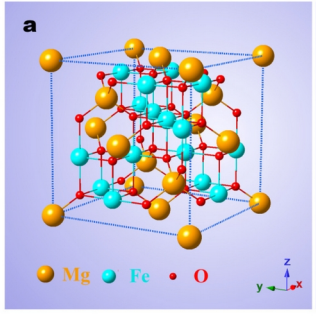
(b)

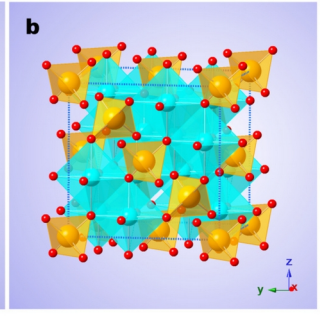


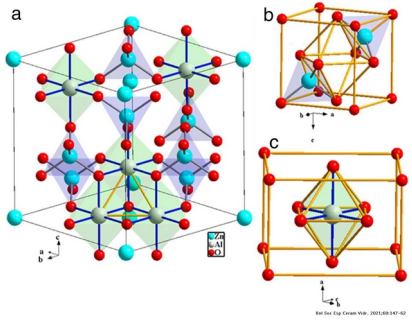




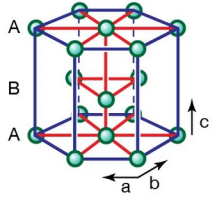
Transition Metal Compounds



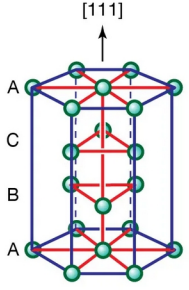




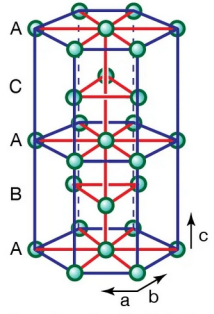
rare-earth metals



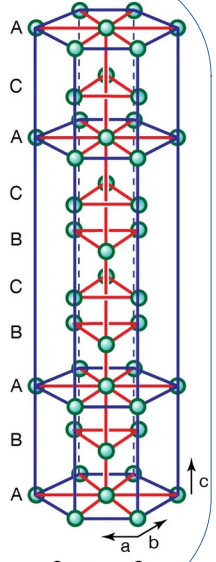
hcp: Sc, Y, Sm, Gd, Tb, Dy, Ho, Er. Tm, Yb, Lu



fcc: La, Ce, Yb

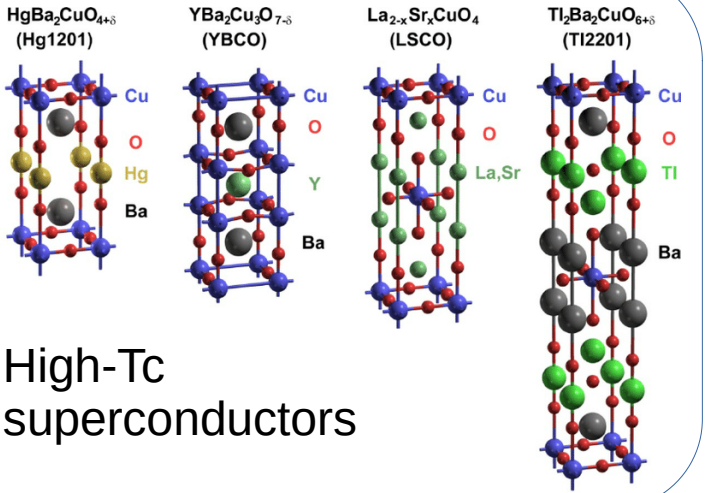


dhcp: La, Ce, Pr, Nd, Pm



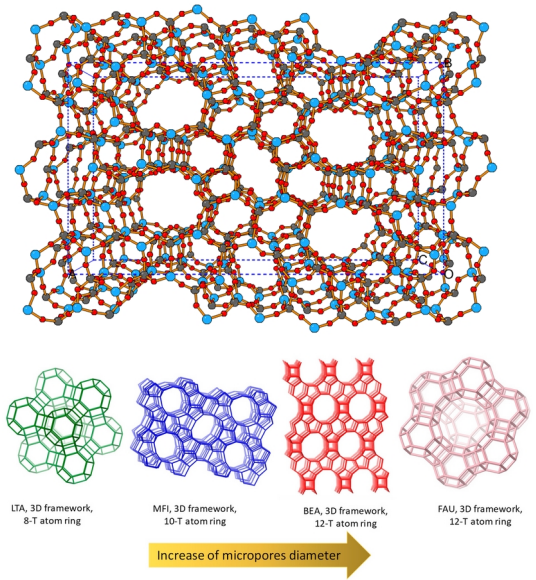
Sm-type: Sm

Crystal Structures

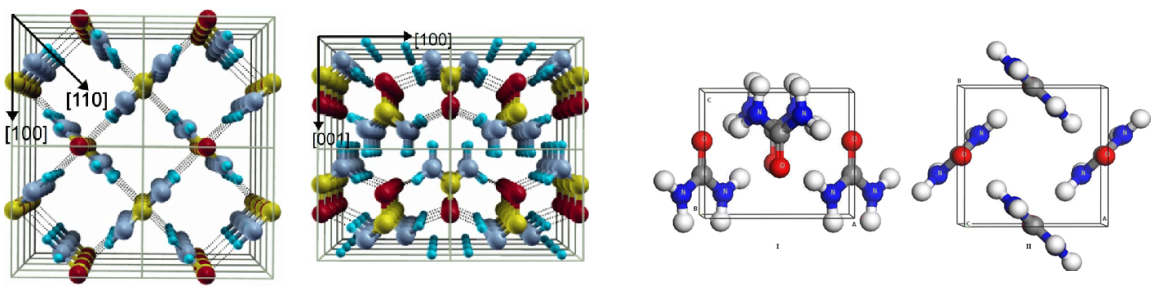


High-Tc superconductors

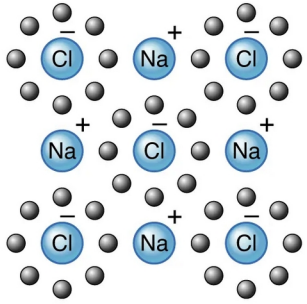
Zeolites



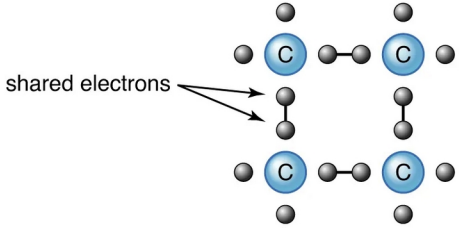
organic crystals: urea crystal



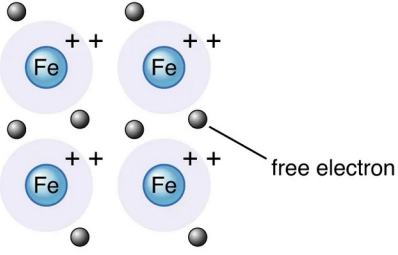
Chemical Bonds



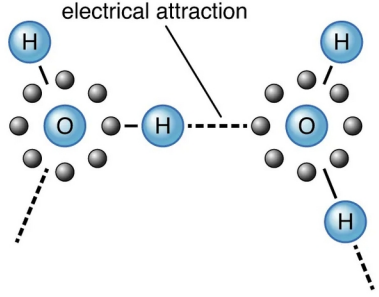
ionic bonding
electron transferred from Na to Cl



covalent bonding
atoms share electrons



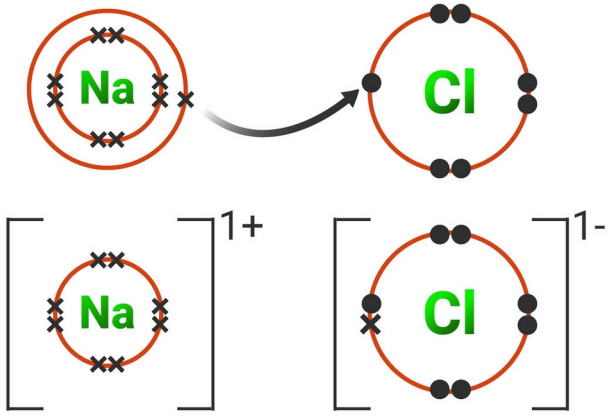
metallic bonding
ions surrounded by free electrons

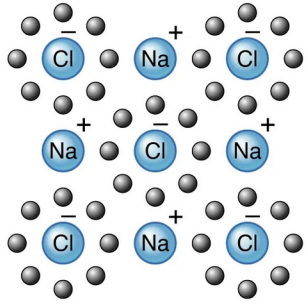


molecular bonding
weak electrical attraction binds molecules

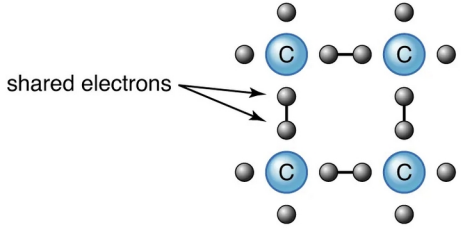
Chemical Bonds

$Na \equiv [Ne]3s$ $Cl \equiv [Ne]3s^2 5p^5$

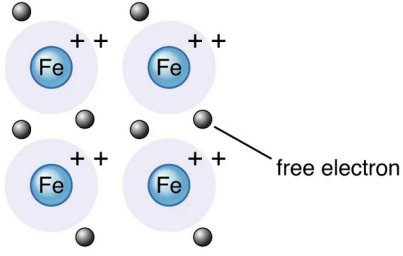




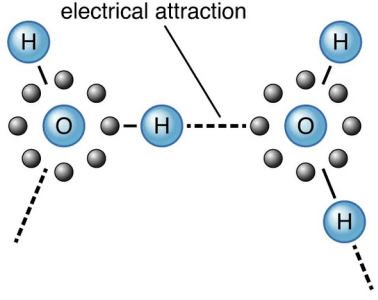
ionic bonding
electron transferred from Na to Cl



covalent bonding
atoms share electrons



metallic bonding
ions surrounded by free electrons

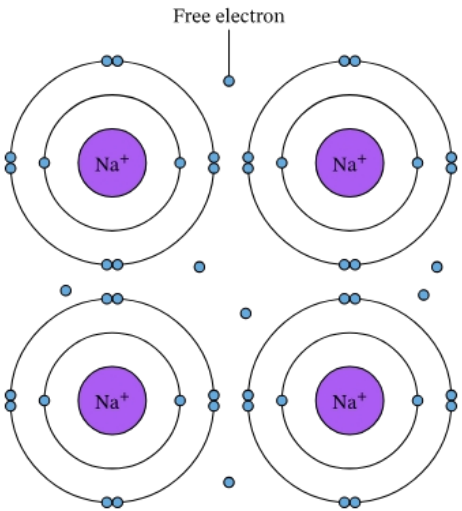


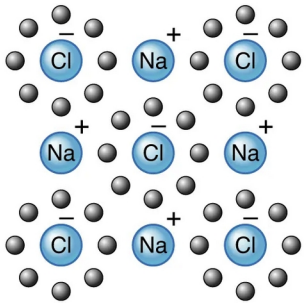
molecular bonding
weak electrical attraction binds molecules

Chemical Bonds

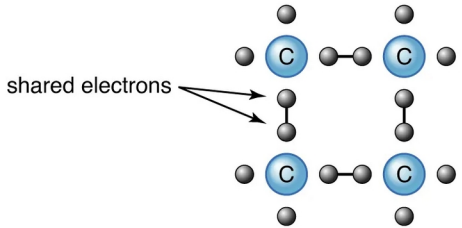
$$Na \equiv [Ne]3s$$

Metallic bonding

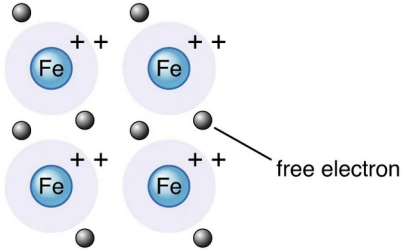




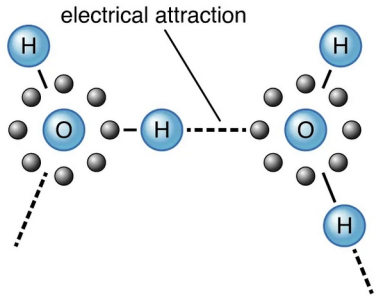
ionic bonding
electron transferred from Na to Cl



covalent bonding
atoms share electrons

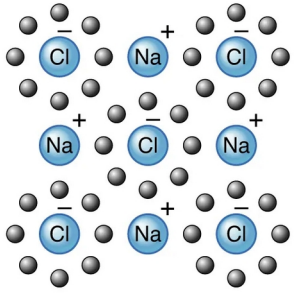


metallic bonding
ions surrounded by free electrons

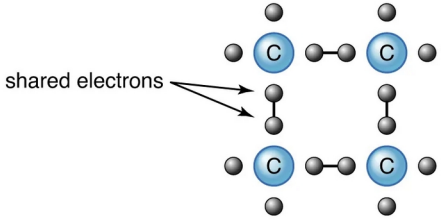


molecular bonding
weak electrical attraction binds molecules

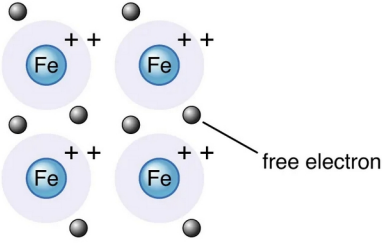
Chemical Bonds



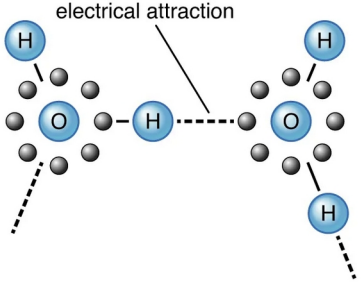
ionic bonding
electron transferred from Na to Cl



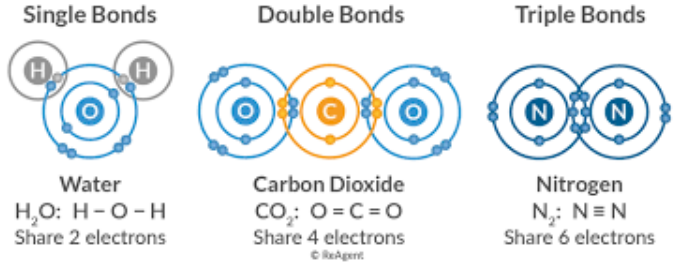
covalent bonding
atoms share electrons

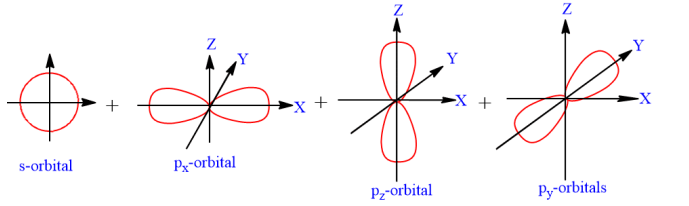


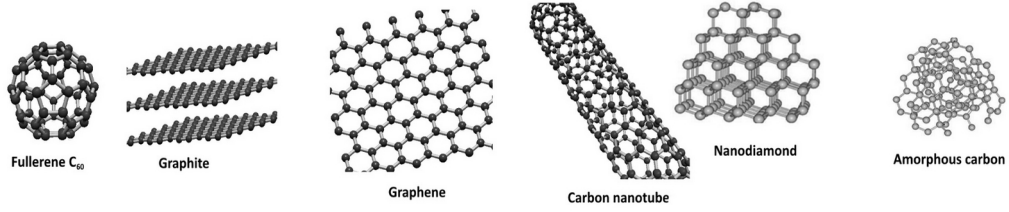
metallic bonding
ions surrounded by free electrons



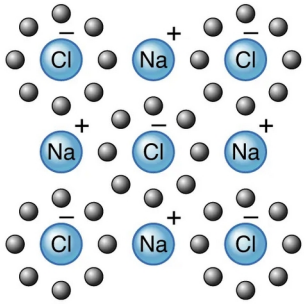
molecular bonding
weak electrical attraction binds molecules



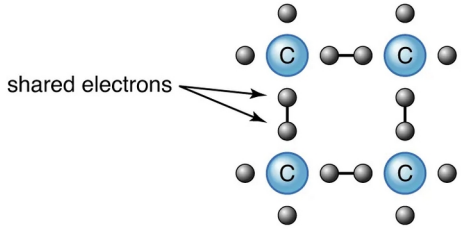




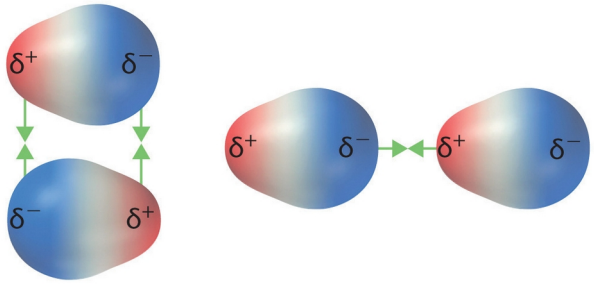
Chemical Bonds

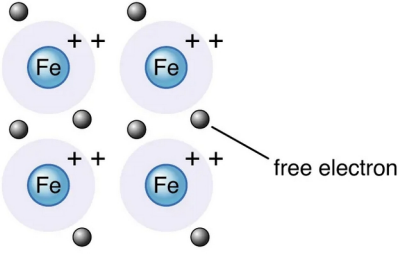


ionic bonding
electron transferred from Na to Cl

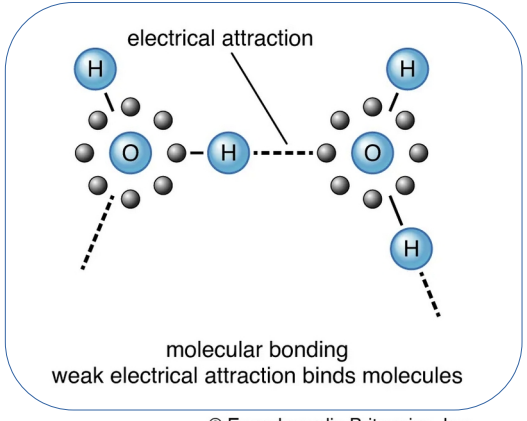


covalent bonding
atoms share electrons

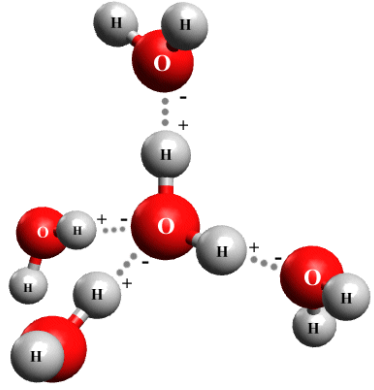




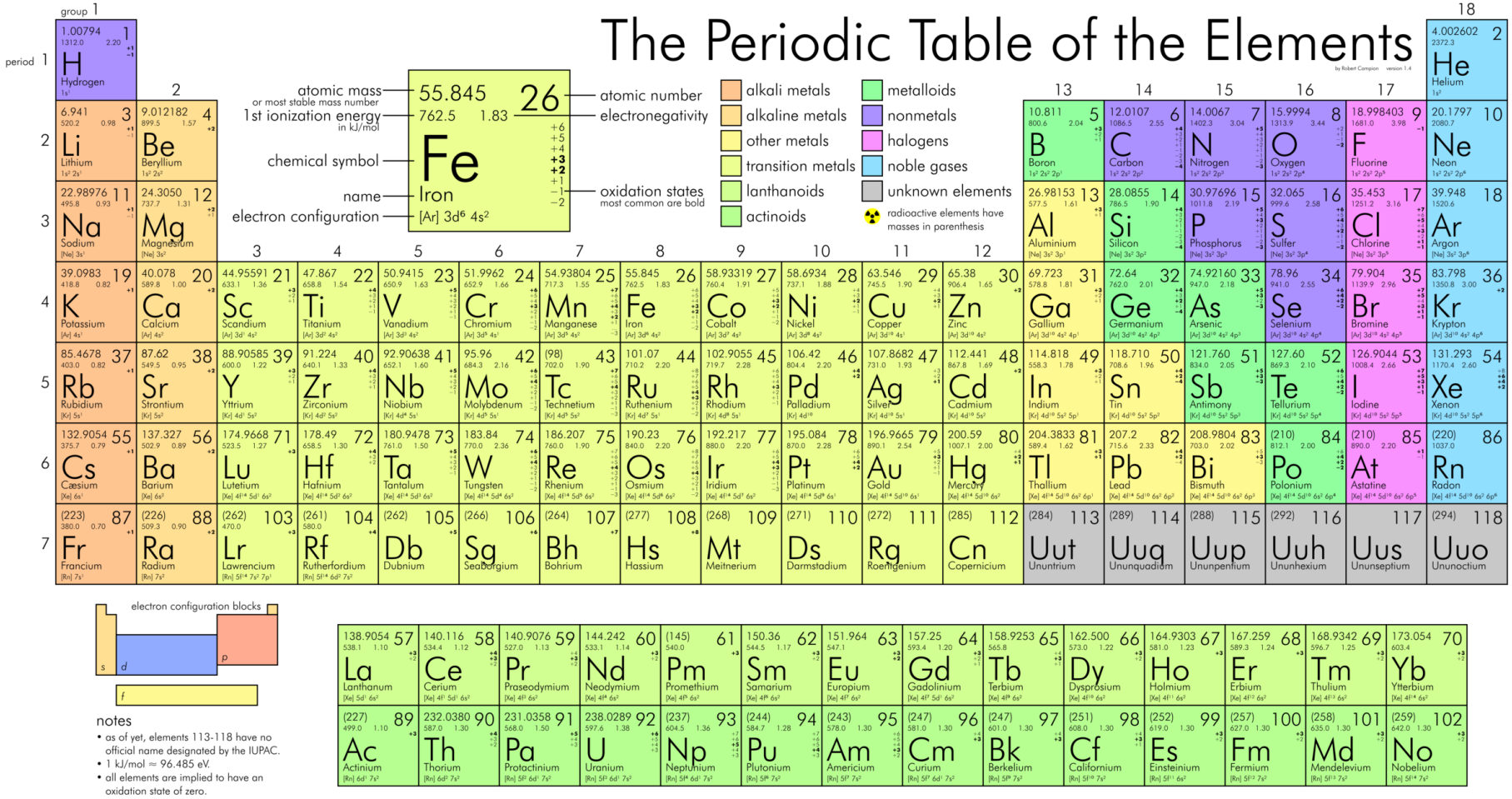
metallic bonding
ions surrounded by free electrons



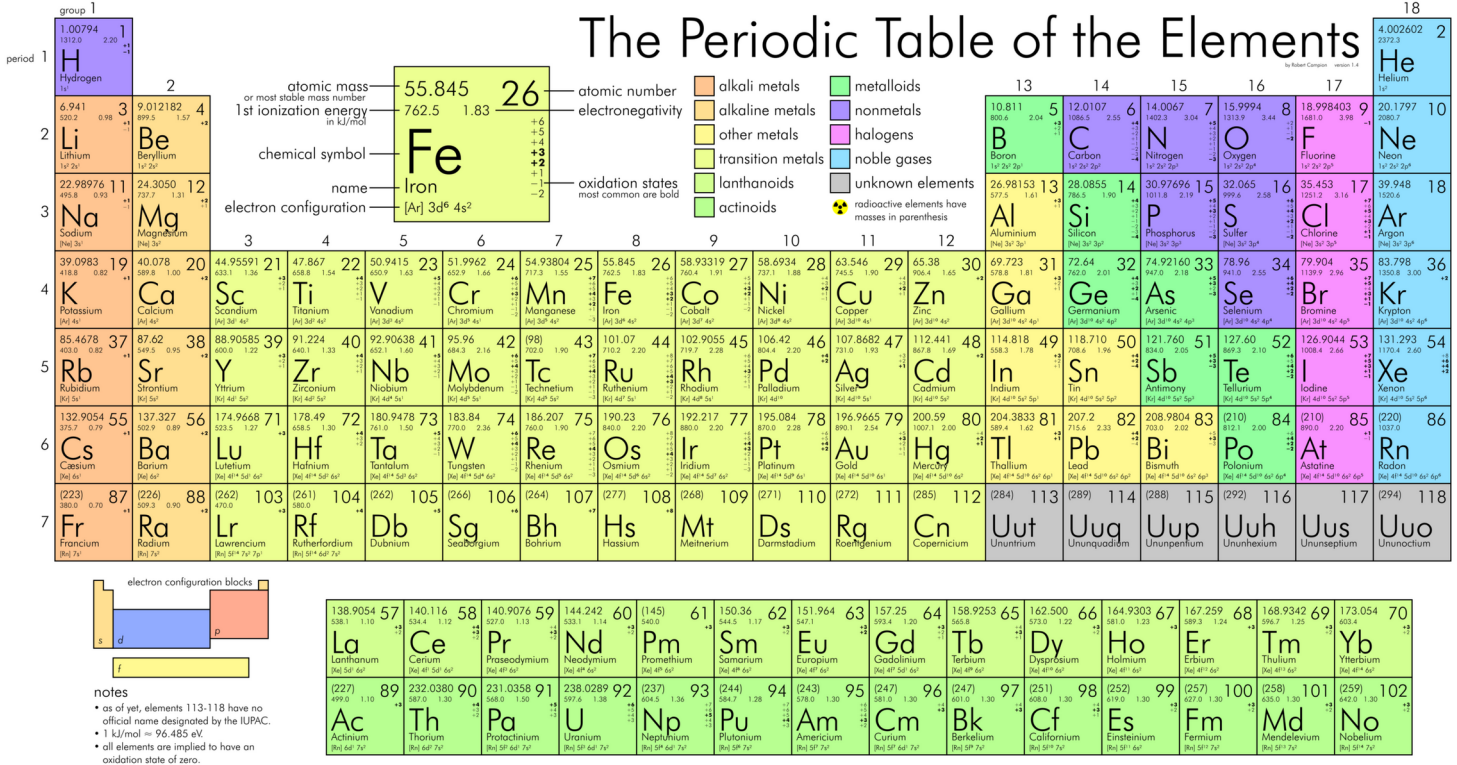
molecular bonding
weak electrical attraction binds molecules

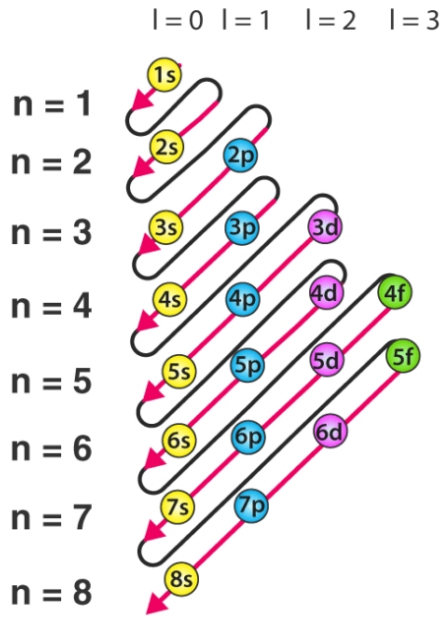


Periodic Table

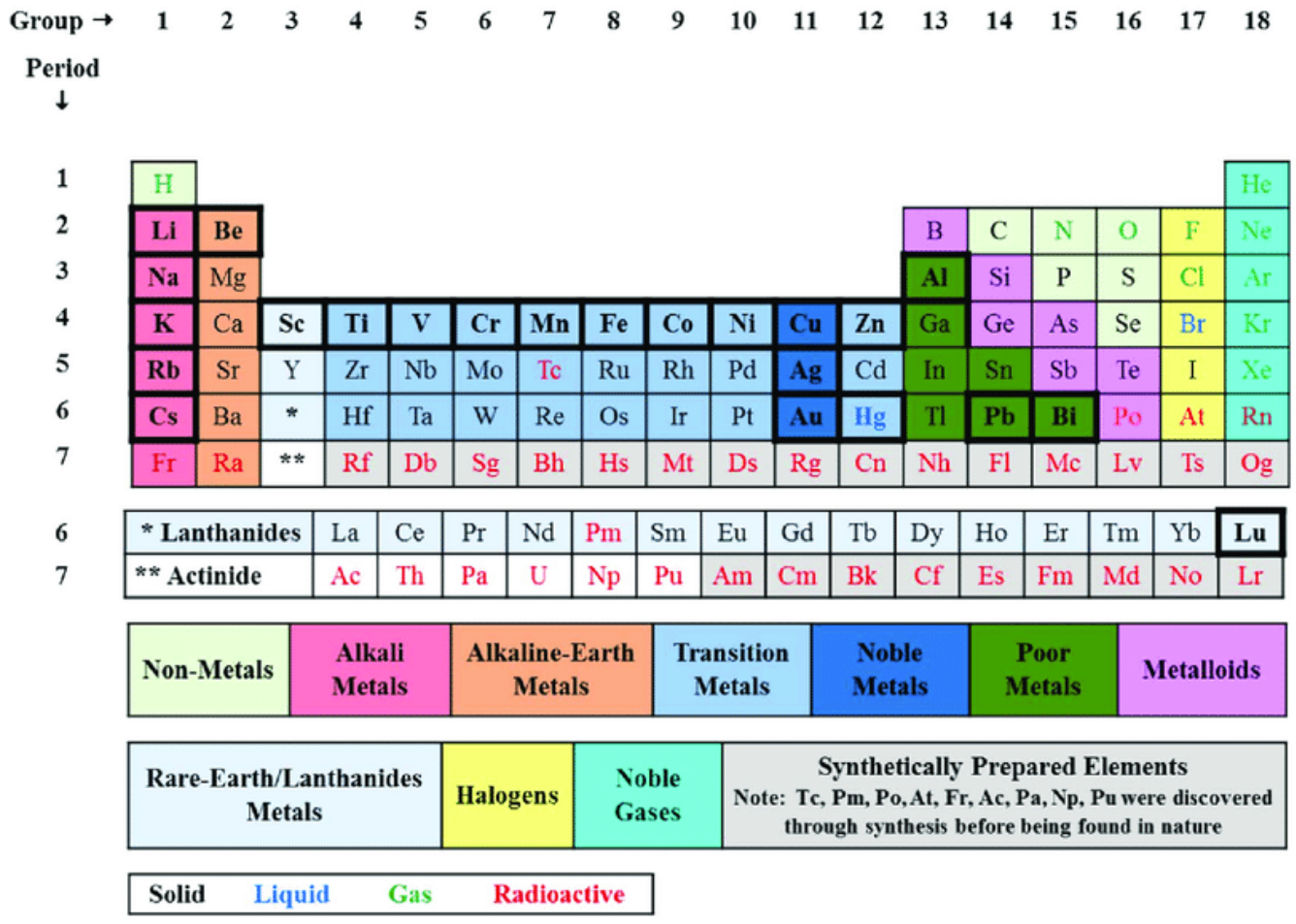


Periodic Table

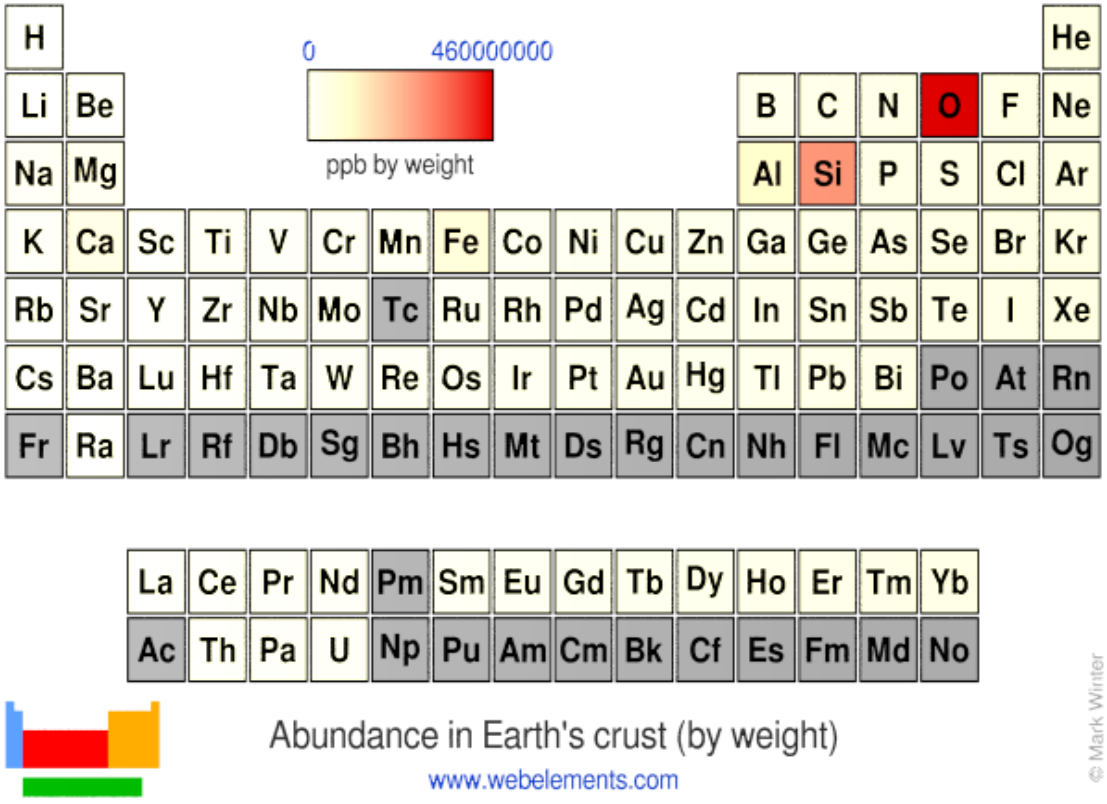




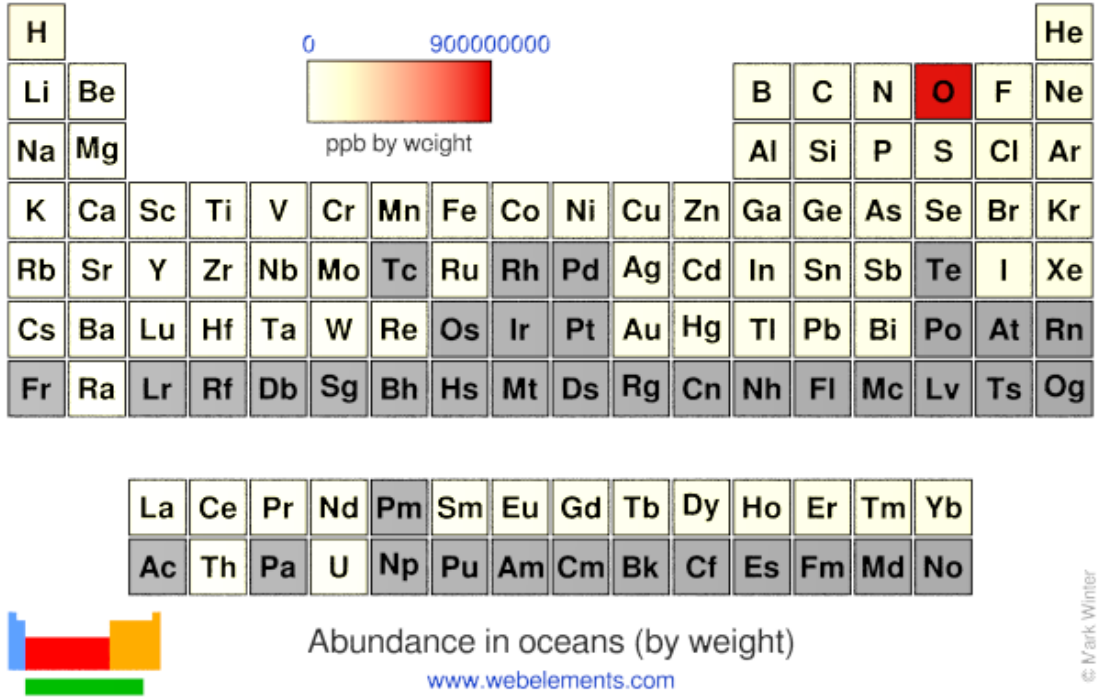
Periodic Table



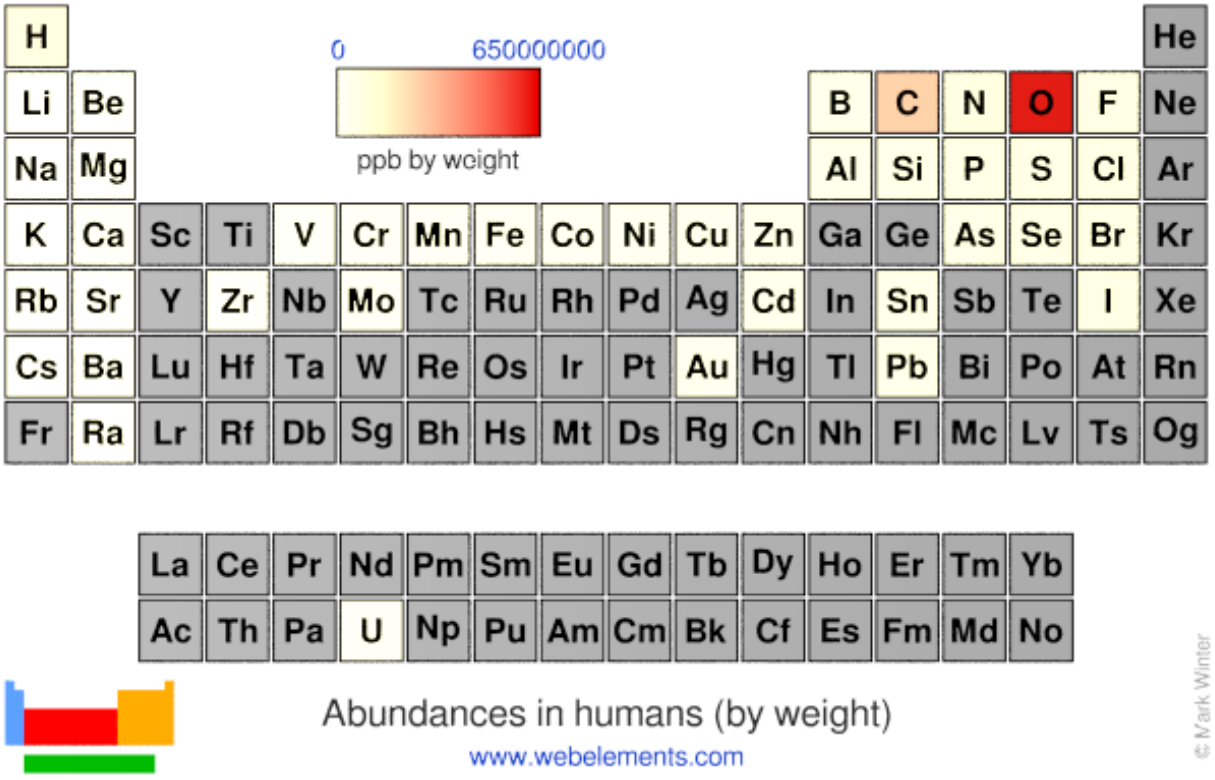
Periodic Quiz



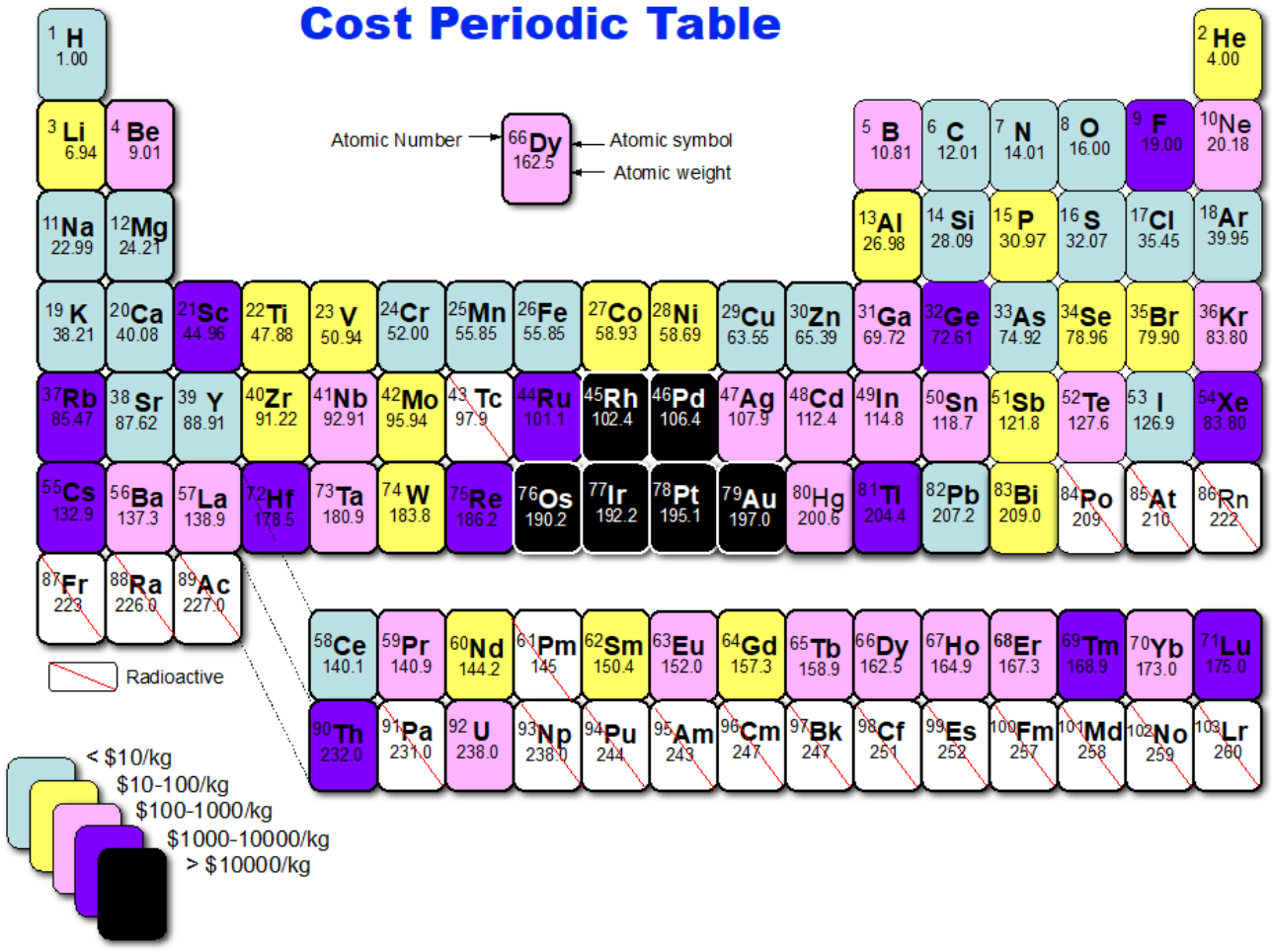
Periodic Quiz



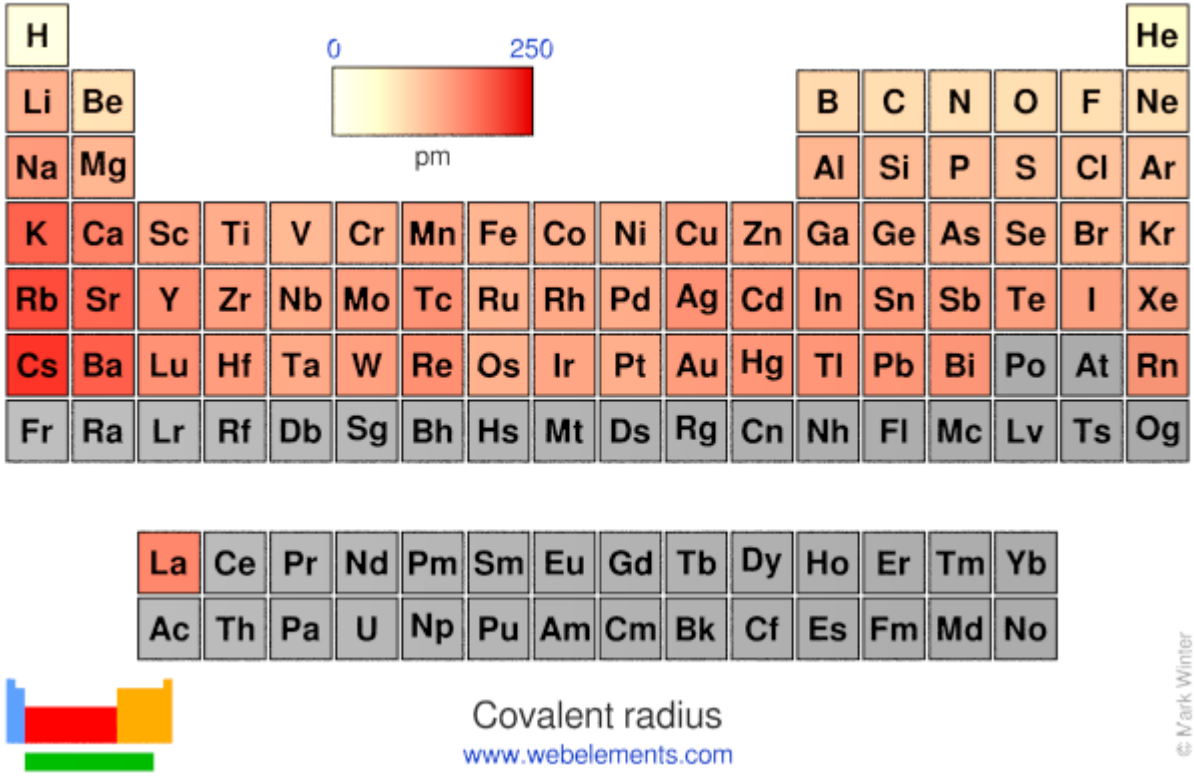
Periodic Quiz



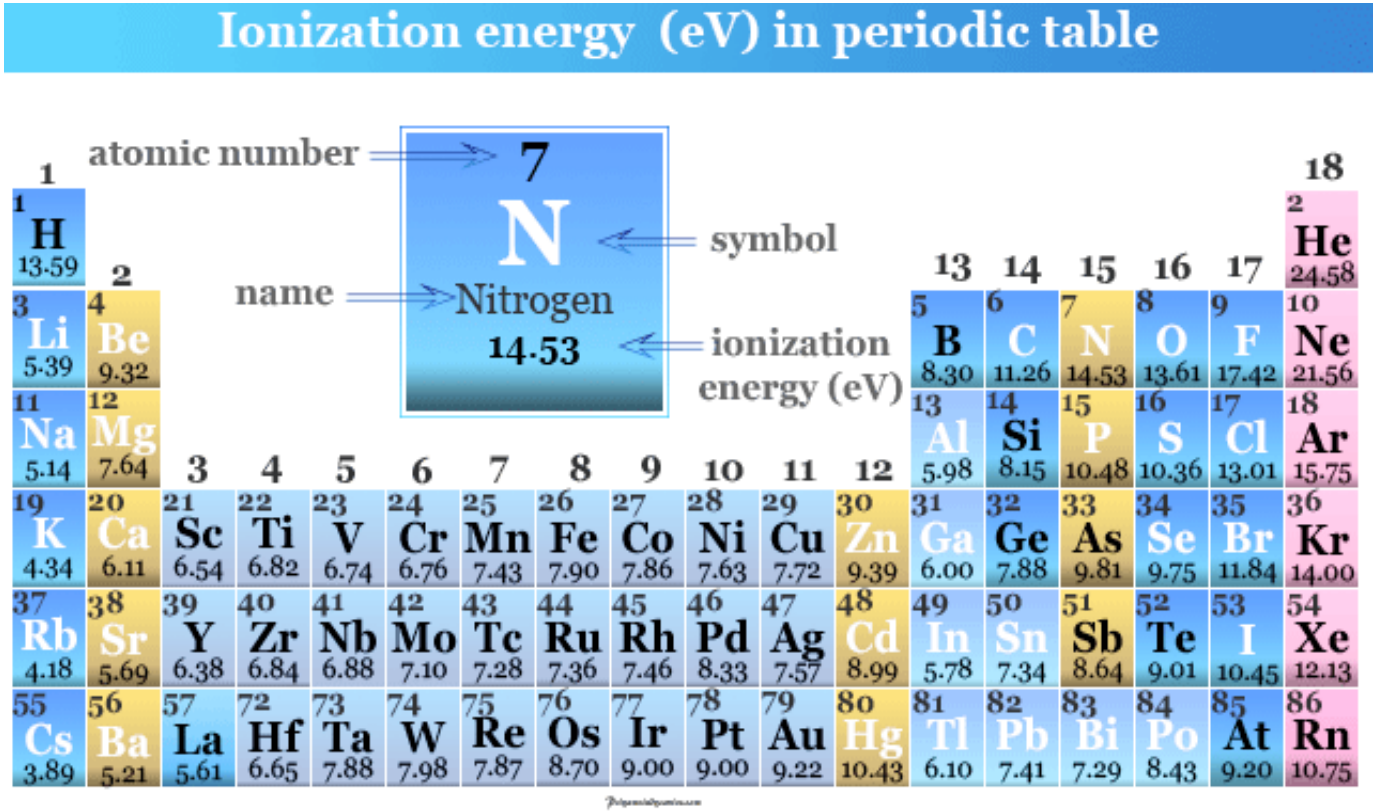
Periodic Quiz

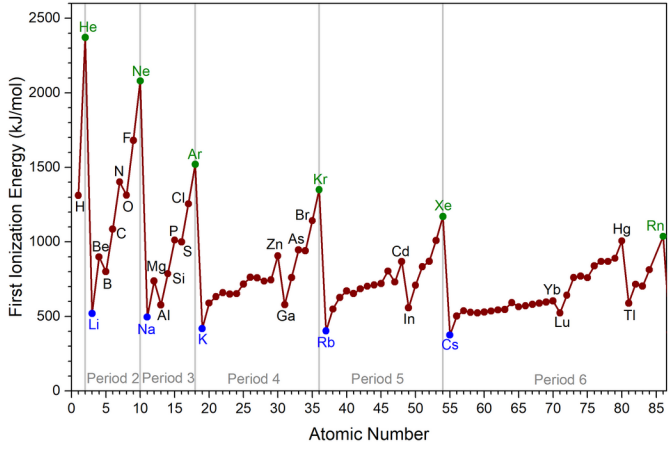


Periodic Quiz

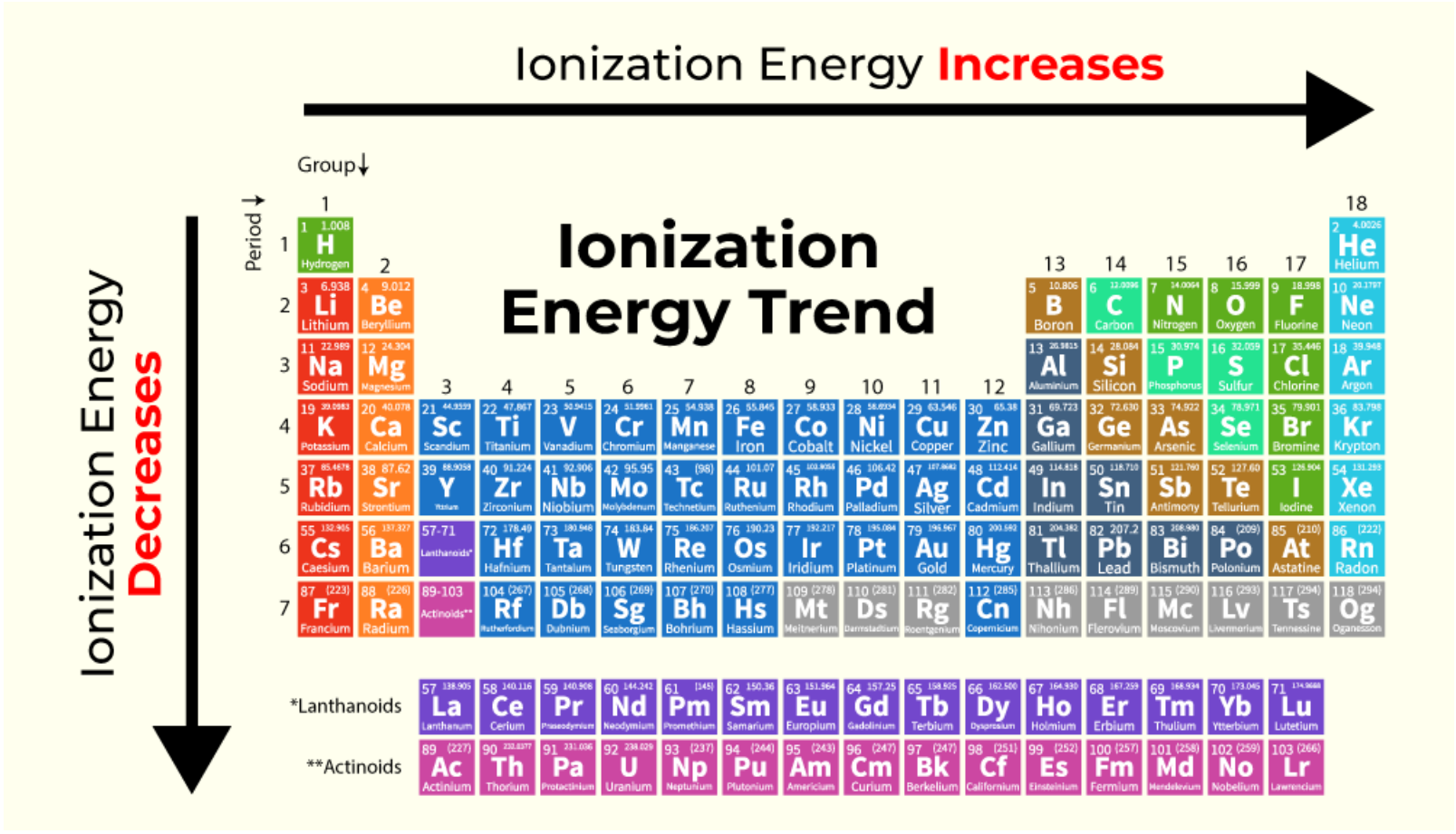


Periodic Quiz

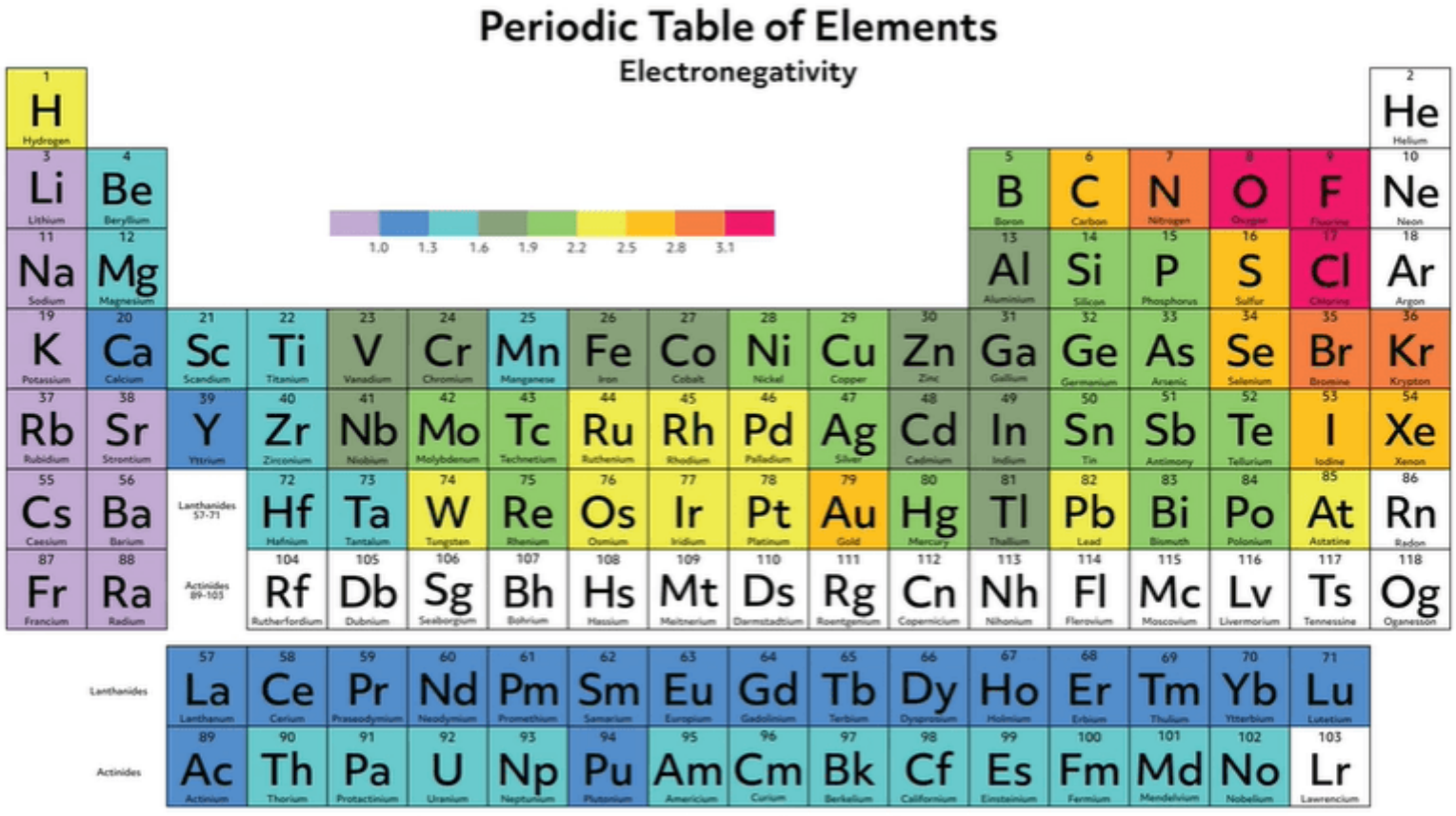




Periodic Quiz

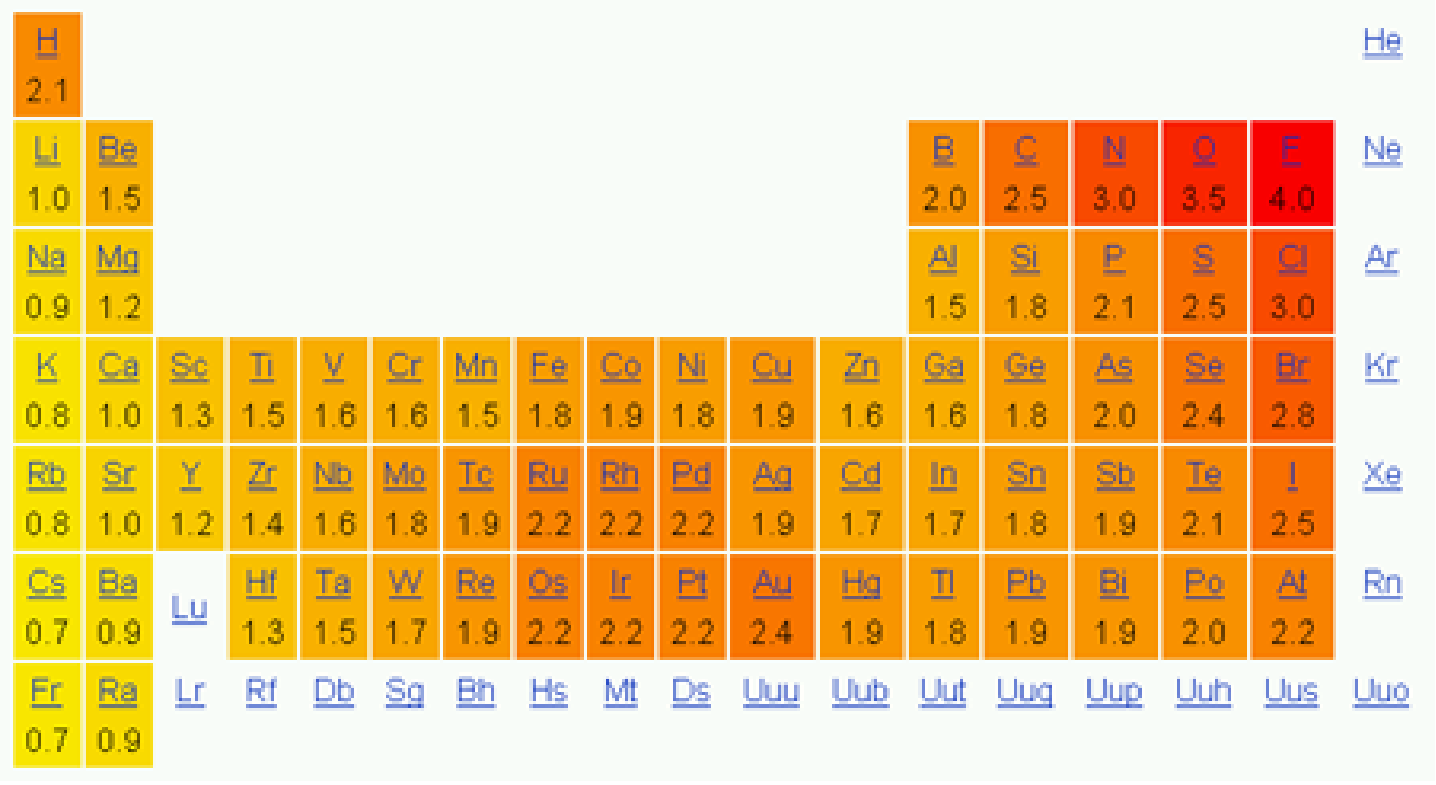


Periodic Quiz

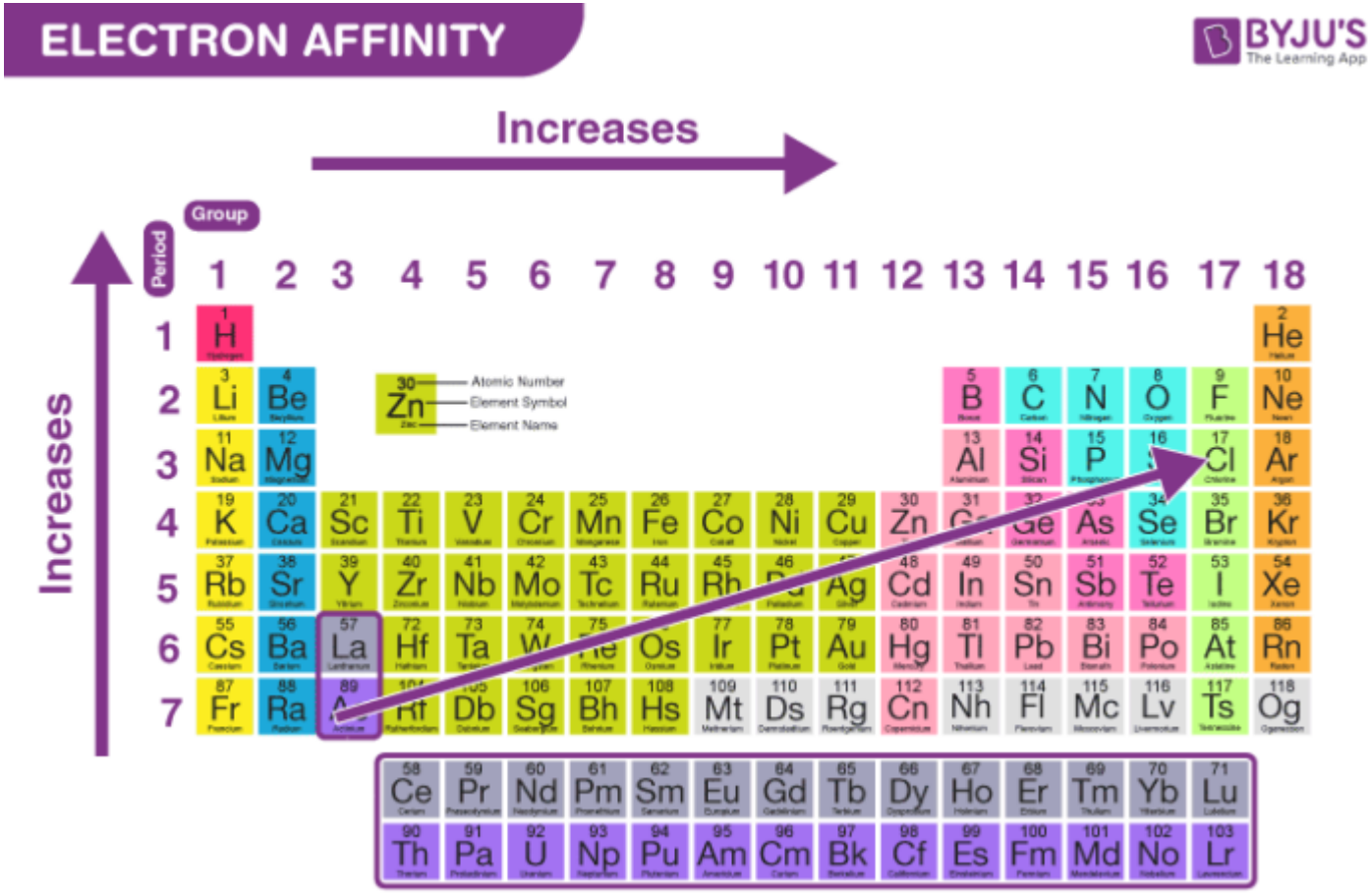


Periodic Quiz

electronegativity

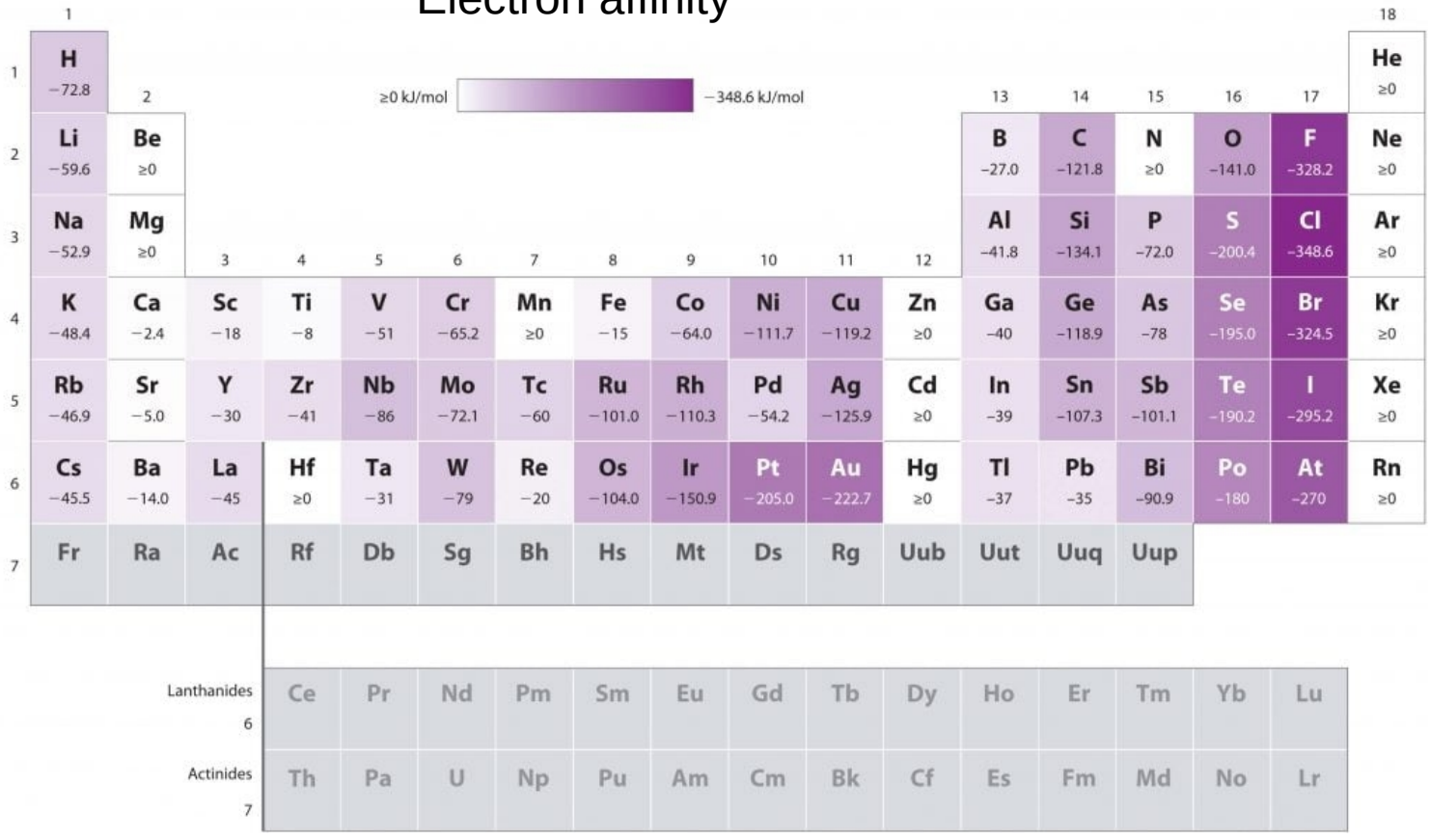


Periodic Quiz

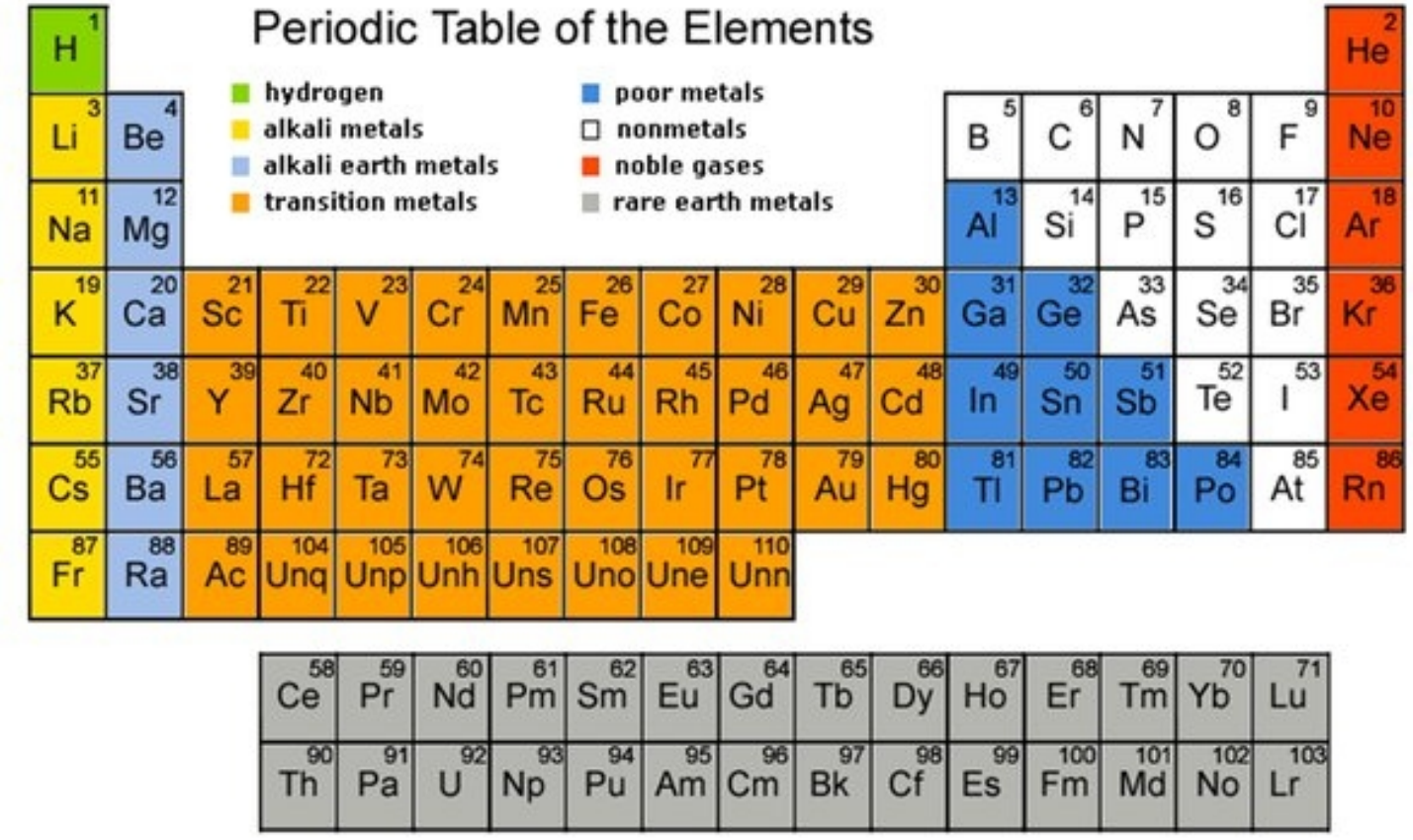


Periodic Quiz

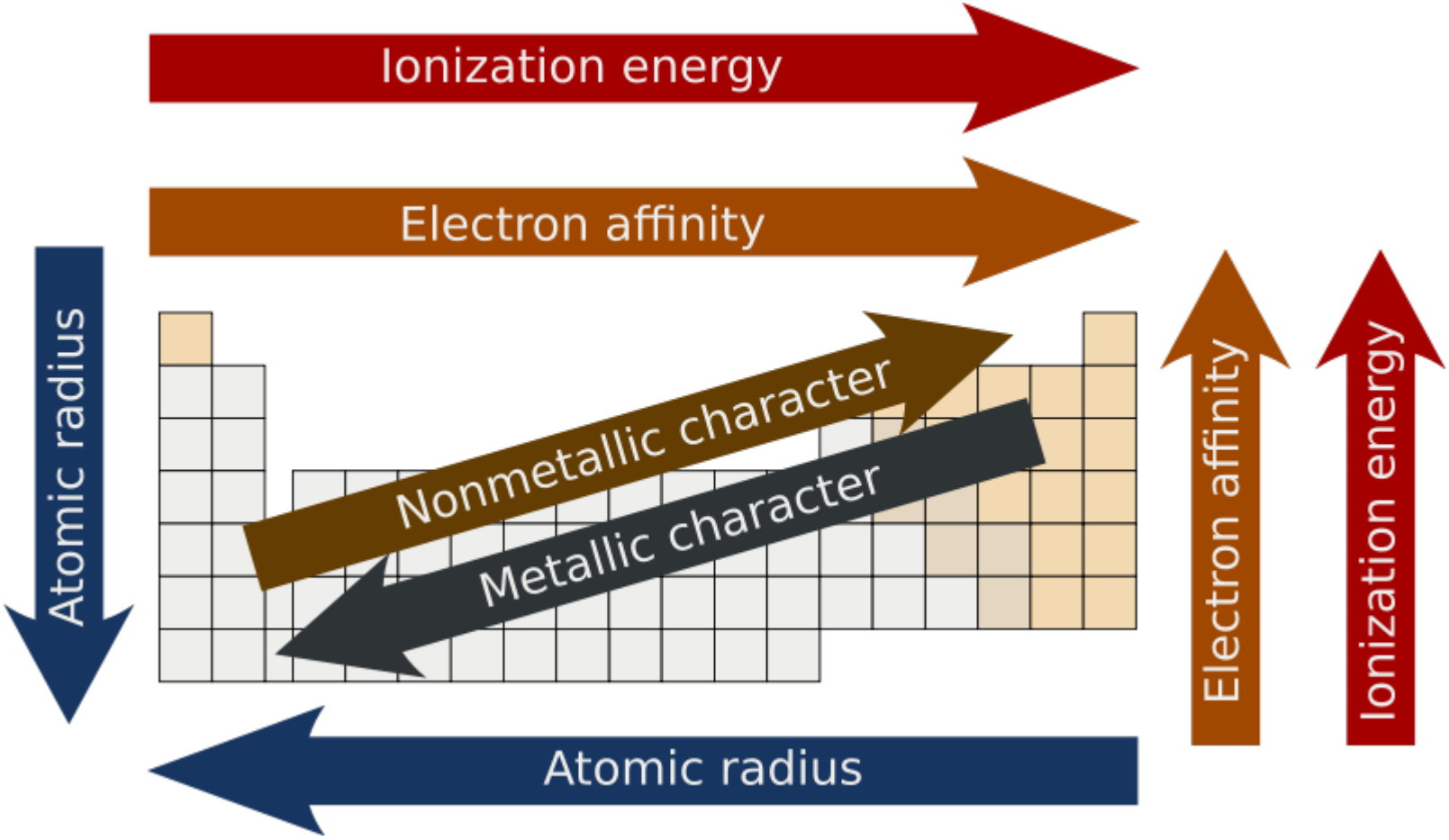
Electron affinity



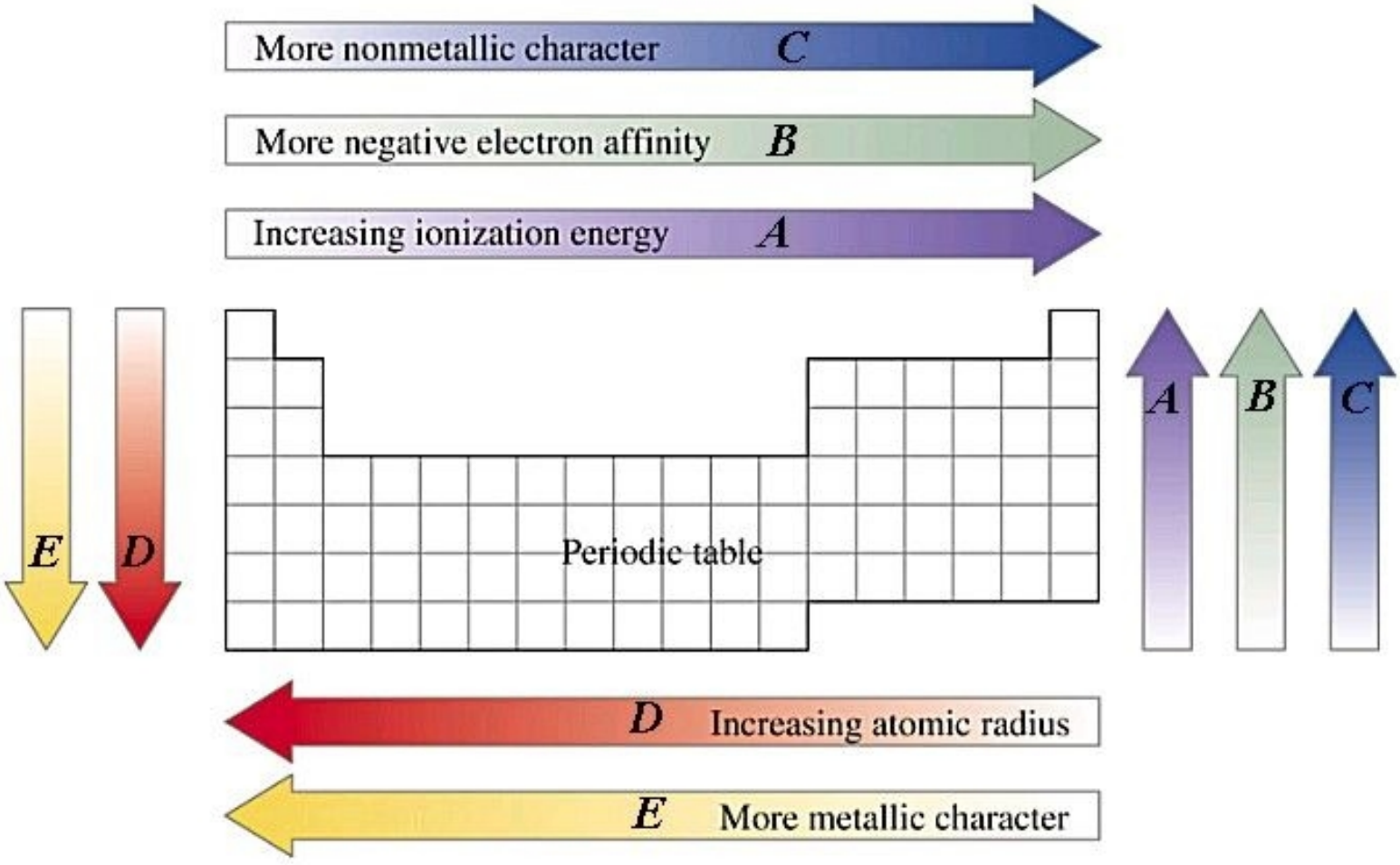
Periodic Quiz



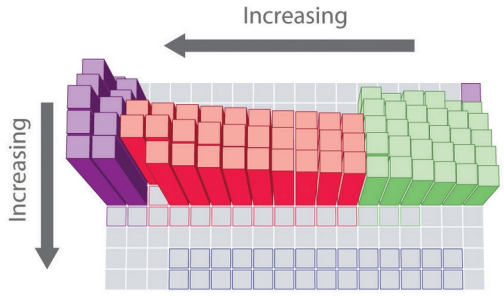
Periodic Quiz



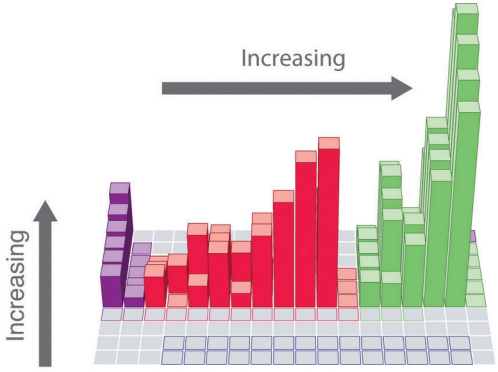
Periodic Quiz



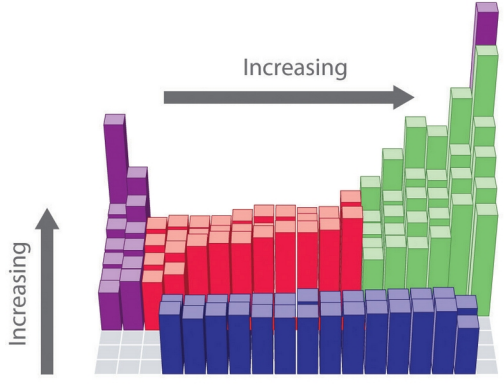
Periodic Quiz



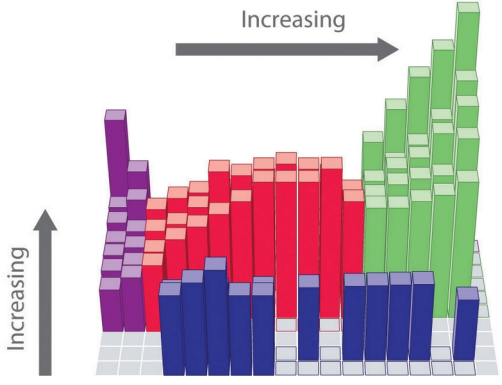
Calculated atomic radius (pm)



Magnitude of electron affinity (kJ/mol)



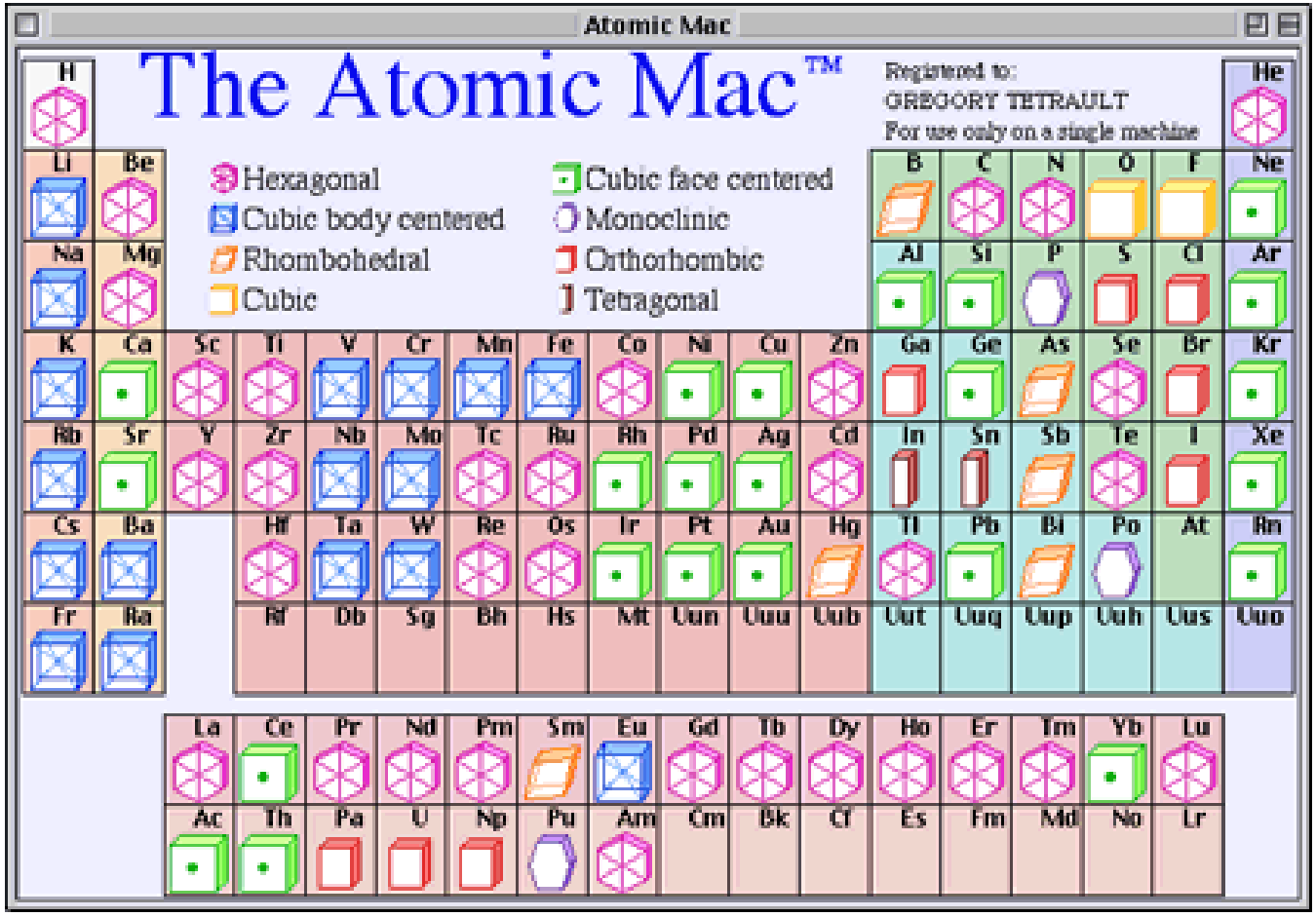
First ionization energy (kJ/mol)



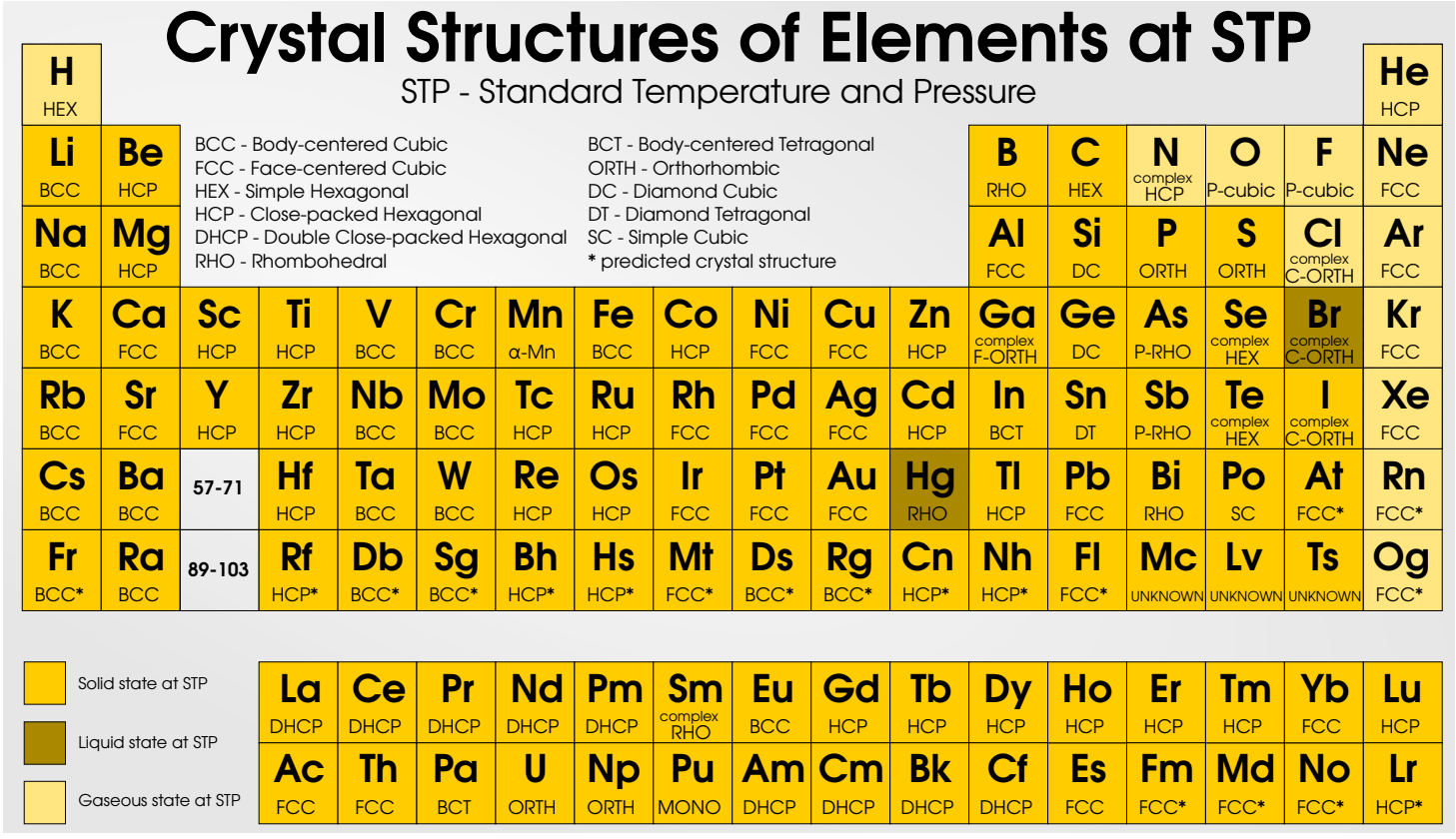
Electronegativity, χ

s block *p* block *d* block *f* block

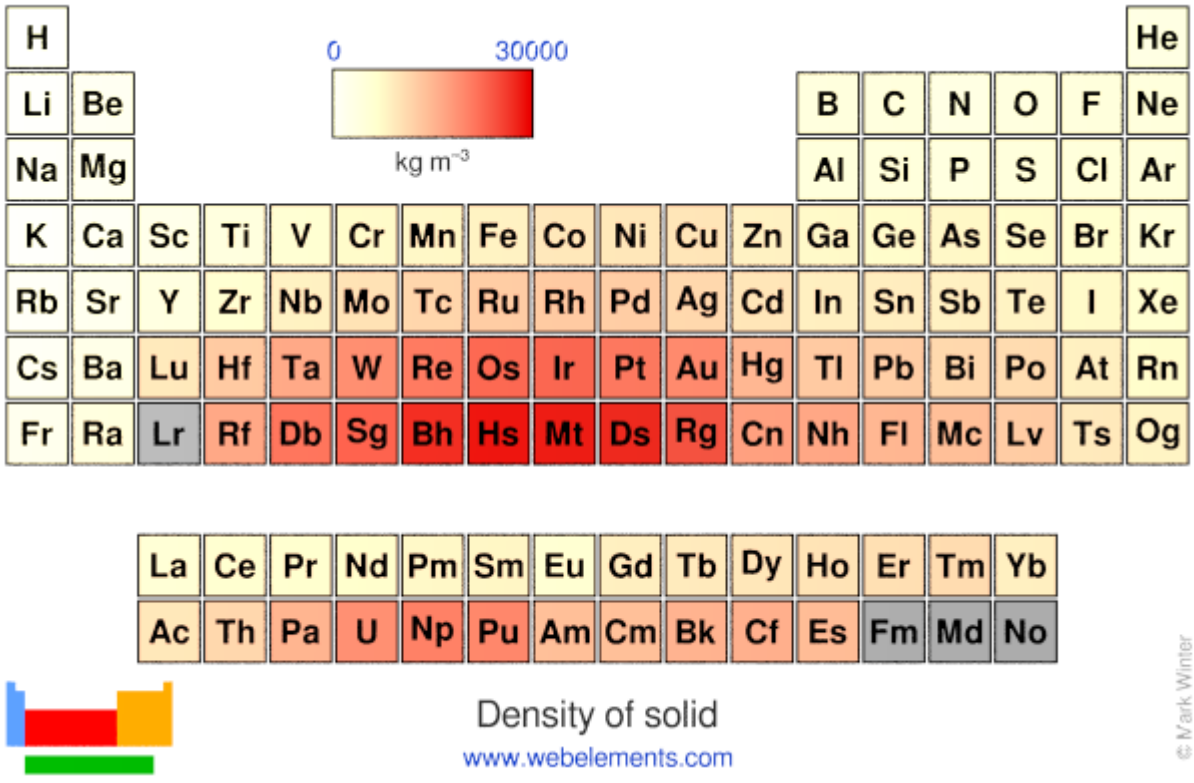
Periodic Quiz



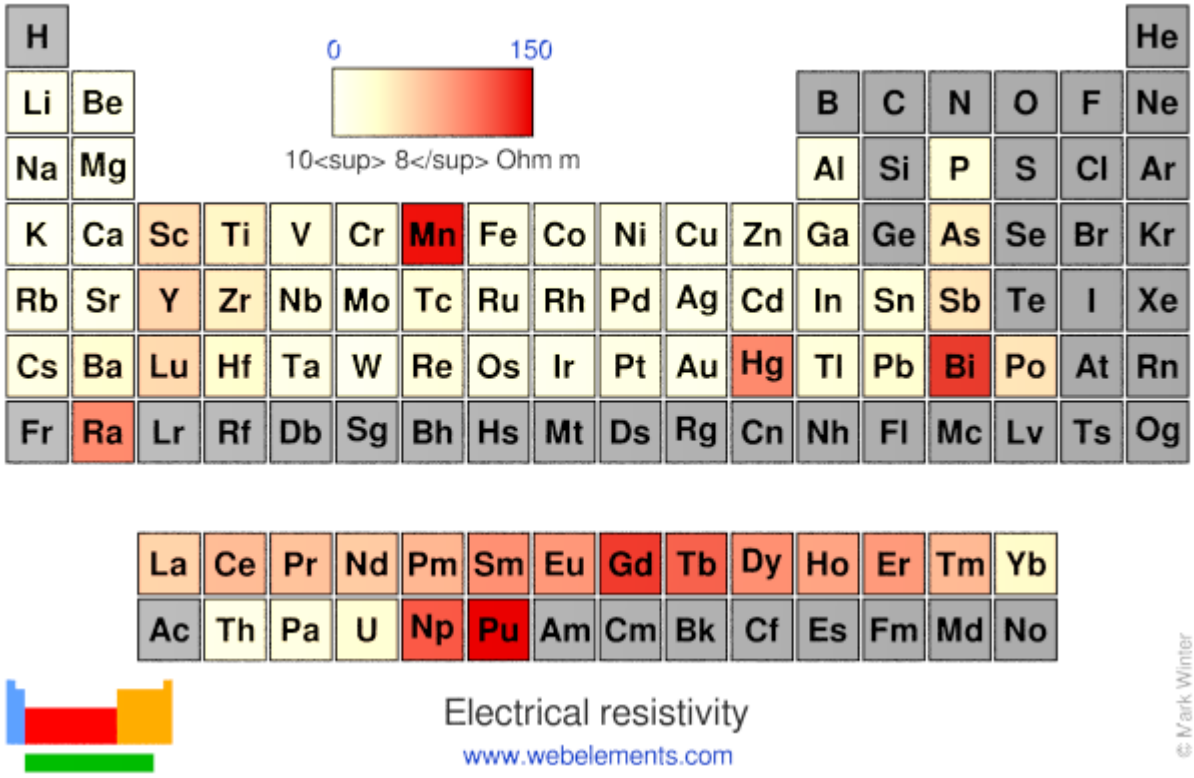
Periodic Quiz



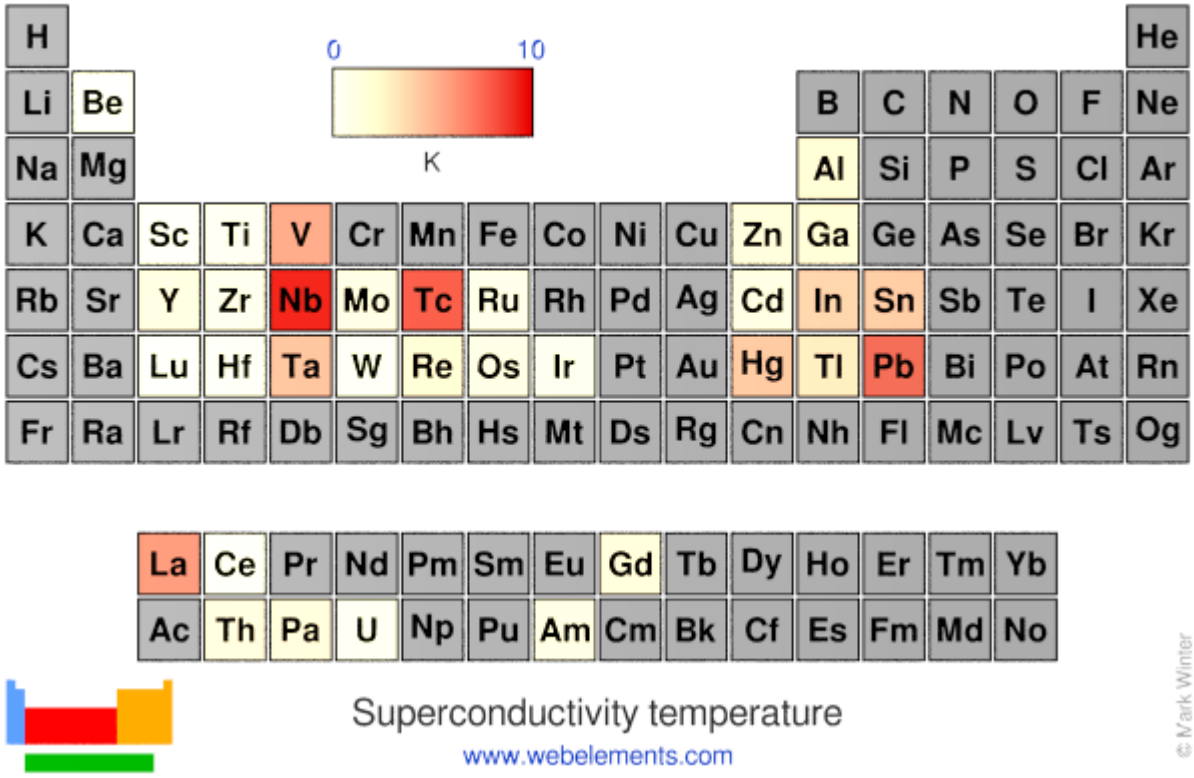
Periodic Quiz



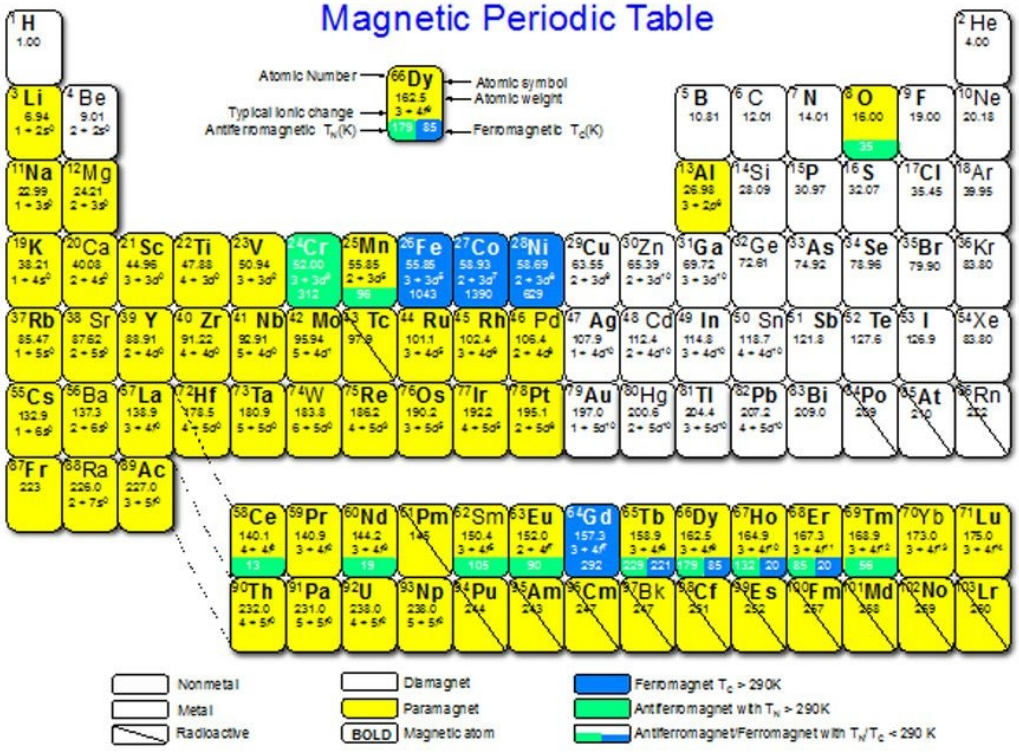
Periodic Quiz

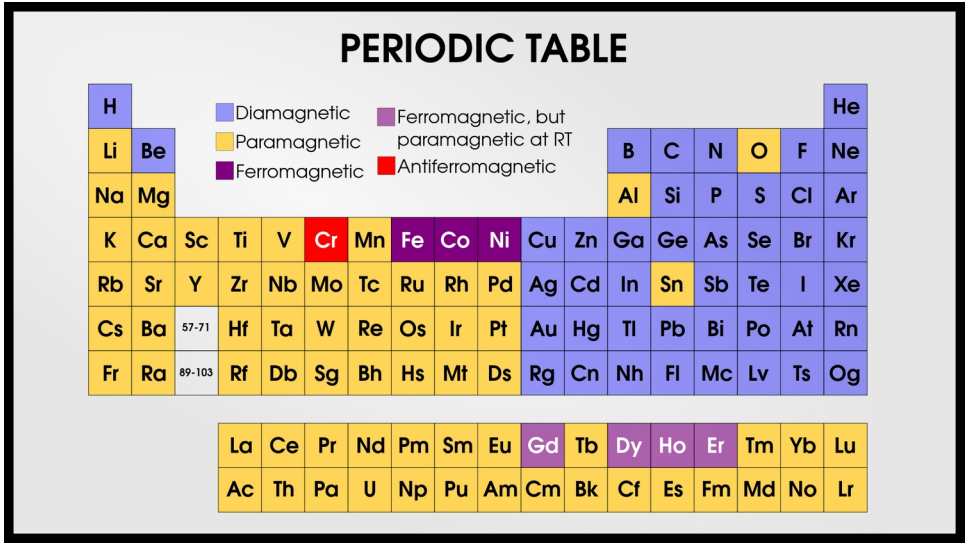


Periodic Quiz

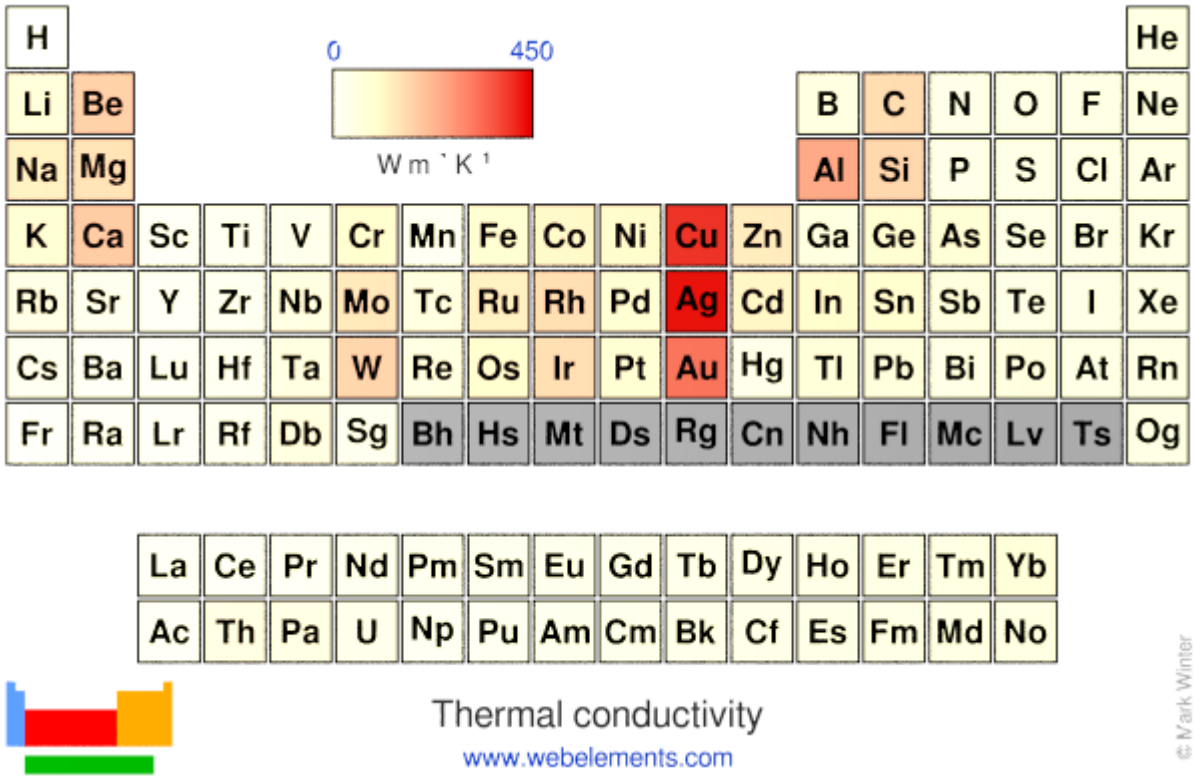


Periodic Quiz

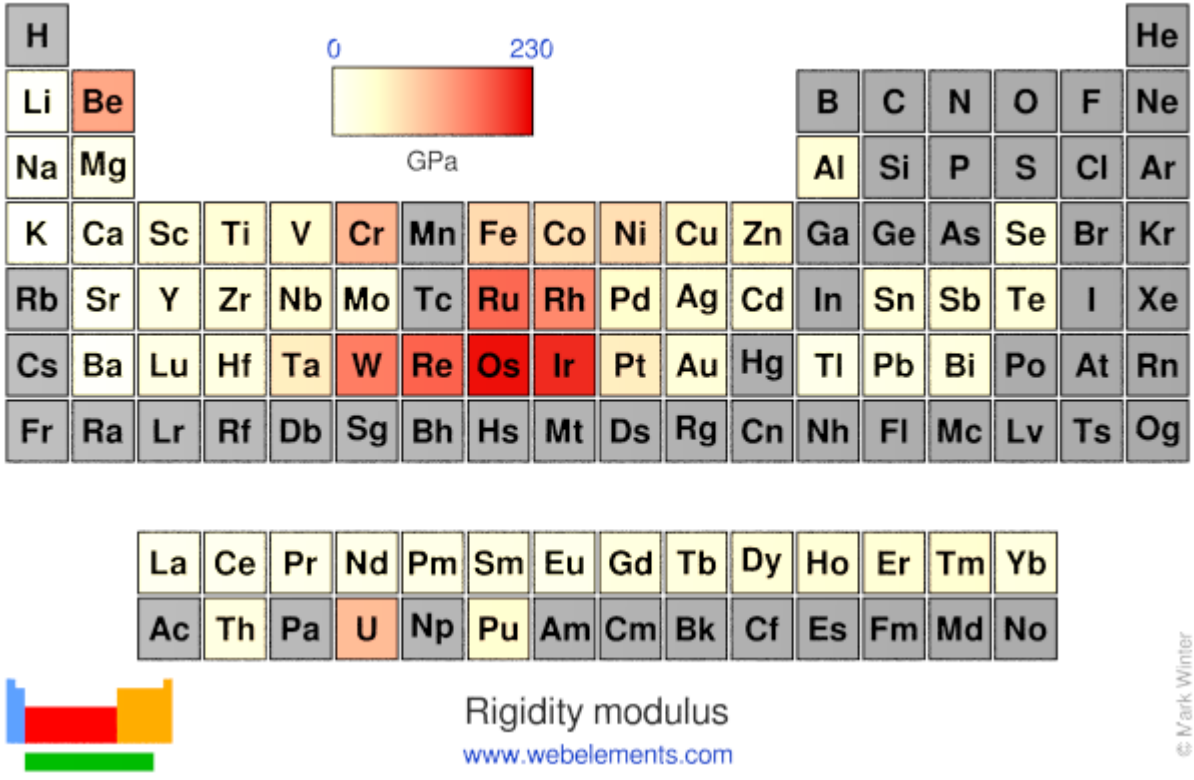




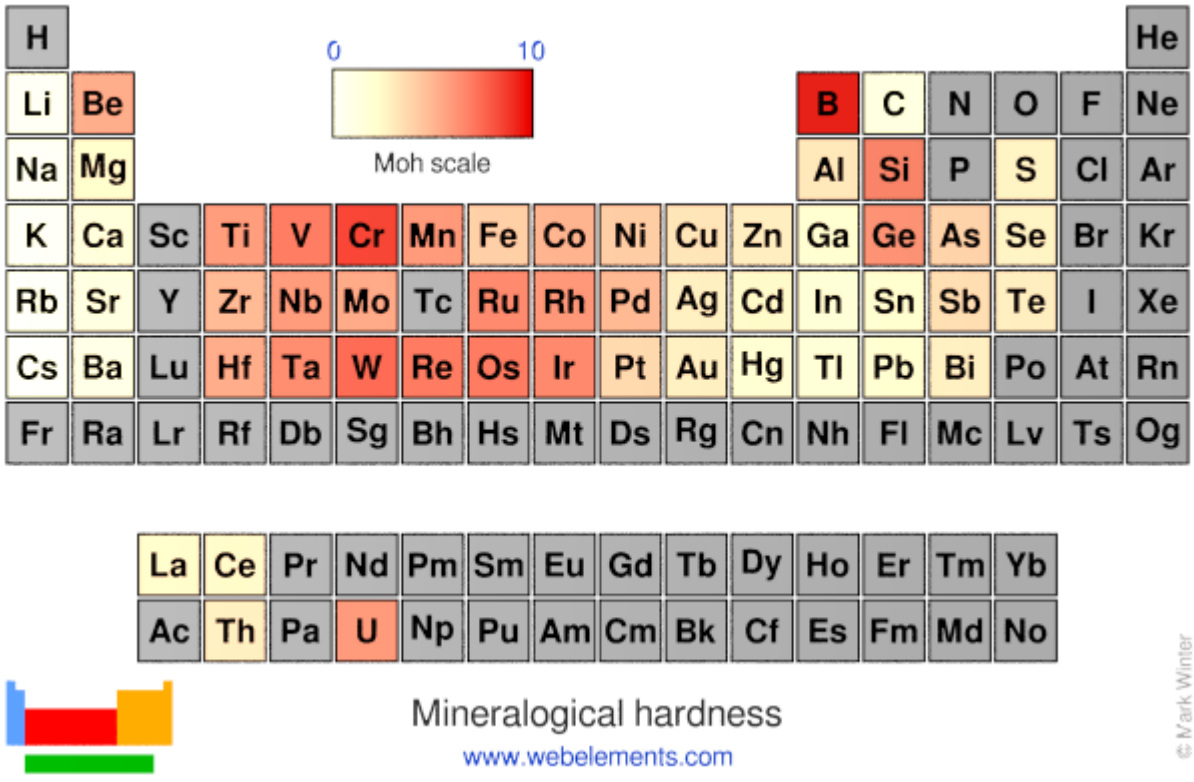
Periodic Quiz



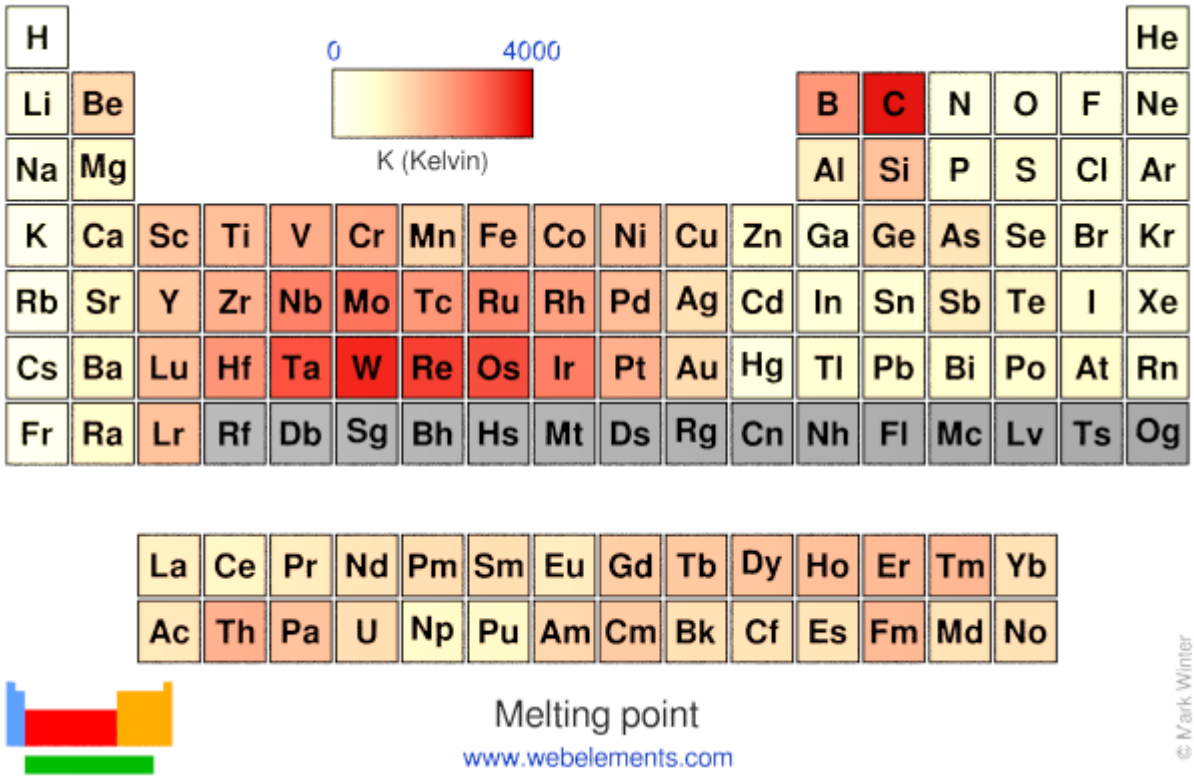
Periodic Quiz



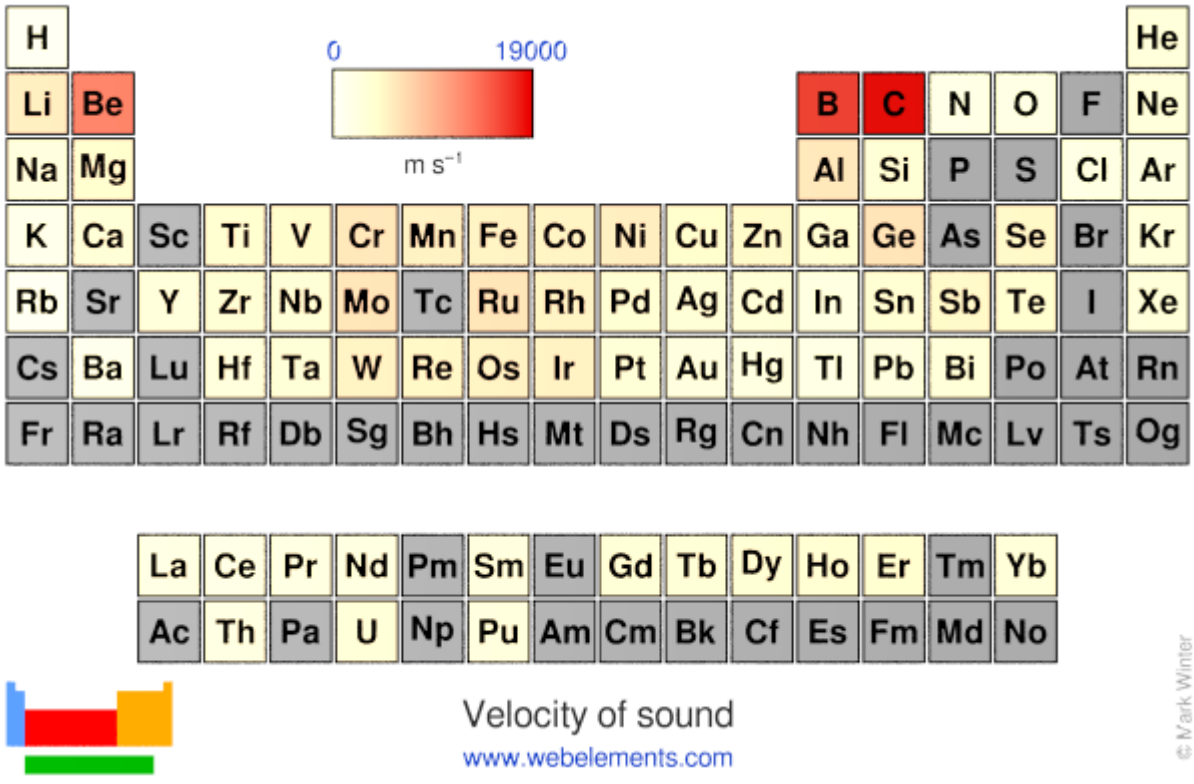
Periodic Quiz



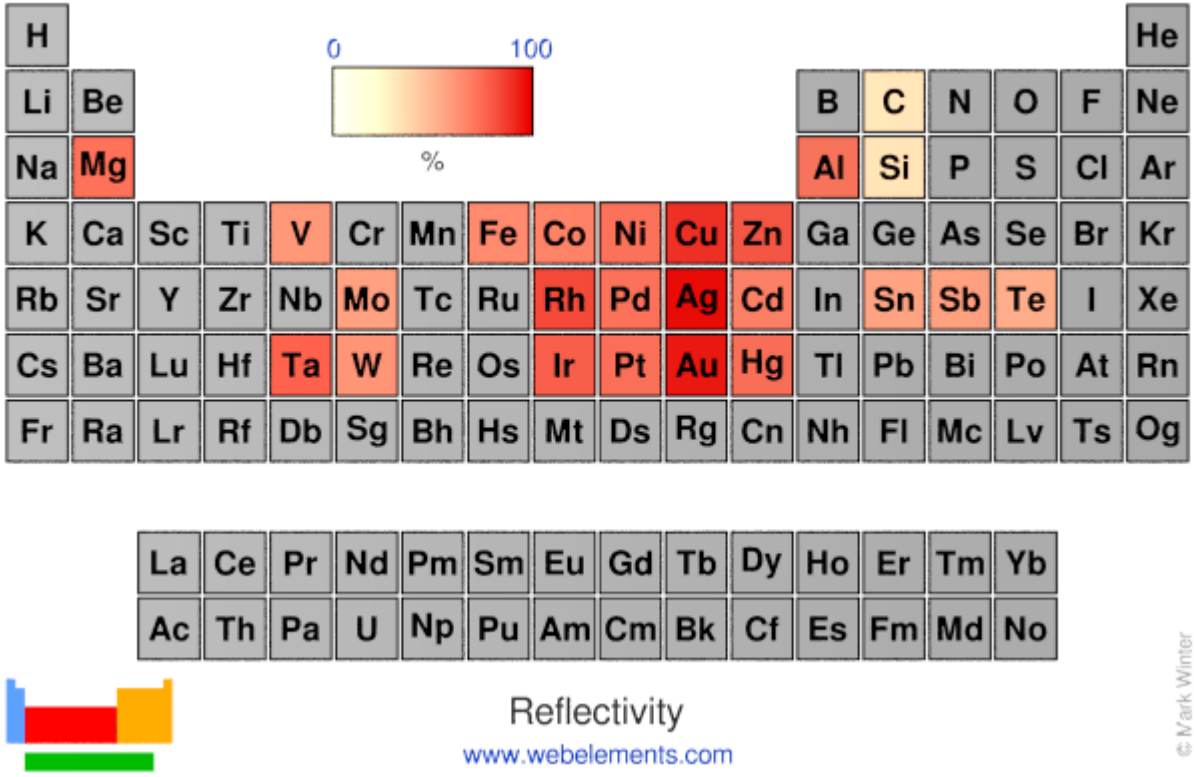
Periodic Quiz



Periodic Quiz



Periodic Quiz



Periodic Quiz