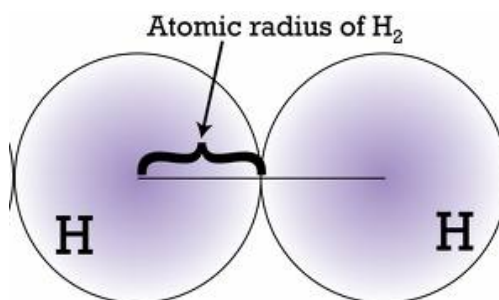


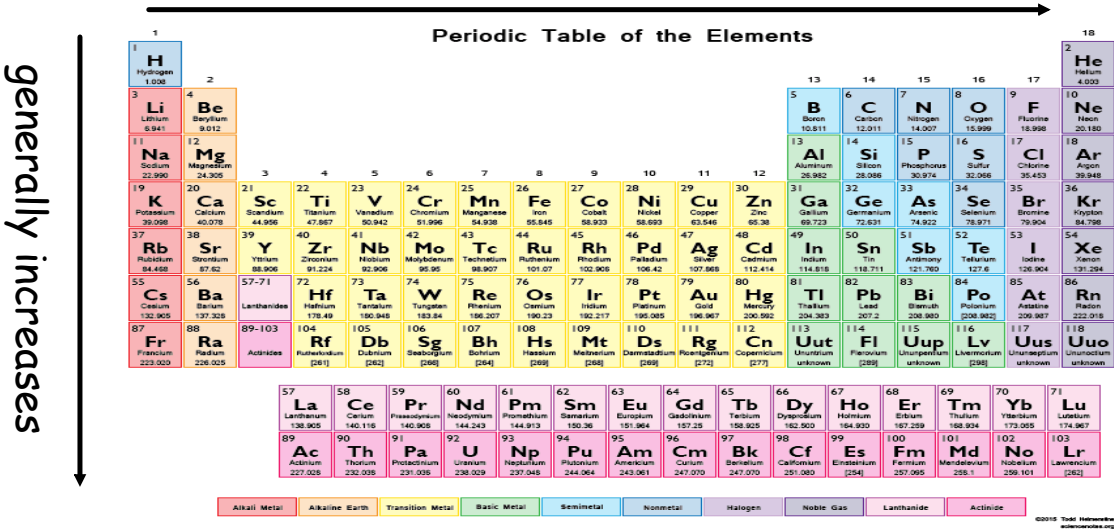
Periodic Trends

- **Atomic Radius** - the distance from the center of the nucleus to the furthest electron in a **neutral** atom.



Periodic Trends

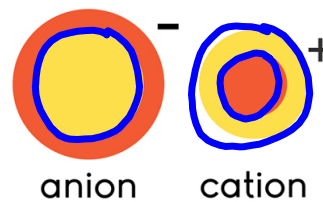
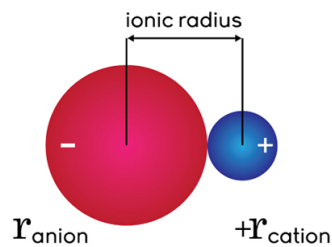
- Atomic Radius generally decreases





An **ion** is an atom with a net charge other than zero. An atom that has lost or gained electrons to be happy (**meet octet rule = full valence shell!**)

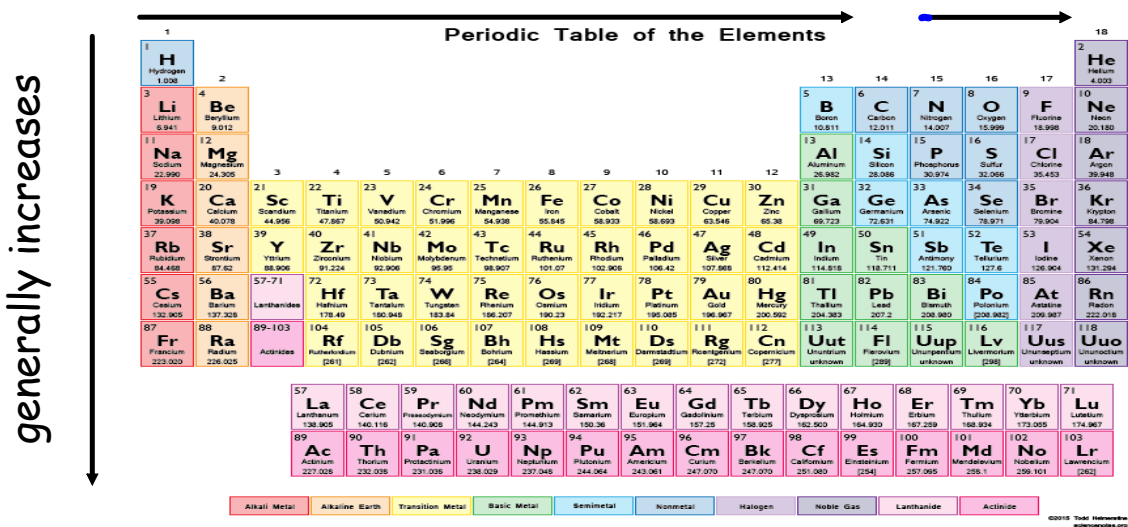
- paws.*
- > **Cation**: positively charged ion (lost electrons) = smaller
 - > **Anion**: negatively charged ion (gained electrons) = bigger



Periodic Trends

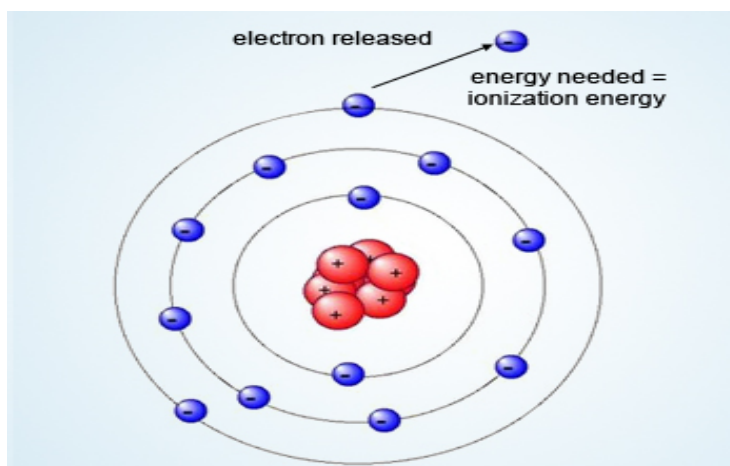
- Ionic Radius

cations decrease anions decrease





Ionization energy - the energy requires to remove an electron from an atom (become a **cation**)



Periodic Trends

• Ionization Energy

generally increases

generally decreases

Periodic Table of the Elements																		18											
1 H Hydrogen 1.008																	2 He Helium 4.003												
3 Li Lithium 6.941	4 Be Beryllium 9.012											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180												
11 Na Sodium 22.990	12 Mg Magnesium 24.305											13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.066	17 Cl Chlorine 35.453	18 Ar Argon 39.948												
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.631	33 As Arsenic 74.922	34 Se Selenium 78.971	35 Br Bromine 79.904	36 Kr Krypton 84.798												
37 Rb Rubidium 84.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.95	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.904	54 Xe Xenon 131.294												
55 Cs Cesium 132.905	56 Ba Barium 137.327	57-71 Lanthanides		72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.222	78 Pt Platinum 195.085	79 Au Gold 196.967	80 Hg Mercury 200.592	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium 209	85 At Astatine 210	86 Rn Radon 222											
87 Fr Francium 223.020	88 Ra Radium 226.025	89-103 Actinides		104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [269]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [269]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 Nh Nihonium [284]	114 Fl Flerovium [289]	115 Uup Ununpentium [288]	116 Lv Livermorium [293]	117 Uus Ununseptium [294]	118 Uuo Ununoctium [294]											
57 La Lanthanum 138.905	58 Ce Cerium 140.116	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.242	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.502	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.934	70 Yb Ytterbium 173.055	71 Lu Lutetium 174.967	89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.044	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium [254]	100 Fm Fermium 257.10	101 Md Mendelevium 258.10	102 No Nobelium 259.10	103 Lr Lawrencium [262]
Alkali Metal		Alkaline Earth		Transition Metal			Basic Metal		Semimetal		Nonmetal		Halogen		Noble Gas		Lanthanide		Actinide										

- **Reactivity of Metals**

generally increases

Periodic Table of the Elements																		18
1 H Hydrogen 1.008																	2 He Helium 4.003	
3 Li Lithium 6.941	4 Be Beryllium 9.012											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180	
11 Na Sodium 22.990	12 Mg Magnesium 24.305											13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.06	17 Cl Chlorine 35.453	18 Ar Argon 39.948	
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37 Rb Rubidium 84.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.94	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.905	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.905	54 Xe Xenon 131.29	
55 Cs Cesium 132.905	56 Ba Barium 137.327	57-71 Lanthanides		72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.225	78 Pt Platinum 195.085	79 Au Gold 196.967	80 Hg Mercury 200.59	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [209]	85 At Astatine [210]	86 Rn Radon [222]
87 Fr Francium 223.020	88 Ra Radium 226.025	Actinides		104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [277]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [271]	111 Rg Roentgenium [272]	112 Cn Copernicium [285]	113 Uut Ununtrium [284]	114 Fl Flerovium [289]	115 Uup Ununpentium [288]	116 Lv Livermorium [293]	117 Uus Ununseptium [294]	118 Uuo Ununoctium [294]
																		72 Lu Lutetium 174.967
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																		111 Rg Roentgenium [272]
																		112 Cn Copernicium [285]
																		113 Uut Ununtrium [284]
																		114 Fl Flerovium [289]
																		115 Uup Ununpentium [288]
																		116 Lv Livermorium [293]
																		117 Uus Ununseptium [294]
																		118 Uuo Ununoctium [294]
																		119 Uuh Ununhennium [295]
																		120 Uuq Ununquadium [296]
																		121 Uub Ununbium [297]
																		122 Uut Ununtrium [284]
																		123 Uuq Ununquadium [296]
																		124 Uub Ununbium [297]
																		125 Uut Ununtrium [284]
																		126 Uuq Ununquadium [296]
																		127 Uub Ununbium [297]
																		128 Uut Ununtrium [284]
																		129 Uuq Ununquadium [296]
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																		131 Uut Ununtrium [284]
																		132 Uuq Ununquadium [296]
																		133 Uub Ununbium [297]
																		134 Uut Ununtrium [284]
																		135 Uuq Ununquadium [296]
																		136 Uub Ununbium [297]
																		137 Uut Ununtrium [284]
																		138 Uuq Ununquadium [296]
																		139 Uub Ununbium [297]
																		140 Uut Ununtrium [284]

Alkali Metal

Alkaline Earth

Transition Metal

Basic Metal

Semimetal

Nonmetal

Halogen

Noble Gas

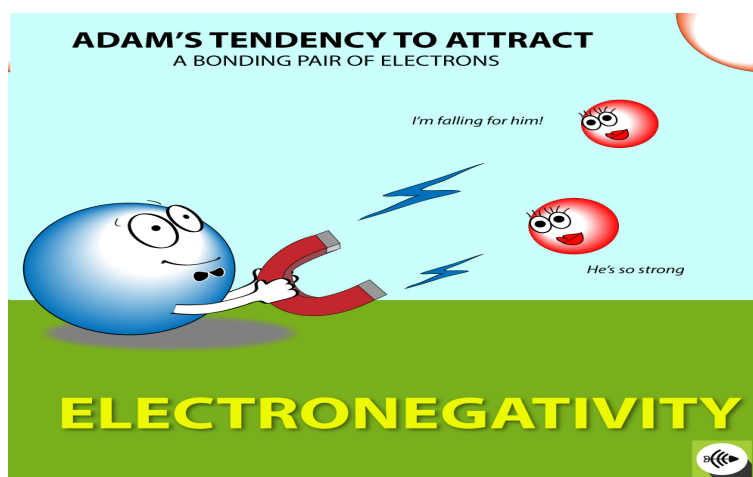
Lanthanide

Actinide

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Electronegativity - ability of an atom to attract an electron (become an **anion**)

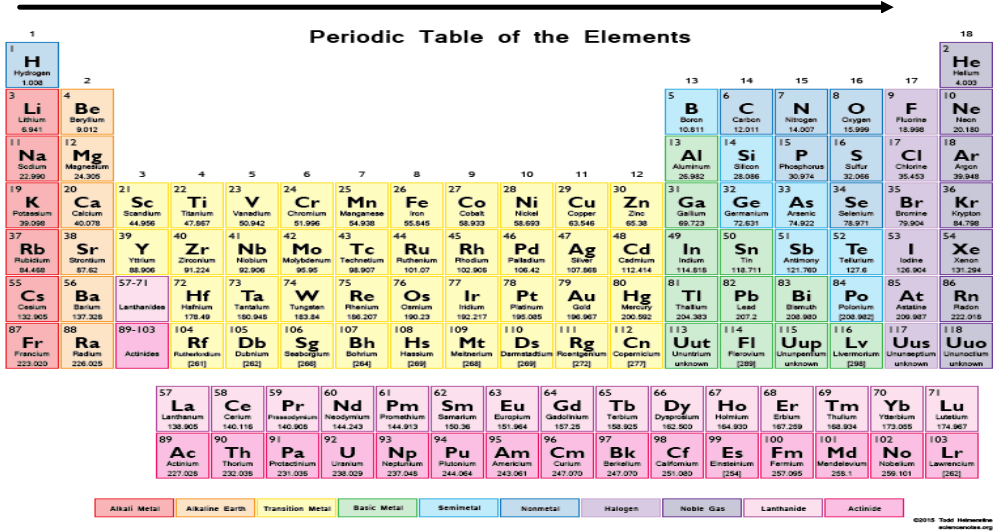


Periodic Trends

- Electronegativity

generally increases

generally decreases



Periodic Trends

- Reactivity of non-metals

