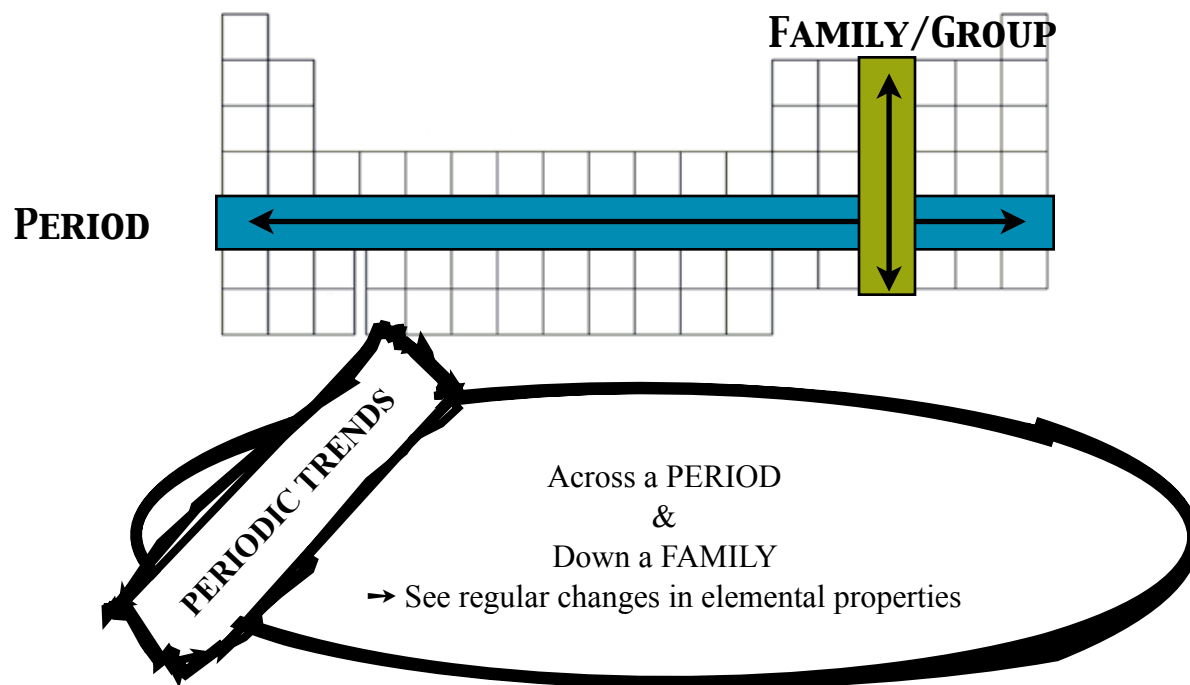


6.2 PERIODIC TRENDS

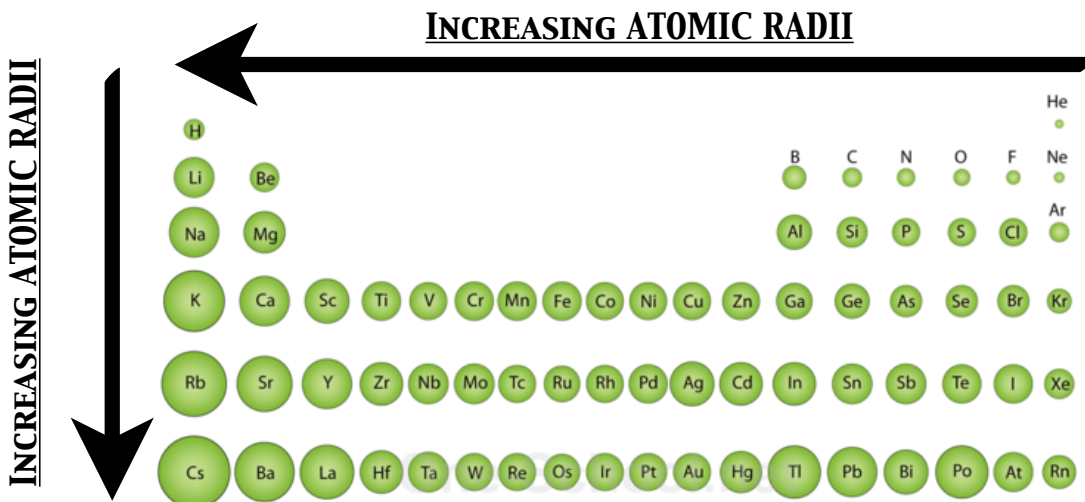


ATOMIC SIZE

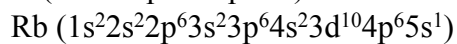
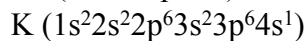
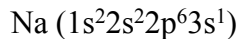
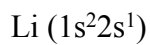
Definite Size Vs. Estimated Size	
Definite Size	Estimated Size
Definite boundaries of an object Eg. Marbles	Possible boundaries with approximations Eg. e^- clouds where e^- spend 90% of their time

ATOMIC SIZE TREND

1. As enr levels (n) \uparrow → e^- are further from the nucleus → atom size \uparrow
2. When e^- feel nucleus pull (**effective nuclear charge**) → e^- cloud is closer to nucleus → atom size \downarrow



Example:



IONIC SIZE TREND

-Ionic radii of -ve ions > their neutral atomic radii.

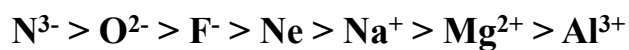
➔ Ionic radii of -ve ions **↑** as the -ve charge **↑**.

-Ionic radii of +ve ions < their neutral atomic radii.

➔ Ionic radii of +ve ions **↓** as the +ve charge **↓**.

Example:

Same # of e^- ; diff # of p^+ and n^0



IONIZATION ENERGY TREND

Ionization Energy (IE): the minimum enr required to remove an e^- from a (g) atom or ion

Large atom:

Nucleus has a **↓** hold on e^-

↓ IE

Small atom:

Nucleus has a **↑** hold on e^-

↑ IE

INCREASING IONIZATION ENERGY

Metals:
↓ IE
Lose e⁻

1 H Hydrogen 1.00794																	2 He Helium 4.003						
3 Li Lithium 6.941	4 Be Beryllium 9.012182																	5 B Boron 10.811	6 C Carbon 12.01107	7 N Nitrogen 14.006434	8 O Oxygen 15.9994	9 F Fluorine 18.9984032	10 Ne Neon 20.1797
11 Na Sodium 22.989770	12 Mg Magnesium 24.3050	21 Sc Scandium 44.955910	22 Ti Titanium 47.867	23 V Vanadium 50.9415	24 Cr Chromium 51.9961	25 Mn Manganese 54.938049	26 Fe Iron 55.845	27 Co Cobalt 58.933200	28 Ni Nickel 58.6934	29 Cu Copper 63.546	30 Zn Zinc 65.39	31 Ga Gallium 69.723	32 Ge Germanium 72.61	33 As Arsenic 74.92160	34 Se Selenium 78.96	35 Br Bromine 79.904	36 Kr Krypton 83.80						
37 Rb Rubidium 85.4678	38 Sr Strontium 87.62	39 Y Yttrium 88.90585	40 Zr Zirconium 91.224	41 Nb Niobium 92.90638	42 Mo Molybdenum 95.94	43 Tc Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.90550	46 Pd Palladium 106.42	47 Ag Silver 107.8682	48 Cd Cadmium 112.411	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.760	52 Te Tellurium 127.60	53 I Iodine 126.90447	54 Xe Xenon 131.29						
55 Cs Cesium 132.90545	56 Ba Barium 137.327	57 La Lanthanum 138.9055	58 Ce Cerium 140.12	59 Pr Praseodymium 140.90766	60 Nd Neodymium 144.242	61 Pm Promethium (145)	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.92535	66 Dy Dysprosium 162.50033	67 Ho Holmium 164.93033	68 Er Erbium 167.259	69 Tm Thulium 168.93032	70 Yb Ytterbium 173.054	71 Lu Lutetium 174.967	72 Hf Hafnium 178.49						
87 Fr Francium (223)	88 Ra Radium (226)	89 Ac Actinium (227)	90 Th Thorium (232)	91 Pa Protactinium (231)	92 U Uranium (238)	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (258)	102 No Nobelium (259)	103 Lr Lawrencium (260)	104 Rf Rutherfordium (261)						

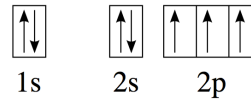
INCREASING IONIZATION ENERGY

Non-metals:
↑ IE
Gain e⁻

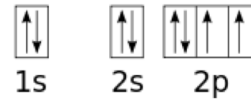
Exceptions to IONIZATION ENERGY TREND

Nitrogen & Oxygen

N: larger atom, but ↑ IE



O: smaller atom, but ↓ IE



ELECTRONEGATIVITY TREND

Electronegativity: Relative ability of a bonded atom to attract shared e⁻ to itself

INCREASING ELECTRONEGATIVITY

1 H Hydrogen 1.00794																	2 He Helium 4.003						
3 Li Lithium 6.941	4 Be Beryllium 9.012182																	5 B Boron 10.811	6 C Carbon 12.01107	7 N Nitrogen 14.006434	8 O Oxygen 15.9994	9 F Fluorine 18.9984032	10 Ne Neon 20.1797
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INCREASING ELECTRONEGATIVITY