

Warm-up:

Ions

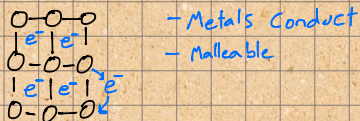
An ion is an atom or a group of atoms that have acquired an electrical charge due to a loss or gain of electrons. The atoms of some elements in the periodic table tend to gain or lose one or more electrons in an effort to have an outer electron shell like that of the closest noble gas. They do this to become more stable, which, in a way, is a goal of all elements that are free to react. Column 1 of the periodic table usually produces ions with a +1 charge; Column 2 usually produces +2 charges; and the transition metals in Groups 3-12 usually have a +1 or +2 charge. Column 13 often has +3 ions, and Columns 15, 16, and 17 usually produce ions with charges of -3, -2, and -1, respectively. The noble gases don't readily form ions and almost always have a charge of zero.

What is the most likely ionic charge that each of the following elements would form?

- a. Li⁺ c. Br⁻ e. P³⁻
 b. Ne⁰ d. Ca²⁺ f. Ga³⁺



• **Metallic Bond:** when metal atoms share valence electrons
 ↳ type of covalent bond



• **Alloy:** mixture of metals → Not a bond!

↳ Blended in any ratio

↳ Ex: Amalgam → tooth fillings Hg, Ag

• **Covalent Bond:** two or more atoms share valence electrons
 ↳ Non-metals

• **Single Covalent Bond:** 2 e⁻ shared

↳ ex: Cl₂



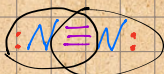
• **Double Covalent Bond:** 4 e⁻ are shared

↳ ex: O₂



• **Triple Covalent Bond:** 6 e⁻ are shared

↳ ex: N₂

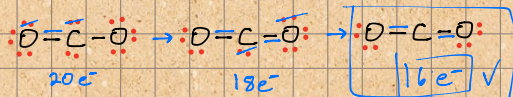


Lewis Diagram Rules:

- 1) Find total # of valence e⁻ [budget]
- 2) Build from the central atom [atom w/ least valence e⁻]
- 3) Give Full Valences to every atom
- 4) Compare total electrons to your budget
- 5) Adjust bonding to match budget

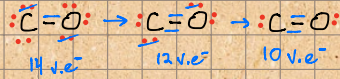
4 + 6 = 10

↳ Ex: CO₂ → Carbon Dioxide



↳ Ex: CO → Carbon Monoxide

4+6 = 10 v.e⁻



Naming of covalent compounds:

★ Use Greek Prefixes

1 = mono 6 = hexa
2 = di 7 = hepta
3 = tri 8 = octa
4 = tetra 9 = nona
5 = penta 10 = deca

Special considerations:

1) Avoid double vowels ["oo" or "oo"] → monoxide → monoxide
→ tetraoxide → tetroxide

2) Avoid mono with first element

• Ex: 1) N_2O_7 2) CCl_4 3) SO_3
Dinitrogen heptoxide Carbon tetrachloride Sulfur trioxide
4) SF_6 5) Dihydrogen Monoxide 6) Phosphorus Tribromide
Sulfur hexafluoride H_2O PBr_3

• Ionic vs Covalent:

↳ Doesn't include #^s [unless transition element]

↳ Does include #^s Cannot predict how many are present