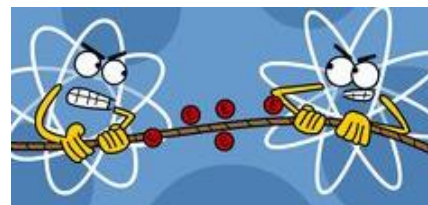


Atoms & Bonding NOTES



I. **Atoms**: basic building blocks of all substances.

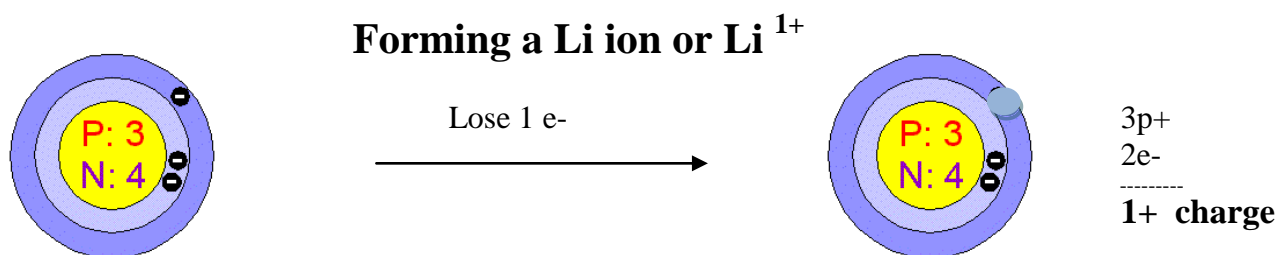
II. **Chemical bonding**: combining of atoms of elements to form new substances.

*The number of valence electrons determines if a bond forms.

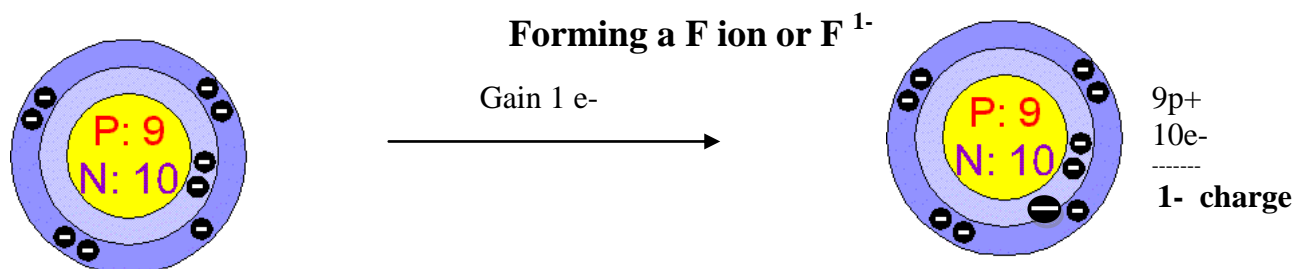
*An atom may gain, lose, or share electrons to form a **stable octet**.

A. **Ionic bonding**: involves a transfer of electrons from one atom to another to form charged atoms called ions. (metal & nonmetal)

1. **Cation**: a positively charged ion. Ex: Li^{1+} , Na^{1+}



2. **Anion**: a negatively charged ion. Ex: F^{1-} , Cl^{1-}



3.) **Ionization**: the process of removing electrons & forming ions.
The energy needed for ionization is called **ionization energy (I.E.)**.

*Atoms with a few valence electrons tend to have a **low** I.E. = **lose** electrons easily. Ex: most metals; especially Alkali & Alkaline Earth Metals.

*Atoms with many valence electrons tend to have a **high** I.E. = **gain** electrons easily. Ex: nonmetals- F, Cl, I

4.) **Electron affinity**: the tendency to attract electrons (E.A.).

Ex: Metals have a **low** E.A.= low e^- attraction

Non-metals have a **high** E.A.= high e^- attraction

5.) Ionic bonds form in compounds that are often **crystalline**.
(repeating arrangements) Ex: NaCl- table salt

6.) A chemical formula for an ionic compound shows the **ratio** of ions present in the crystal lattice. Ex: NaCl = 1Na & 1Cl

B. **Covalent bonding**: involves the sharing of electrons that are in the valence levels of both atoms at the same time. (nonmetal & nonmetal)

1.) Covalent bonding often takes place between atoms of the same element.

Ex: 7 Diatomic elements- N₂, H₂, O₂, F₂, Br₂, I₂, Cl₂

2.) The combination of atoms formed by a covalent bond is a **molecule**.

3.) **Polyatomic ions**: a group of covalently bonded atoms that act like a single atom when combining with other atoms.

Name	Formula
Ammonium	NH ₄ ¹⁺
Acetate	C ₂ H ₃ O ₂ ¹⁻
Hydrogen carbonate	ClO ₃ ¹⁻
Hydroxide	OH ¹⁻
Nitrate	NO ₃ ¹⁻
Nitrite	NO ₂ ¹⁻
Carbonate	CO ₃ ²⁻
Sulfate	SO ₄ ²⁻
Sulfite	SO ₃ ²⁻
Phosphate	PO ₄ ³⁻

C. **Metallic bond**: bond formed by atoms of metals, in which the outer electrons of the atoms form a common electron cloud. Ex: Zn-Zn

