




# **Chemical Bonding**

**By BUI, LALEIN A. PAJARILLO**

# Introduction

**Chemical Bond – the type of force that holds two or more atoms together. It is the attraction between positive nucleus and their negative electrons.**

**There are 3 types of bonds...**

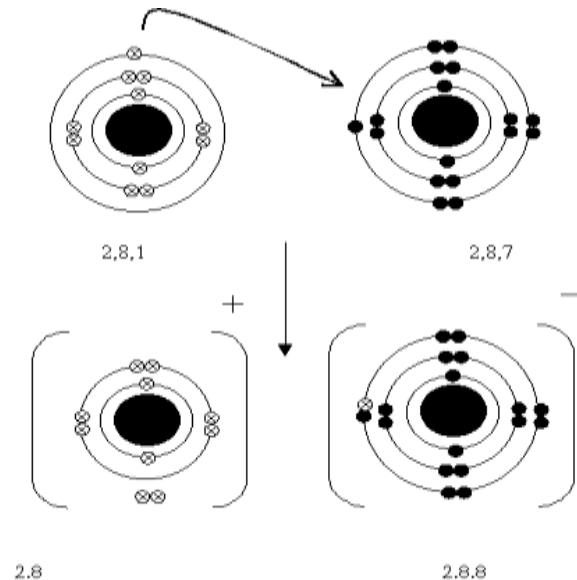
-  **Ionic Bond**
-  **Metallic Bond**
-  **Covalent Bond**

# Ionic Bonding

This is the reaction between a metal (cation) and non-metal (anion) where in the cation transfers its valence electrons to the anion due to electrostatic force in order to make it stable (octet rule). Strong bonding.

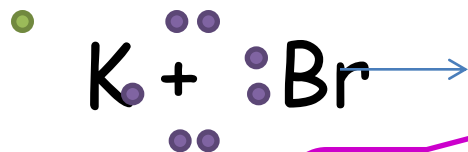
Its properties:

- Hard
- High melting boiling point
- Brittle

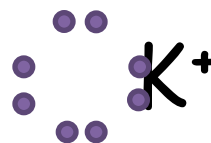


# Ionic Bonding

(Potassium) (Bromine)



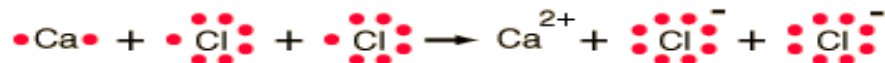
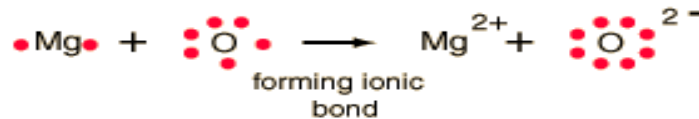
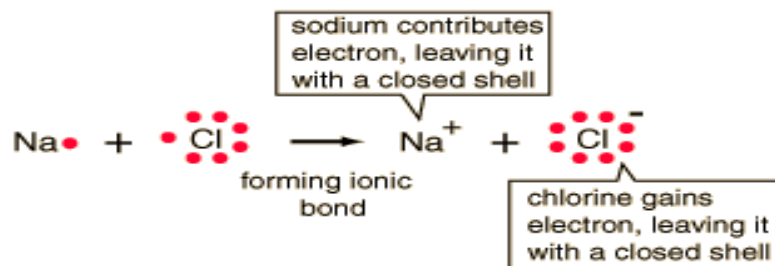
K transfer its electron to the Br becoming a positive ion.



Now, Br gained an electron making it a negative ion. It also achieve the octet rule.

Thus they, formed the KBr or the Potassium Bromide.

## Other Examples:



# **Metallic Bonding**

The kind of bonding between metallic elements in which the valence electrons can move freely from one atom to another. Since they can move freely they are called delocalized electrons. They do not share, lose or gain electrons. Their valence electrons form a "sea" of electrons. Weak bonding.

## **Properties:**

- ✗ High melting and boiling points**
- ✗ Electrical and heat conductor**

**Examples of metal elements: Lithium, Magnesium, Sodium etc.**

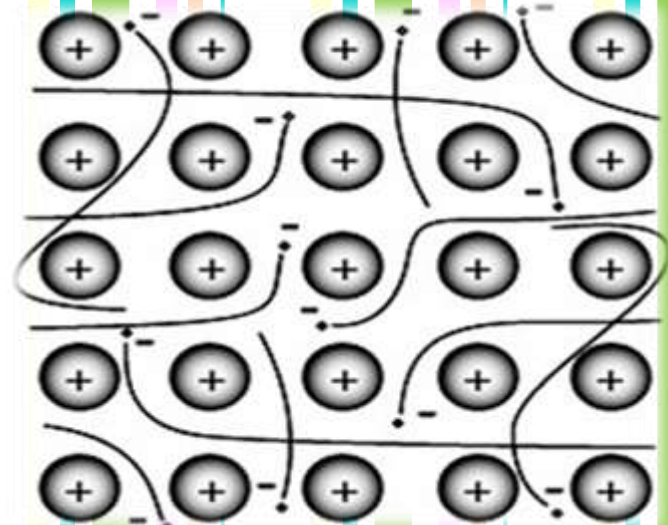
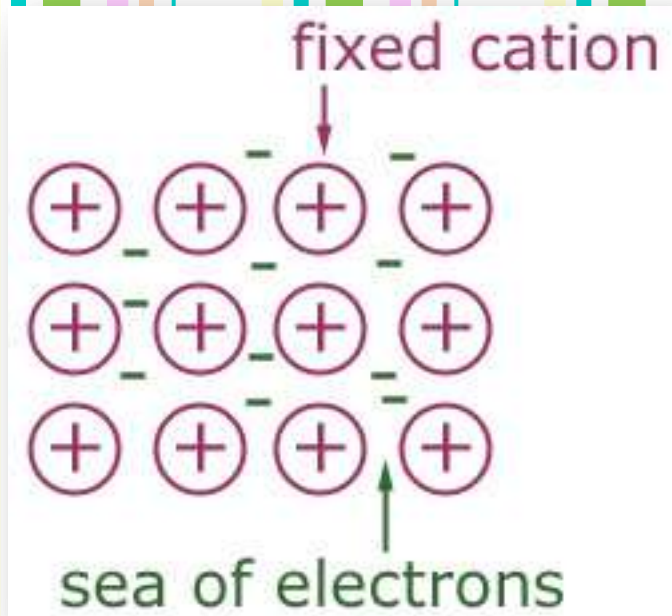
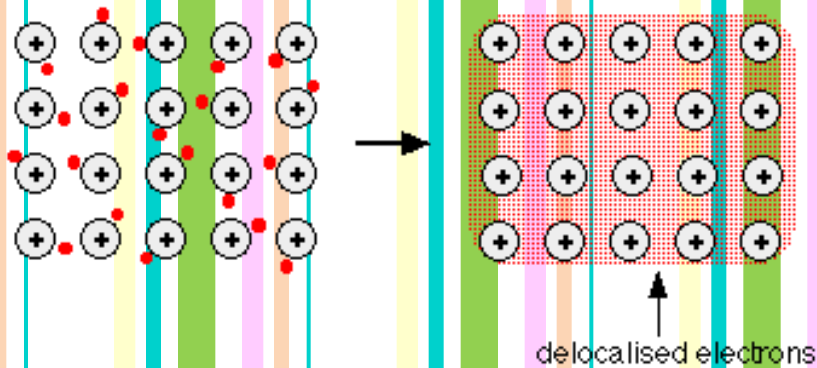
# Covalent Bonding

Covalent bonding is the result of chemical bonding of elements that share pairs of valence electrons. These bonds are usually formed between non-metal elements.

## Three types of Covalent Bonds...

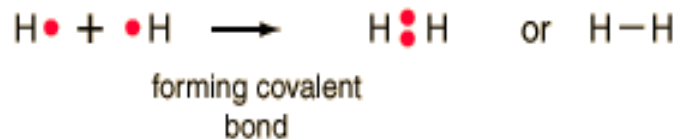
- **Single Bond:** A single covalent bond is formed when two atoms bond and share a single pair of electrons.
- **Double Bonds:** A type of covalent bond in which two electron pairs are shared between two atoms. Each atom contributes two electrons to the bond.
- **Triple Bonds:** A covalent bond in which three electron pairs are shared between two atoms.
- (their valence electrons are associated with how many pairs they can create)

# Metallic Bonding

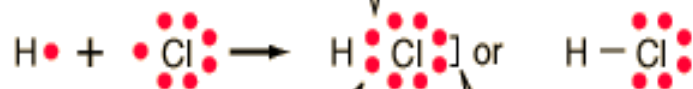


# Covalent Bonding

## SINGLE BOND



Constituent atoms share a pair of electrons, closing the shell for each

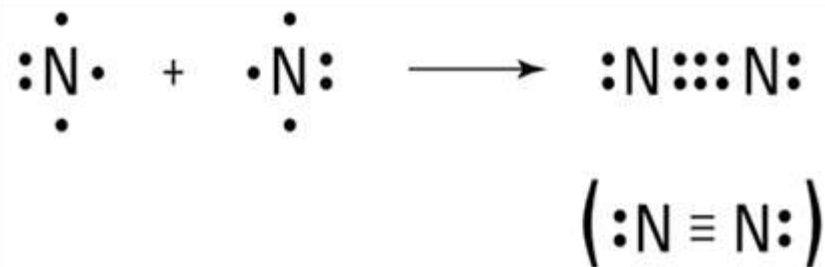


Bonding pair

Lone pair

E  
X  
A  
M  
P  
L  
E  
S  
:

## DOUBLE BOND



## TRIPLE BOND

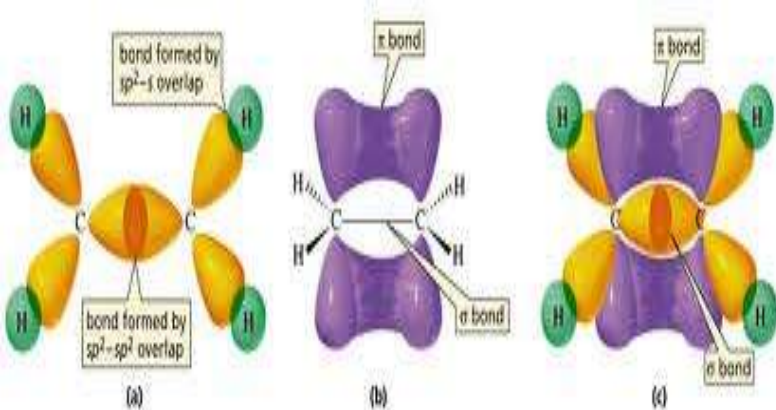


each N has an octet of e<sup>-</sup>s



# sigma

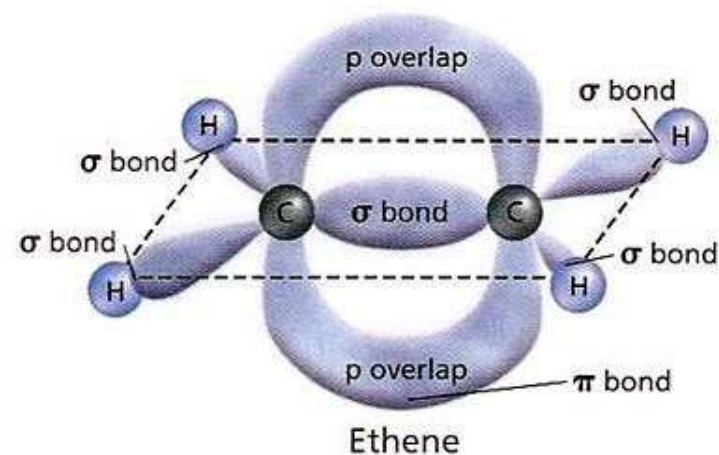
Sigma ( $\sigma$ ) bonds are the strongest type of bonds in the covalent bonding. They are formed by head-on overlapping between atomic orbitals. The valence atomic orbitals of the two atoms which share the electrons overlap or merge end to end.



Vs.

# Pi

Pi ( $\pi$ ) bonds, on the other hand, are weaker bonds and they are formed when parallel orbitals overlapped to share the electrons.



# Conclusion

We therefore conclude that there are three types of Chemical bond which are Ionic, Metallic and Covalent. Each type of bonds has its own applicability. Ionic **transfer** of electrons between non-metal and metal. Metallic is the bond between metal elements in which electrons are **delocalized**, while covalent is the **sharing** of pairs of electrons.