

### Chemical Bonds

Chemical Bonding: The combining of atoms of elements to form a new substance.

When atoms bond together their valence electrons (electrons in the outermost energy level) are what hold the atom together.

Atoms that have their outermost energy levels complete are very stable and do not form chemical bonds.

The electron arrangement determines whether or not an atom will form a chemical bond and the type of bond it will form.

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Ionic Bonds: Involves the transferring of electrons, one atom gains electrons and the other atom loses electrons.

Within each atom the negative and positive charges no longer balance. The atom then becomes an ion.

If the atom loses an electron, it becomes a positive ion

Example: Na has one valence electron, so it becomes a positive ion +1.

If the atoms needs to gain an electron, it becomes a negative ion

Example: Chloride has 7 valence electrons, so it needs one electron to fill its outer ring, it becomes a negative ion -1

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Ionic Bonds usually occur between metals and non-metals.

Atoms that form ionic bonds tend to form a crystal lattice arrangement. This gives the atoms great stability and certain physical properties.

Ionization: process of removing electrons and forming ions. Energy is needed for this process (ionization energy).

Electron Affinity: tendency of an atom to attract electrons.

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Covalent Bond: Electrons are shared rather than transferred to fill their outer energy levels. The attraction between the nucleus and the shared electrons holds the atom together.

Covalent bonds usually occur between two non-metals

Diatomic Elements are elements that are never found by themselves (7)

Examples: Hydrogen, Nitrogen, Oxygen, Fluorine, Chlorine, Bromine, Iodine

Polyatomic Ions: A group of covalently bonded atoms that acts like a single atom when combining with other atoms.

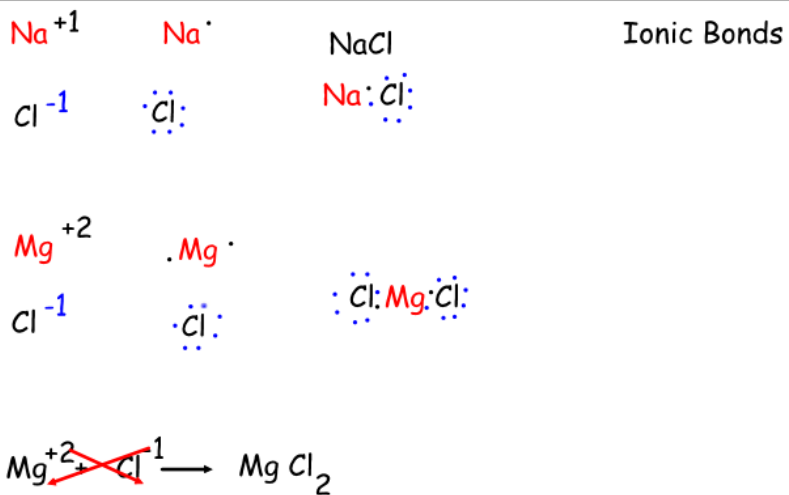
ex:  $\text{SO}_4^{-2}$ ,  $\text{NH}_4^{+1}$ ,  $\text{PO}_4^{-3}$

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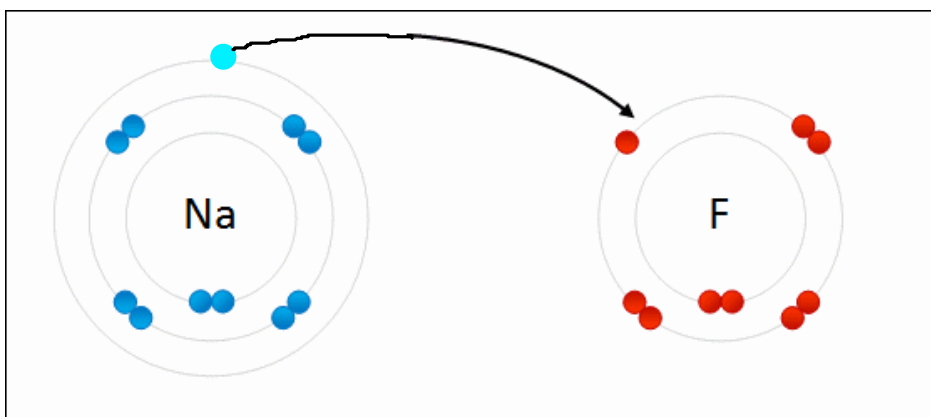
Metallic Bonds: The outer electrons of the atom form a common electron cloud. Occurs between two metal atoms, they form a sea of electrons and nuclei that are attracted to one another.



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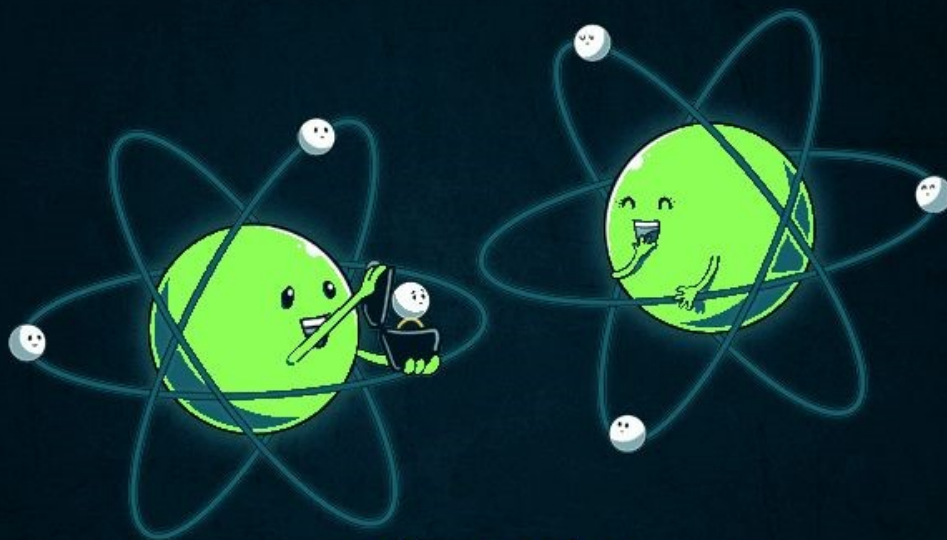


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[https://en.wikipedia.org/wiki/Ionic\\_bonding#/media/File:NaF.gif](https://en.wikipedia.org/wiki/Ionic_bonding#/media/File:NaF.gif)

# TYPES OF CHEMICAL BONDS

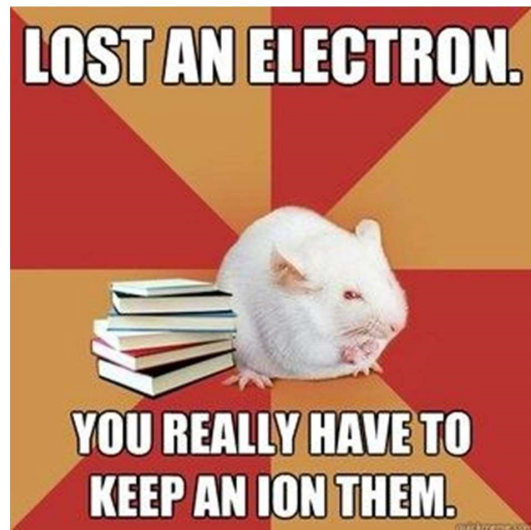


## #1: IONIC

Take this and be mine!

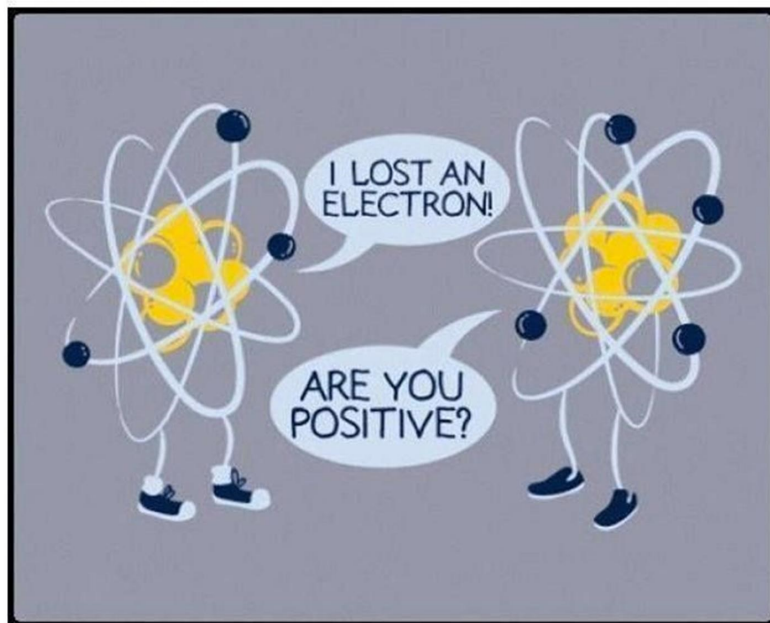
## Ion

- An ion is an atom or group of atoms that has an electric charge



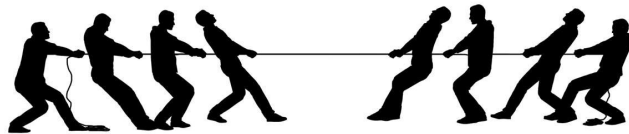
# Positive Ions

Atom humor



## Polar Bonds

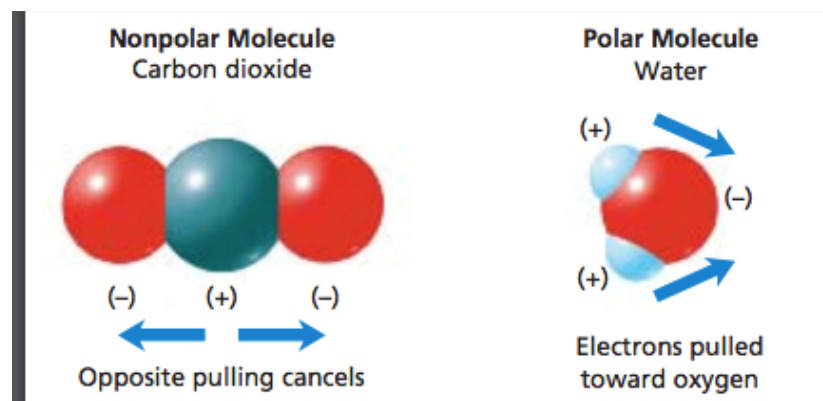
- Tug O'War
- Shared electrons are not always shared equally





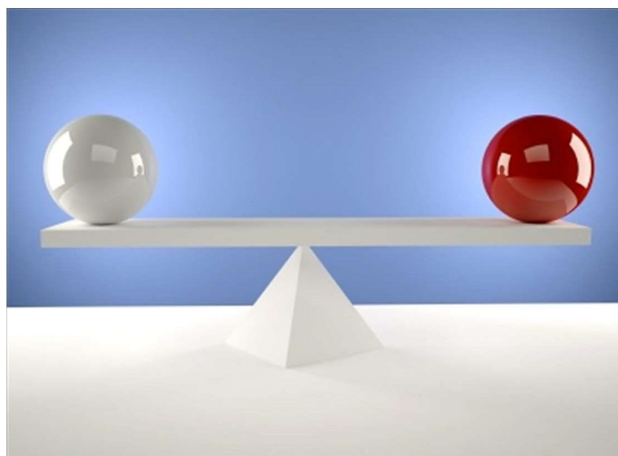
## Polar Bonds

- Polar ***bonds*** can result in polar or nonpolar ***molecules***




## Nonpolar Bonds

- When electrons are shared equally between two atoms, it is a **nonpolar** bond.



## Metallic Bonding

- <https://www.youtube.com/watch?v=vOuFTuvf4qk>  

- Chemistry: What is a metal? (Metallic Bonds)

