Medical chemistry- year1

Chemical bonding

Lecture 2 (part1)

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Objectives

1- definition of chemical bond and Valence electrons

2- types of chemical bonding

3- properties of ionic compounds

4-properties of covalent compounds

5- type of covalent bonds

6-Metallic bonds

7- Properties of Metallic bonds

definition

Chemical Bonding- mutual electrical attraction between the nuclei and valence electrons of different atoms that bind the atoms together .

Valence electrons- outer most electrons that are available to be lost ,gained or shared to from a chemical bond.

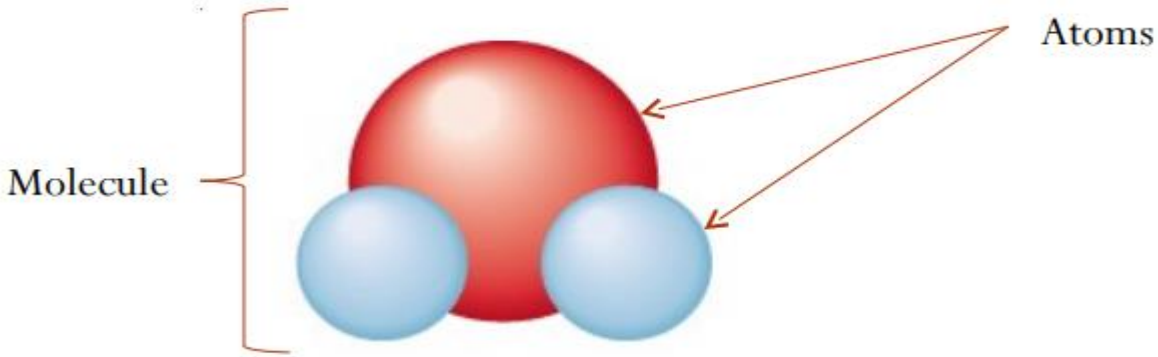
- All atoms trying to achieve a stable octet.

Chemical Bond

A force that holds groups of 2 or more atoms together and makes them function as unit

Atom- smallest unit of an element

Molecule- group of covalently bonded atoms



Types chemical Bonding

three major types of bonding

- Ionic Bonds(Compounds)
- Covalent Bonds (molecules)
- Metallic Bonds

Ionic Bonds

- Electrons are transferred between valence shells of atoms
- ionic compounds are made of ions
- ionic compounds are called salts or crystals
- always formed between matals and non-metals

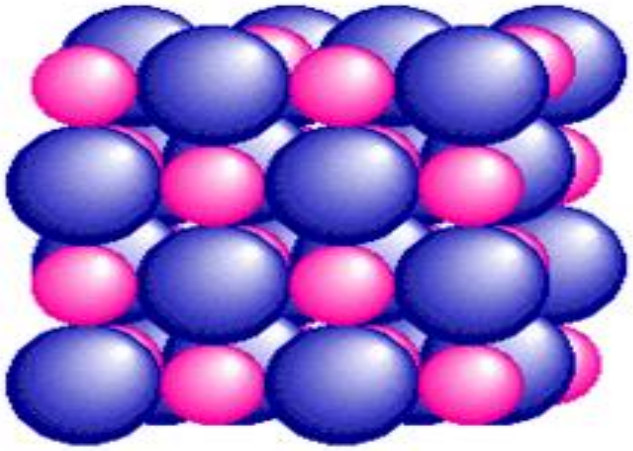
Metals ⟶ lose e-

non- metals ⟶ gained e -

Ionic Bonds

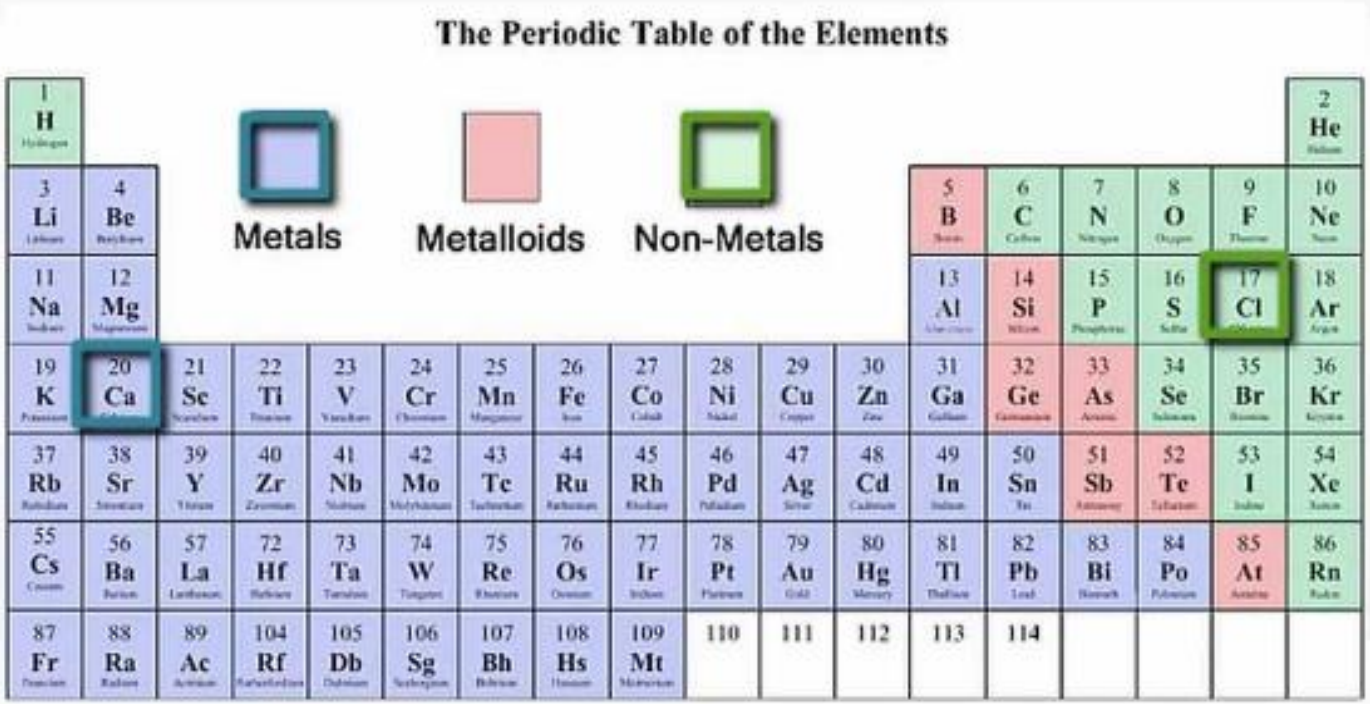
- Lose an electron Atom is Positive
- Gain an electron Atom is Negative
- Positive Ion is called Cation
- Negative Ion is called Anion

Ionic Bonds



Anion (-) Cation (+)

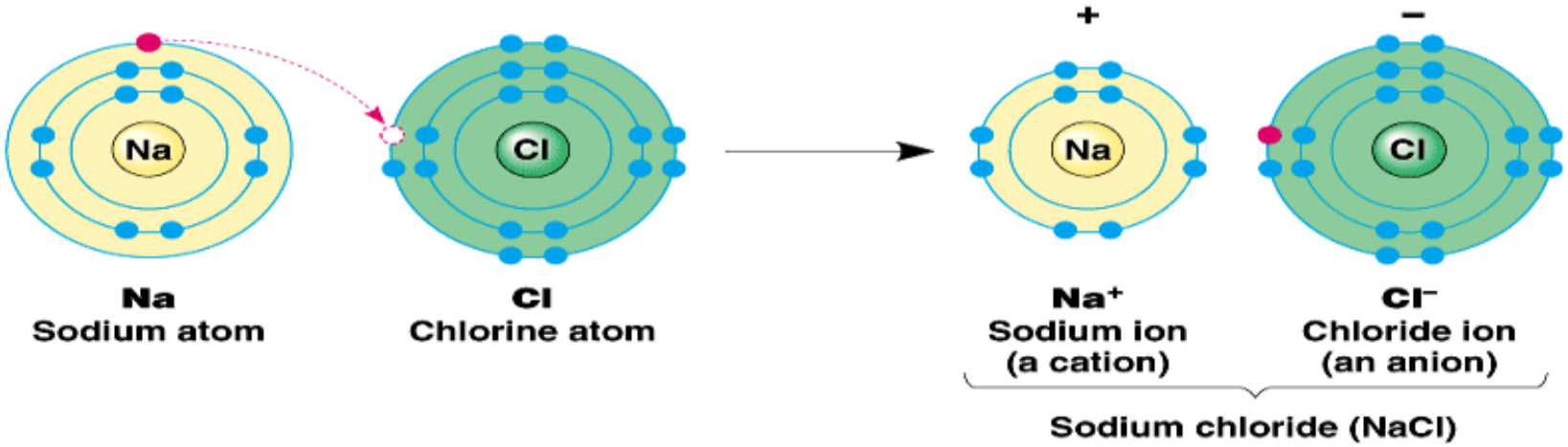
Ionic Compounds



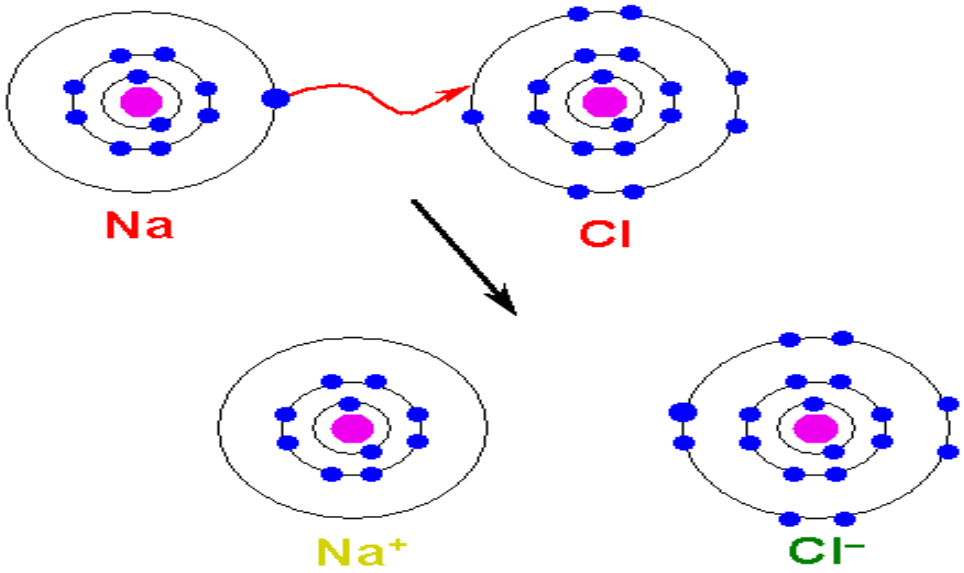
$CaCl_2$

FeOH

Example Of Ionic Bonds



A classic example of ionic bonding is between Na and Cl.Na is a silvery metal. It has 1 valence electon.Cl is a yellow- green gas, and it needs 1 electron to fill its valence shell. If you put the gas and the metal together ,then they will burn as electrons are exchanged .the metal dissolves and the gas disappears . The ions now have oppsite charges and are attracted to each other by electrostatic forces. They form a crystal with the rock salt structure.



$$Na + Cl \rightarrow Na^{+} + Cl^{-} \rightarrow NaCl$$

11: $Na / 1S_2\ 2S_2\ 2P_6\ 3S_1 \longrightarrow Na^{+} / 1S_2\ 2S_2\ 2P_6$

17: $Cl / 1S_2\ 2S_2\ 2P_6\ 3S_2\ 3P_5 \longrightarrow Cl^{-} / 1S_2\ 2S_2\ 2P_6\ 3S_2\ 3P_6$

Properties of Ionic Compounds

- hard solid at 22°C .
- high mp temperatures .
- nonconductors of electricity in solid phase.
- good conductors in liquid phase or dissolved in water (aq) .