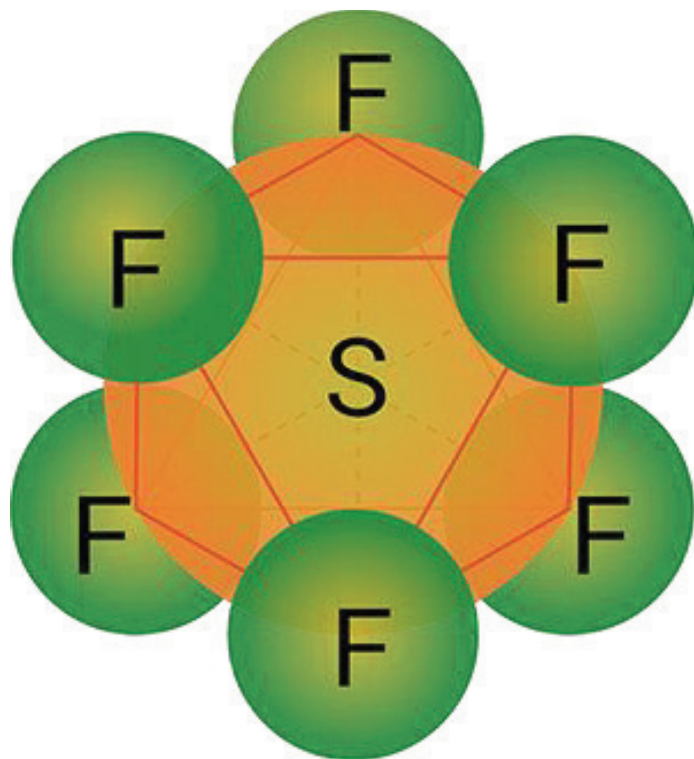


CHEMICAL BONDING AND MOLECULAR STRUCTURE



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CHEMICAL BONDING AND MOLECULAR STRUCTURE

Introduction:

Structure and Bonding is the heart of chemistry. Chemical bond is very important to explain the properties and structure of compound. The important aspect of each type of force is its relative strength, how rapidly it decreases with increasing distance and whether it is directional in nature or not.

Chemical Bond:

It is the force of attraction between two atoms which hold them together in a compound or molecule. Nature loves stability and bond formation is associated with stability. Every element has a tendency to occupy inert electronic configuration which is considered as very stable. Noble gas electronic configuration can be achieved by

1. Transference of electrons
2. Mutual sharing of electrons
3. Donation of lone pair of electrons

Types of Bond

In order to explain the formation of a chemical bond in terms of electrons, Lewis postulated that atoms achieve stable octet when they are linked by a chemical bond. On the basis of this chemical bonds are following type:

1. Ionic bond
2. Covalent bond
3. Co-ordinate bond
4. Metallic bond
5. Hydrogen bond
6. van der Waal's bond

Lewis Dot Structures

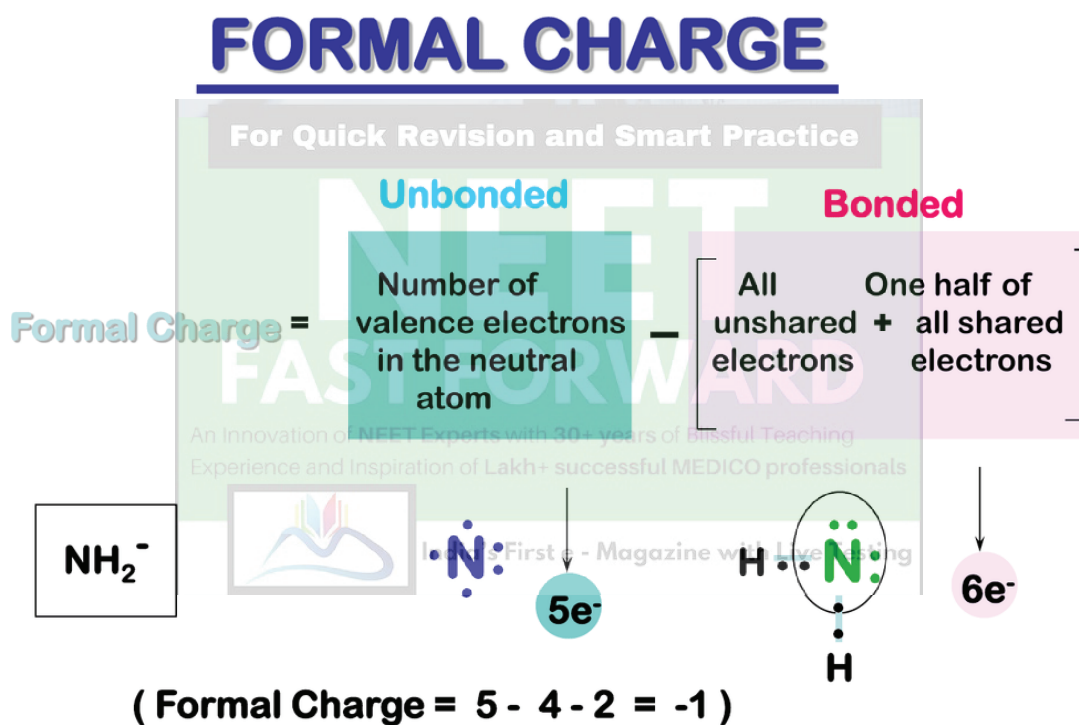
Valence Electrons: In the formation of a molecule only the outer shell electrons take part in chemical bond combination and they are known as valence electrons. In Lewis symbols, an element is shown with symbol and valence electrons.

Octet Rule

It is proposed by Kossel and Lewis and according to this, "Every atom has a tendency to attain Noble gas electronic configuration or to have 8 valence electrons". This is known as law of octet rule or if it has two valence electrons then this is known as law of duplet. According to Lewis, only those compounds will be stable which follow octet rule.

Formal Charge

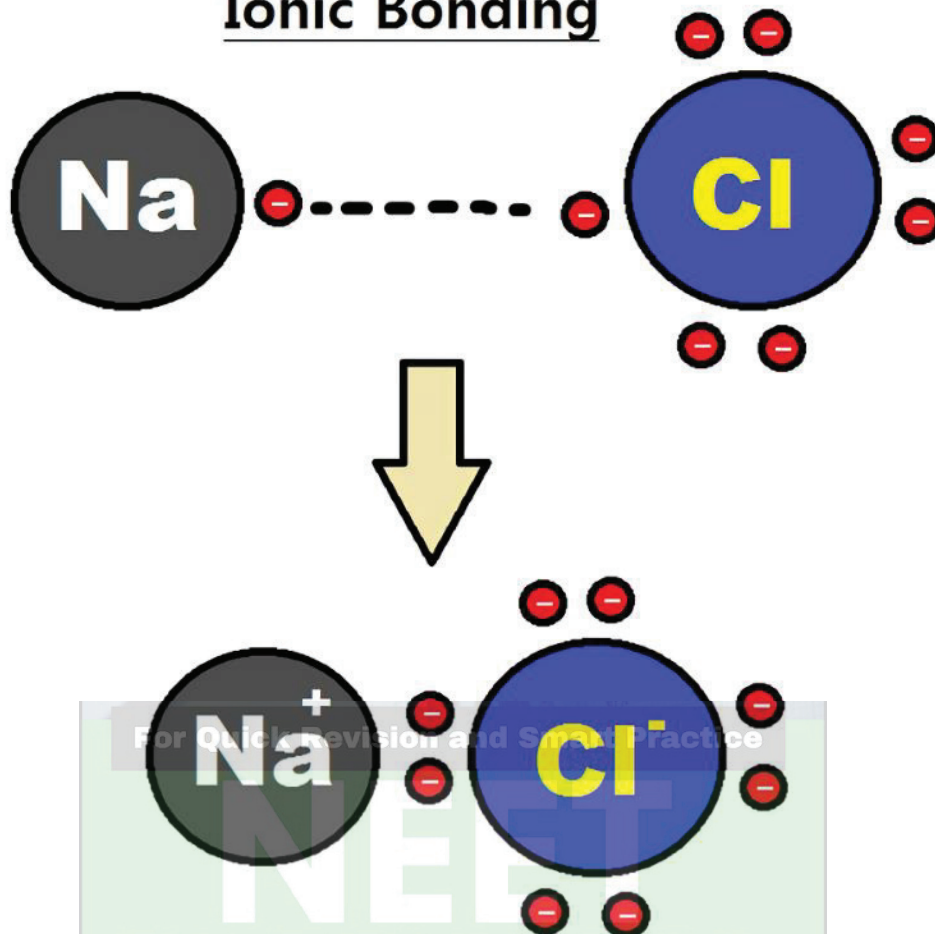
Formal charge on an atom is the difference between the number of valence electrons in an isolated atom and the number of electrons assigned to that atom in a Lewis structure. It is expressed as:



Ionic Bond

An ionic bond is formed by complete transference of one or more electrons from the valence shell of one atom to the valence shell of another atom. In this way both the atoms acquire stable electronic configurations of noble gases. The atom which loses electron becomes a positive ion and the atom which gains electron becomes negative ion.

Ionic Bonding



Note: Electrovalency is the number of electrons lost or gained during the formation of an ionic bond or electrovalent bond.

Characteristics of Ionic Compounds:

1. They are hard, brittle and crystalline.
2. They have high melting and boiling points.
3. They are polar in nature.
4. The linkage between oppositely charged ions is non rigid and non directional.
5. They are soluble in polar solvents such as water and insoluble in non polar solvents such as CCl₄, Benzene, ether etc.
6. They are good conductors of electricity in fused state and in solution due to mobility of the ions. They are bad conductors of electricity in solid state because ions are unable to move.



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