

In this article, we will discuss the **chemical bonding** which many elements forms to complete its octet. This topic is important for the competitive exams.

Chemical bonding:

- Atoms, molecule or ions or different elements except the noble, do not have complete or stable octet so they combine with another element to complete its octet, this process of completing its octet by combining with other element is known as **chemical bonding**.

Valency:

- Valency is the main point on which chemical bonding depends.
- Valency of an element is the **capacity** to form chemical bonds and it is equal to the number of electron in its atom.

Ions:

- An ion is electrically charged particle.
- A positively charged particle is called **cation** while a negatively charged particle is known as **anion**.
- A cation is formed due to the **loss** of electron (Na^+ , H^+).
- An anion is formed due to the **gain** of electron (F^- , Cl^-).

Types of chemical bonding:

Chemical bonding are of following types depending upon the sharing of electron or transfer of electron.

Electrovalent Bond:

- The bond formed by the transfer of an electron from one atom to another is called electrovalent bond or ionic bond.
- The compound formed due to electrovalent bond is called **electrovalent compound** or ionic compound.
- These bonds are formed between metals and non-metals.
- Electrovalent compound have high melting and boiling point.
- They are conductor of **electricity** when dissolved in water.
- They are soluble in water but not in organic solvents like alcohol.
- e.g. Aluminium Oxide (Al_2O_3), Ammonium chloride (NH_4Cl) and Calcium chloride (CaCl_2)

Covalent Bond:



- The bond is formed by the **sharing** of an electron between two atoms of the same or different elements, is called covalent bond and the compound formed due to this bonding is called Covalent compound.
- Covalent bond may be single, double or triple depending upon the number of sharing pairs of electron.
- Covalent compounds have **low** melting and boiling point.
- They do not conduct electricity and are insoluble in water but dissolve in organic compound.
- e.g. Alcohol (C_2H_5OH), Ammonia (NH_3), Ethane (C_2H_6), Methane (CH_4).

Coordinate and Dative Bond:

- The bond is formed by one-sided sharing of one pair of electrons between two atoms.
- The main condition for formation of Coordinate bond is that octet of one atom should be complete, having at least one lone pair of electron and other atom should have a deficiency of at least one pair of electrons.
- The atom having complete octet which provides the electron pair for sharing is known as **donor**.
- The other atom which accepts the electron pair is called **acceptor**.

Sigma Bond:

- A bond is formed by the linear overlapping of atomic orbitals is called sigma bond.
- The extent of overlapping in sigma bond is large so they are **strong bond**.

Pi-bond:

- This bond is formed by the lateral or **sidewise** overlapping of atomic orbitals.
- Since the extent of overlapping is small so they are weak bond.
- e.g. in O_2 one bond is sigma and one is pi bond.

Hydrogen bond:

When hydrogen atom is present between two most electronegative atoms then it is bonded to one by a covalent bond and to other by a weak force of attraction which is called hydrogen bond. e.g. Present in H_2O and HF .

