

Chemical Bonding

The force that holds together the different atoms in a molecule is called chemical bond. There are many types of chemical bond.

1. Ionic bond or (Electrovalent bond) : A bond formed by the complete transfer of one or more electrons from one atom to other atom is called ionic bond.

Condition of ionic bond : I. Ionization energy of metal should be low.

II Electron affinity of non-metal should be high.

Properties of ionic compounds :

- (a) Ionic compounds have high melting point & boiling point.
- (b) Ionic compounds are good conductor of electricity in molten state or in water.
- (c) Ionic compounds are bad conductor of electricity in solid state.
- (d) Ionic compounds are soluble in water.
- (e) Ionic compounds are insoluble in non-polar covalent like Benzene, Carbon tetrachloride etc.

Properties of covalent compounds :

- (a) Covalent compounds have high m.p. & b.p.
- (b) They are generally bad conductor of electricity (exception graphite)
- (c) They are generally insoluble in water.
- (d) They are generally soluble in organic solvent like benzene, acetone, chloroform etc.
- (e) Covalent bonds are directional.

Sigma bond (σ -bond) : A bond formed by the linear overlapping of atomic orbitals is called sigma bond. Since, the extent of overlapping of atomic orbitals in σ -bond is large. Hence σ -bond is a strong bond.

Bond energy : The amount of energy required to break one mole bonds of a particular type between the atoms in the gaseous state of a substance is called bond energy. The bond energy depends upon the following factors.

I. Size of atom II. Multiplicity of bonds.

Greater the size of atoms, Lesser will be bond energy.

Greater the bond multiplicity more will be bond energy.

Bond energy : Single bond < double bond < triple bond

Bond length : The average equilibrium distance between the centres of the two bonded atoms is called bond length. The bond length is influenced by the following factors—

(i) Size of atoms (ii) Multiplicity of bonds

Greater the size of atoms, greater will be bond length.

Greater the multiplicity of bonds, lesser will be bond length.

There are two type of hydrogen bonding

(i) Intermolecular hydrogen bond.

(ii) Intramolecular hydrogen bond.

Intermolecular hydrogen bond arises when hydrogen bonding occurs between two or more molecules. In this case m.p. & b.p. of compound increases due to molecular association.

