CONCEPT MAP

CHEMICAL BONDING

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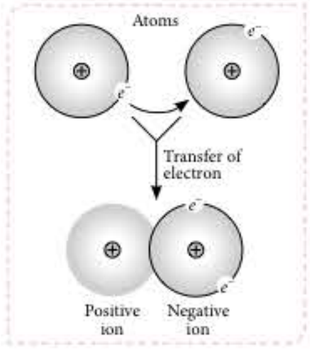
When a chemical bond is formed, the potential energy becomes minimum and the system gains stability.

Primary Bonds

Primary bonds involve sharing or donating electrons between atoms to form a more stable electronic configuration.

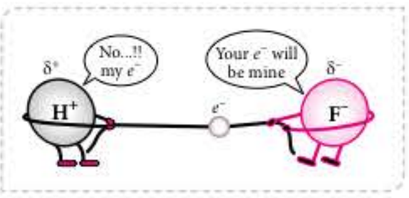
Ionic Bond

The electrostatic bond between two ions formed through the transfer of one or more electrons.



Factors favouring ionic bond formation :

- Low ionisation enthalpy of metal
- High electron gain enthalpy of non-metal
- High lattice enthalpy of ionic compounds
  - Higher charge on ions
  - Smaller size of ions

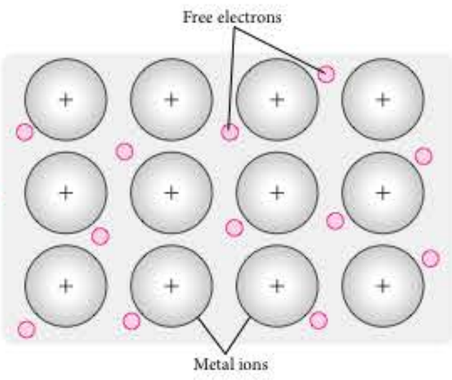


Metallic Bond

Electrostatic attraction between sea of electrons and positive ions.

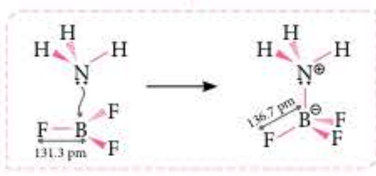
Factors favouring metallic bond formation :

- Low ionization enthalpy.
- Sufficient number of vacant orbitals in valance shell.



Coordinate Bond

In this type of bond sharing electrons are donated by one atom only.

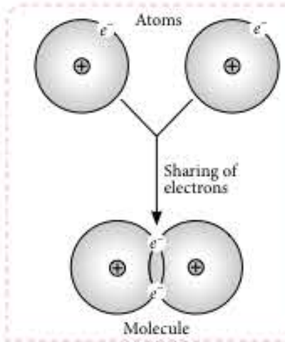


Conditions required for coordinate bond formation :

- One atom must have lone pair of electrons.
- Another atom must have the tendency to take that lone of pair of electrons.

Covalent Bond

Covalent bond formation takes place due to the sharing of electrons.



Factors favourable for covalent bond formation :

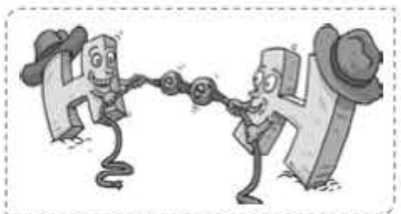
- Ionisation enthalpies of combining atoms must be comparable.
- Electron gain enthalpies of combining atoms must be comparable.

Polar Covalent Bond

- Between two atoms with different abilities to attract electrons.
- Molecule itself becomes polar when the shape of the molecule allows a permanent separation of charge.

Non-Polar Covalent Bond

- Between two atoms with same abilities to attract electrons.
- Some linear molecules (of different atoms) can be non-polar because the separated charge cancels each other.



Secondary Bonds

Secondary bonds are not bonds with valance electrons being shared or donated, they are usually formed when an uneven charge distribution occurs.

Hydrogen Bond

Hydrogen bonding occurs when :

- Hydrogen atom is attached to a highly electronegative atom such as F, O and N.
- The highly electronegative atom is small in size.
- The highly electronegative atom has unshared pair of electrons.

Electrostatic attraction of hydrogen covalently bonded to an electronegative atom in one molecule or different molecules.

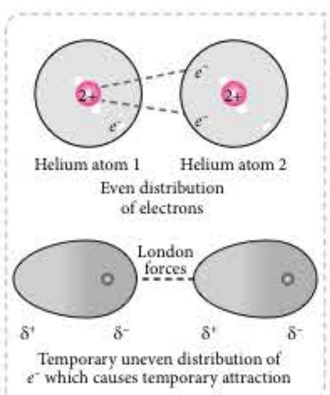
Hydrogen Bonding in water molecule

van der Waals' Forces

It is a general term used for short range electrostatic attractive forces between uncharged molecules.

London Forces

- It is a temporary attractive force that results when an electron in two adjacent atom occupy positions that make atoms to form temporary dipole.
- It is also called induced dipole-induced dipole.
- This is the weakest intermolecular force.



Dipole Interactions

- It results when two dipolar molecules interact with each other through space.
- Polar molecules align so that the positive end of one molecule attract the negative end of another molecule.