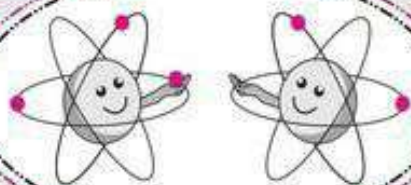




## CHEMICAL BONDING

a force that acts between two or more atoms to hold them together and makes them function as a unit.

Class  
XI



### Electrovalent or Ionic Bond

A chemical bond formed by the electrostatic attraction between positive and negative ions. e.g., in NaCl,  $\text{MgF}_2$ ,  $\text{Na}_2\text{S}$ , etc.

### Favourable Conditions

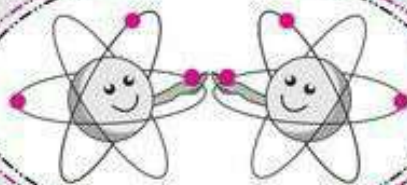
- Difference in electronegativities of two atoms must be about 2 or more.
- Lower I.E. of an atom to form a cation, higher E.A. of another atom to form an anion and higher L.E. released when cations and anions are condensed into crystal will favour the formation of ionic bond. The summation of three energies should be negative i.e., energy is released.  
 $\text{I.E.} + \text{E.A.} + \text{L.E.} = -ve$

### Characteristics

- Compounds having ionic bonding are usually crystalline in nature.
- They have high stability, density, m.pt and b.pt.
- They conduct electricity only when melted or dissolved in a polar solvent.
- They are soluble in polar solvents like water, etc.

### Types of Covalent Bonds

- **Non-polar covalent bond :** Shared electrons are equally attracted by the two atoms as the electronegativity of the atoms is same. e.g.,  $\text{H}_2$ ,  $\text{Cl}_2$ , etc.
- **Polar covalent bond :** Shared pair of electrons move towards the atom having greater electronegativity. e.g.,  $\text{NH}_3$ ,  $\text{CHCl}_3$ , etc.



### Covalent Bond

A chemical bond formed by sharing one or more electron pairs between atoms provided each atom contributes equally e.g., in  $\text{CH}_4$ , HCl,  $\text{H}_2\text{O}$ , etc.

### Characteristics

- Compounds with covalent bonds generally have low m.pt. and b.pt. due to weak forces of attraction between molecules.
- In general, these compounds are bad conductor of electricity.
- These compounds are soluble in non-polar solvents and insoluble in polar solvents.

### Favourable Conditions

- Difference in electronegativities of two atoms must be zero or very small (approx. less than 1.6)
- Atoms having 5, 6 or 7 valence electrons share electrons to complete its noble gas configuration.

### Characteristics

- Compounds with coordinate bond have m.pt. and b.pt. higher than pure covalent compounds and lower than pure ionic compounds.
- These compounds like covalent compounds are bad conductor of electricity.
- These compounds are sparingly soluble in polar solvents but readily soluble in non-polar solvents.

### Coordinate Bond

A covalent bond in which both electrons of the shared pair are contributed by one of the two atoms. e.g., in  $\text{NH}_4^+$  ion, CO molecule, etc.

