METALS & NON-METALS

Lithium	Li
Potassium	K
Barium	Ba
Sodium	Na
Calcium	Ca
Magnesium	Mg
Aluminium	Al
Zinc	Zn
Iron	Fe
Nickel	Ni
Tin	Sn
Lead	Pb
Hydrogen	H
Copper	Cu
Mercury	Hg
Silver	Ag
Gold	Au
Platinum	Pt

Activity decreases

$Na + Cl \longrightarrow Na^+ + Cl^-$

(2,8,1) (2,8)

$Cl + e^- \longrightarrow Cl^- + EA$

(2,8,7) (2,8,8)

$Na^+ + Cl^- \longrightarrow [Na]^+[:\ddot{Cl}:]^-$ or NaCl

Electrostatic force of attraction due to which positively & negatively charged ions are bonded with each other is known as ionic bond.

Compound containing ionic bonds is known as ionic compound e.g. NaCl, MgO etc.

Ionic bond

- Definition
- Example : formaion of NaCl

Ionic compound

- Definition
- Properties
  - (i) Consist of ions
  - (ii) Solid & hard due to strong electrostatic forceof attraction
  - (iii) Definite crystal structure
  - (iv) High m.p. & b.p.
  - (v) Soluble in polar solvents like H_2O
  - (vi) Brittle nature
  - (vii) Good conductor of electricity in molten and aqueous state

Reactivity series

Chemical properties of non-metal

Reaction with oxygen

Non-metal + Oxygen ⟶ Non-metal oxide

C + O_2 ⟶ CO_2

S + O_2 ⟶ SO_2

Reaction with water

Non-metal + Water ⟶ No reaction

Reaction with dilute acid

Non-metal + Acid ⟶ No reaction

Reaction with salt solution

More reactive Non-metal + Salt ⟶ Less reactive Non-metal + Salt

Cl_2 + KBr(aq) ⟶ Br, + KCl(aq)

Reaction with Hydrogen

Non-Metal + Hydrogen ⟶ Non-Metal hydride

$O_2 + 2H_2 \longrightarrow 2H_2O$

$N_2 + 3H_2 \xrightarrow[Fe,Mo]{Li} 2NH_3$

Physicall properties of metal & non-metal

Non-Metal

- Generally gaseous
- Low m.p. & b.p.
- Brittle
- Generally soft
- Bad conductor of heat & electricity
- Not ductile
- Do not have any lustre
- Not sonorous
- Low density

Metal

- Generally Solid
- High m.p. & b.p.
- Malleable
- Generally hard
- Good conductor of heat & electricity
- ductile
- lustrous
- Sonorous
- High density

Chemical properties of metal

Reaction with oxygen

Metal + Oxygen ⟶ Metal oxide

4Na + O_2 ⟶ $2Na_2O$ (at room temperature)

2Mg + O_2 ⟶ 2MgO (heating)

2Zn + O_2 ⟶ 2ZnO (Strong heating)

2Cu + O_2 ⟶ 2CuO (Prolonged heating)

Reaction with water

Metal + Water ⟶ Metal oxide or Hydroxide + H_2

2Na + 2H,O(cold water) ⟶ 2NaOH + H_2

Mg + H,O(boil water) ⟶ MgO + H_2

Zn + H,O(steam) ⟶ ZnO + H_2

3Fe(red hot) + 4H,O(steam) ⟶ Fe_3O_4 + $4H_2$

Reaction with dilute acid

Metal + dil. acid ⟶ Salt + Hydrogen

2Na + 2HCl ⟶ 2NaCl + H_2

Mg + H_2SO_4 ⟶ MgSO. + H2

Reaction with salt solution

More reactive metal + Salt ⟶ less reactive metal + salt

Fe + $CuSO_4$(aq) ⟶ Cu + $FeSO_4$(aq)

Fe + ZnSO.(aq) ⟶ No reaction