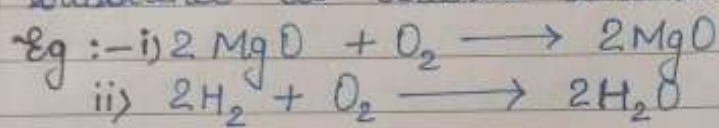
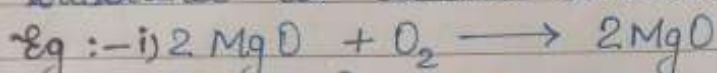


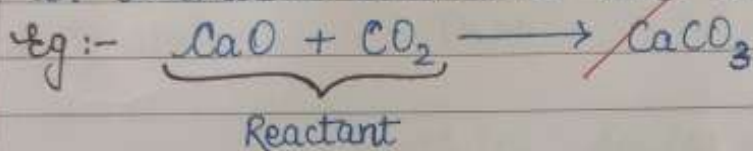
C.W.

Chapter - 1Chemical Reaction & Equation∴ Notes ∴

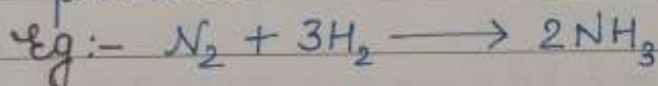
- * Chemical Reaction - The process in which one or more substance transform into a new substance is called chemical reaction.



- * Reactants - The substance which take part in chemical reactions are called reactants.



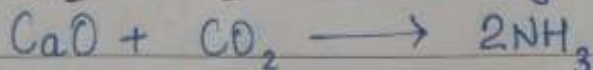
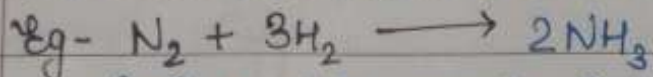
- * Product - the substances which are formed during chemical reaction are called product.



* TYPES OF CHEMICAL REACTION

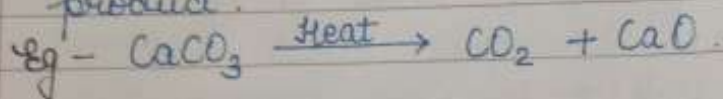
There are following types of chemical reaction:-

- i) Combination Reaction - when two or more substances combine to form a new substance is called combination reaction.

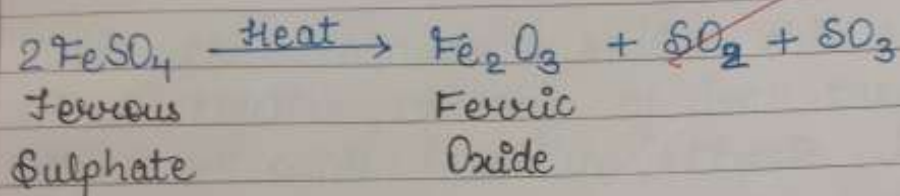


Here Calcium Oxide reacts with Carbon dioxide to form Calcium Carbonate.

ii) Decomposition Reaction - In this reaction, a single reactant breaks down to give simpler product.



When Calcium Carbonate is heated, it decomposes into Calcium Oxide & Carbon dioxide.

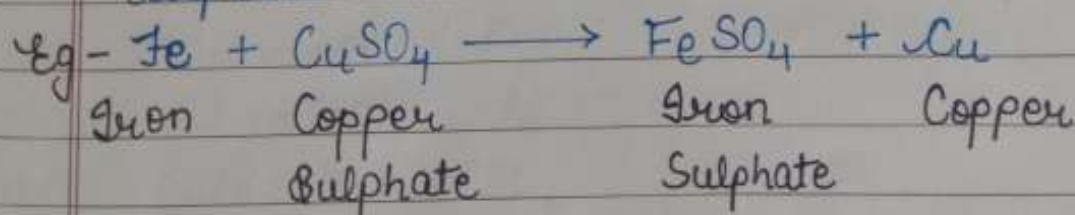


Reactivity Series

Element $\rightarrow$ Potassium $>$ Sodium $>$ Calcium $>$ Magnesium $>$ Aluminium $>$ Zinc $>$ Iron $>$ Lead $>$ Hydrogen $>$ Copper $>$ Mercury $>$ Silver $>$ Gold $>$ Platinum.

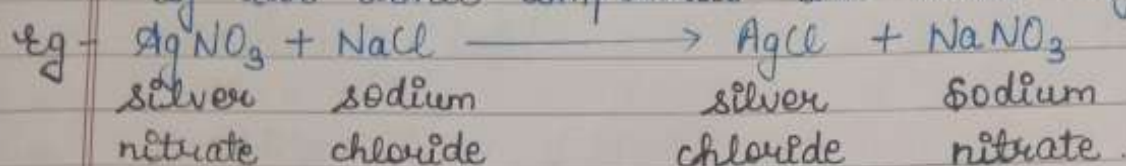
Symbol $\rightarrow$ K $>$ Na $>$ Ca $>$ Mg $>$ Al $>$ Zn $>$ Fe $>$ Pb $>$ H $>$ Cu $>$ Hg $>$ Ag $>$ Au $>$ Pt

iii) Displacement Reaction - those chemical reactions in which more reactive metal displaces a less reactive metal from its salt solution is called displacement reaction.



In above reaction, more reactive iron metal displace the less reactive copper metal from Copper Sulphate salt solution.

iv) Double Displacement - those reactions in which exchange of ions takes place when the solution of two ionic compounds are mixed together.



When silver nitrate & sodium chloride solution mixed together, exchange of ion takes place & silver chloride & sodium nitrate is formed.

Valency for the Basic Ions

★ Monovalent Anions:-

- | | |
|---|-------------------------------------|
| i) Chloride ion = Cl^- | xvi) Chlorite = ClO_2^- |
| ii) Fluoride = F^- | xvii) Hypochlorite = ClO^- |
| iii) Bromide = Br^- | xviii) Cyanide = CN^- |
| iv) Iodide = I^- | xix) |
| v) Hydroxide = OH^- | |
| vi) Bicarbonate = HCO_3^- | |
| vii) Nitrate = NO_3^- | |
| viii) Nitrite = NO_2^- | |
| ix) Acetate = CH_3COO^- | |
| x) Hydride = H^- | |
| xi) Permanganate = MnO_4^- | |
| xii) Chromate = CrO_4^- | |
| xiii) Aluminate = AlO_2^- | |
| xiv) Chlorate = ClO_3^- | |
| xv) Perchlorate = ClO_4^- | |



★ Divalent Anions

- i) Carbonate = CO_3^{2-}
- ii) Sulphate = SO_4^{2-}
- iii) Sulphide = S^{2-}
- iv) Sulphite = SO_3^{2-}
- v) Manganate = MnO_4^{2-}
- vi) Dichromate = $\text{Cr}_2\text{O}_7^{2-}$
- vii) Oxide = O^{2-}
- viii) Carbide = C^{2-}
- ix) Zincate = ZnO_2^{2-}
- x) Plumbate = PbO_2^{2-}

★ Trivalent Anions

- i) Nitride = N^{3-}
- ii) Phosphate = PO_4^{3-}
- iii) Phosphide = P^{3-}
- iv) Phosphite = PO_3^{3-}

★ Monovalent Cations

- | | |
|-------------------------------|-----------------------------------|
| i) Lithium = Li^+ | vi) Phosphonium = PH_4^+ |
| ii) Sodium = Na^+ | vii) Hydrogen = H^+ |
| iii) Potassium = K^+ | viii) Mercurous = Hg^+ |
| iv) Cuprous = Cu^+ | ix) Argentous = Ag^+ |
| v) Ammonium = NH_4^+ | |

★ Divalent Cations

- i) Calcium = Ca^{2+}
- ii) Magnesium = Mg^{2+}
- iii) Barium = Ba^{2+}
- iv) Zinc = Zn^{2+}
- v) Ferrous = Fe^{2+}



- | | |
|-----------------------------------|------------------------------------|
| vi) Cupric = Cu^{2+} | xi) Cobalt = Co^{2+} |
| vii) Mercuric = Hg^{2+} | xii) Nickel = Ni^{2+} |
| viii) Argentio = Ag^{2+} | xiii) Manganese = Mn^{2+} |
| ix) Beryllium = Be^{2+} | xiv) Aurous = Au^{2+} |
| x) Lead = Pb^{2+} | xv) Platinum = Pt^{2+} |

★ Trivalent Cations

- | | |
|------------------------------------|----------------------------------|
| i) Ferric = Fe^{3+} | vi) Arsenic = As^{3+} |
| ii) Auric = Au^{3+} | vii) Antimony = Sb^{3+} |
| iii) Cobalt = Co^{3+} | viii) Bismuth = Bi^{3+} |
| iv) Nickel-Boron = B^{3+} | ix) Gallium = Ga^{3+} |
| v) Aluminium = Al^{3+} | x) Titanium = Ti^{3+} |

★ Tetravalent Cations

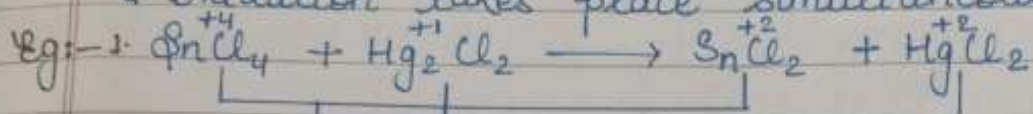
- | | |
|-----------------------------------|---------------------------------|
| i) Lead = Pb^{4+} | iv) Polonium = Po^{4+} |
| ii) Platinum = Pt^{4+} | v) Silicon = Si^{4+} |
| iii) Zirconium = Zr^{4+} | |

Difference between Oxidation & Reduction :-

Oxidation	Reduction
1. Addition of O. eg. $\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO}$	1. Addition of H. eg. $\text{Cl}_2 + \text{H}_2 \longrightarrow 2\text{HCl}$
2. Removal of H. $2\text{NH}_3 + 3\text{Cl}_2 \longrightarrow \text{N}_2 + 6\text{HCl}$	2. Removal of O. $\text{CuO} + \text{H}_2 \longrightarrow \text{H}_2\text{O} + \text{Cu}$
3. Loss of electron(s) eg. $\text{Fe}^{2+} - e^- \longrightarrow \text{Fe}^{3+}$	3. Gain of electron(s) eg. $\text{Cl} + e^- \longrightarrow \text{Cl}^-$
4. Increase in valency	4. Decrease in valency.

v) Redox Reaction :-

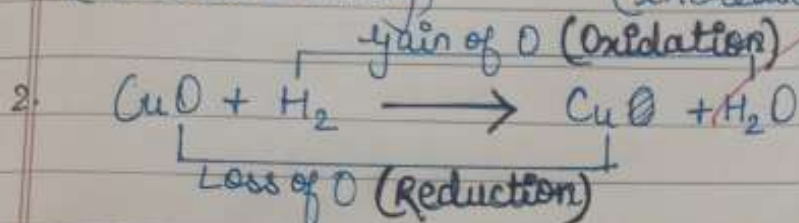
In this type of reaction, reduction & oxidation takes place simultaneously.



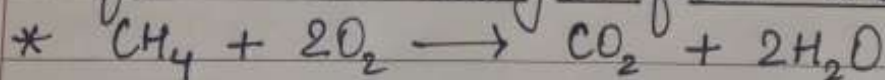
Reduction
(decrease in valency)

Oxidation

(increase in valency)

☆ Significance of CO_2

- The compound is Carbon dioxide
- It is made of 2 Oxygen atoms combined with 1 atom of carbon.
- It is 44 g of carbon-dioxide.
- It is 1 mole of CO_2 .
- It occupies 22.4 l of volume at standard temperature & pressure (STP)
- It contains 6.022×10^{23} molecules of CO_2 .

☆ Information we get from Chemical Reactions

- 1 mole of methane reacts with 2 mole of oxygen to form 1 mole of CO_2 & 2 mole of water (H_2O)
- 16 g of methane reacts with 64 g of oxygen to form 44 g of CO_2 & 32 g of water.



- At standard temp. ~~from~~ pressure 22.4 l of methane reacts with 44.8 l of oxygen to give 22.4 l of CO_2 & 44.8 g of water (H_2O).

Good

4/27
25/4/19

