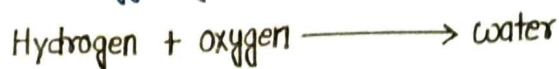


CHEMICAL REACTIONS AND EQUATIONS

CHEMICAL REACTION :- A process in which new chemical(s) are formed.

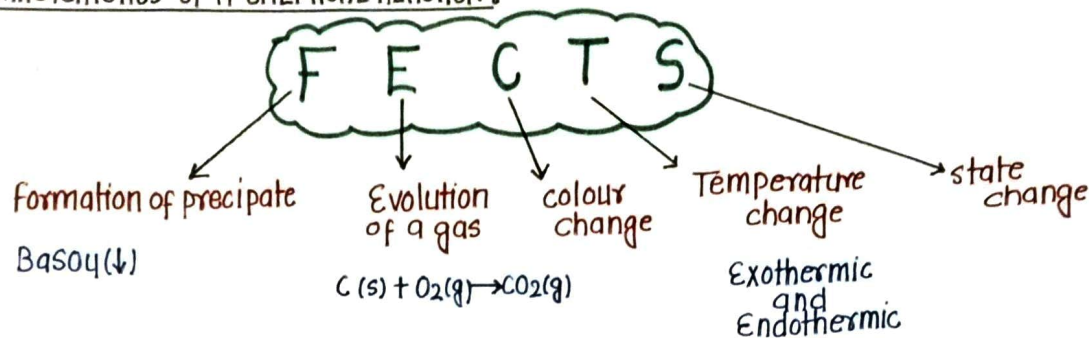
- Hydrogen gas react with Oxygen gas to produce water under some condition.



CHEMICAL EQUATION :- simple Representation of a chemical Reaction with symbols and formula.



CHARACTERISTICS OF A CHEMICAL REACTION :-



BALANCED CHEMICAL REACTION :-

- Number of Atoms of each element in a chemical Equation should be the same as LHS and RHS

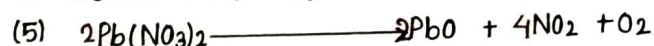
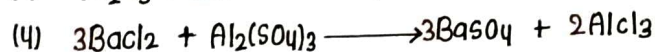
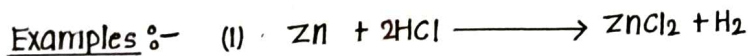


Why Balance?

Conservation of mass - Total mass of Reactant should be equal to total mass of products.

Trick

- First Balance Metals Zn, Fe, Na, Al, Mg, Mn, Cu, Ca, Pb, Ba
- Second Balance Non-Metals Cl, Br, S, N, C
- Third Balance oxygen then Hydrogen



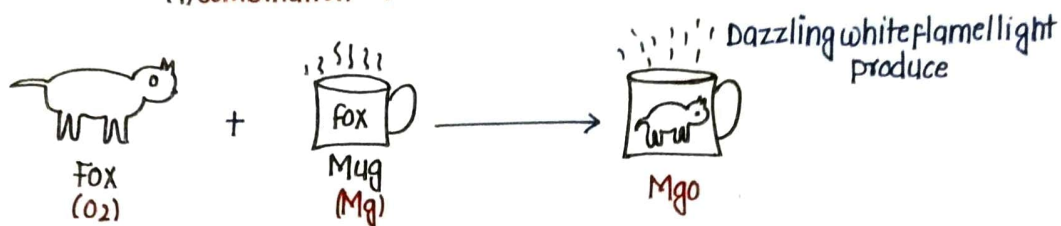
TYPES OF CHEMICAL REACTION :-

(i) Combination Reaction :- Two or More reactant combine to form a single product.



- Important points :-
- (1) Mg burns with Dazzling white flame (Very Bright light)
 - (2) A white MgO powder in watch glass
 - (3) Heat Energy releases so temperature increases.
 - (4) Combination and Exothermic Reaction.

Trick

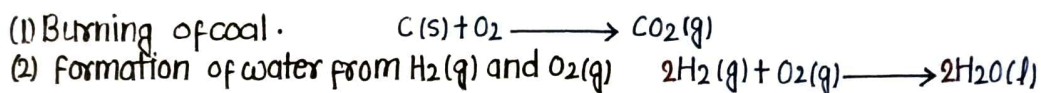


Fox भाकर Mug में गिरा तो एक Dazzling white light produce हुआ।



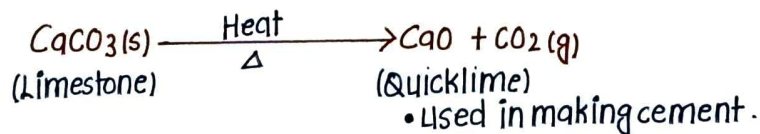
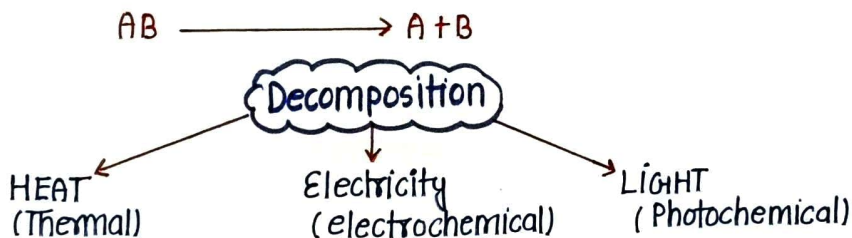
- Important points :-
- (1) Rise in temperature (exothermic).
 - (2) Quick lime reacts vigorously with water.
 - (3) water added slowly because Reaction is exothermic.
 - (4) Quick lime used in making cement.
 - (5) combination and Exothermic Reaction.

Other Examples of Combination Reaction :-

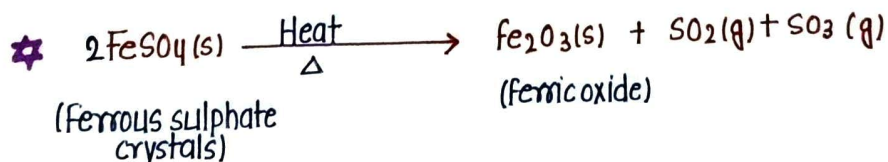


(2) Decomposition Reaction :-

- One reactant breaks into two or more product.

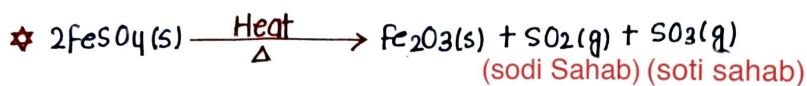
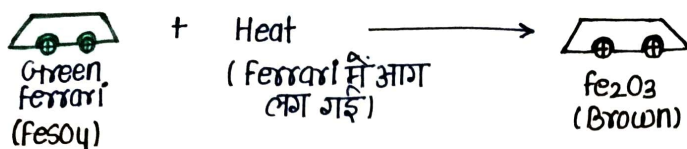


(i) THERMAL DECOMPOSITION (Thermolysis)



- Important points :-
- (1) Ferrous sulphate crystals lose water and colour changes from pale green ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$) to white (FeSO_4) on heating. Further heating decomposes FeSO_4 to Fe_2O_3 (Reddish-brown)

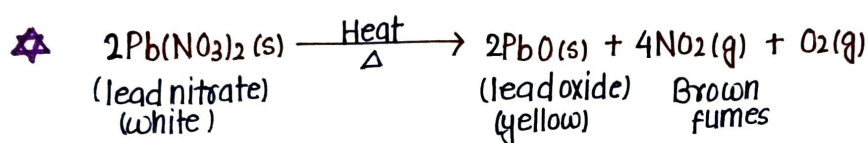
Trick :- ☆ Green $\xrightarrow{\text{Heat}}$ Dirty white $\xrightarrow{\text{Heat}}$ Brown



SO₂ = sulphur dioxide
 SO₃ = sulphur trioxide

- (2) smell of burning sulphur (matchstick) → smell of SO₂(g) (suffocating odour)
- (3) SO₂(g) and SO₃(g) are air pollutant and acidic in nature.
- (4) Thermal Decomposition and Endothermic Reaction.

Trick



pub night (lead Nitrate) mein white kurta pehn kar gya daal (yellow) manga aur daal kurta Pe gir gyi

Important points:-

- (1) cracking sound.
- (2) Brown fumes of NO₂(g) irritates smell.
- (3) Yellow solid residue (PbO).
- (4) NO₂ gas is acidic in nature and turns moisture blue litmus red.
- (5) Thermal Decomposition and Endothermic Reaction.

(2) ELECTROLYTIC DECOMPOSITION (Electrolysis)

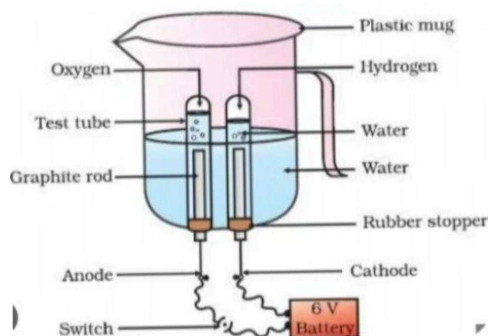
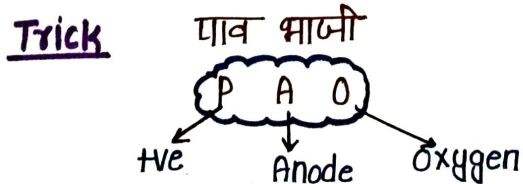


Important points:- (1) Volume of gas H₂:O₂ = 2:1
 (2) Burning of candle.

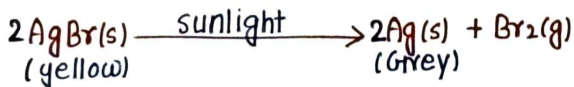
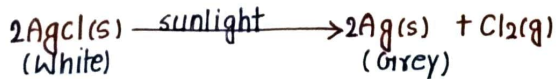
Cathode (H₂(g)) (i) Pop sound and candle extinguish.
 (ii) Combustible but not supporter of combustion

Anode (O₂(g)) (i) candle burns more brightly.
 (ii) Not combustible but supporter of combustion.

(3) Pure water is poor conductor of electricity so a few drop of acids is added. which acts as electrolyte and conduct electricity.



(3) PHOTOCHEMICAL DECOMPOSITION (Photolysis):- breaks due to light.



★ Used in Black and White photography.

☆ This is why AgCl and AgBr are kept in black colour bottles to protect from sunlight.

Displacement Reaction :- More Reactive element Replace a less Reactive element form its compound. $A + BC \rightarrow AC + B$

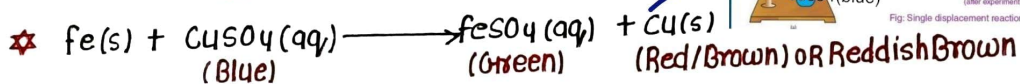
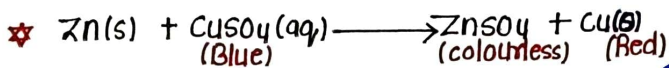


Reactivity series :-

Potassium (K)	kudi
Sodium (Na)	Naal
Calcium (Ca)	Car
Magnesium (Mg)	Mango
Aluminium (Al)	Alto
Zinc (Zn)	Zisko
Iron (Fe)	fir
Lead (Pb)	lekar
Hydrogen (H)	Hum
Copper (Cu)	chale
Mercury (Hg)	Mathura
Silver (Ag)	Sath
Gold (Au)	Ghumne

↑ More reactive

Less Reactive.

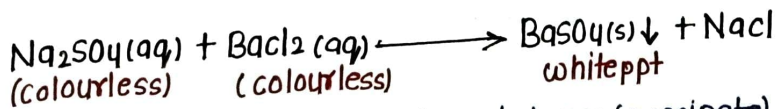


observations:- (i) H_2 gas is colourless and odorless, burn with popsound and extinguishes burning candle.

(2) Temperature increases, reaction is highly exothermic.

(3) Dilute acid is used as reaction is highly exothermic and conc. acid can lead to more exothermic and dangerous reaction.

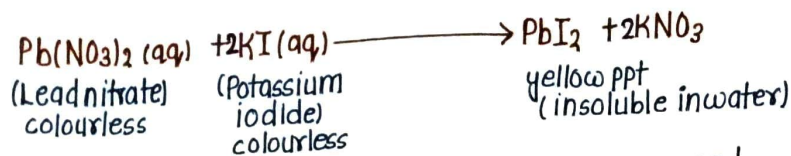
Double Displacement Reaction :- • Exchange of ions between Reactants.



observations:- (i) White insoluble substance (precipitate) of BaSO_4 is formed.
(ii) Double Displacement and precipitation reaction.

(ii) Double Displacement and precipitation reaction.

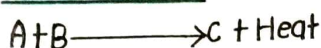
Precipitation Reactions:- When two aqueous soluble-soluble solutions react to form a semi-soluble/insoluble salt, the salt is called precipitate and such reaction is precipitation reactions.



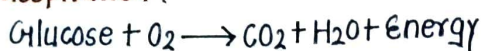
- (i) yellow insoluble substance (precipitate) of PbI_2 is formed.
(ii) Double displacement and precipitation reaction.

HEAT IN REACTIONS :-

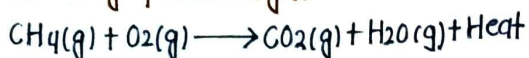
Exothermic Rⁿ



Examples (i) Respiration.



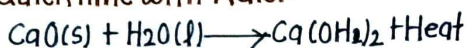
(2) Burning of natural gas.



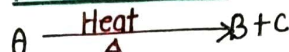
(3) Decomposition of vegetable into compost.

(4) Burning of Mg Ribbon.

(5) Quick lime with Water.

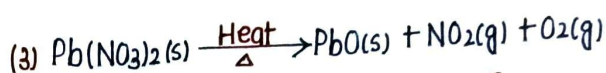


Endothermic Rⁿ



Examples

All Examples of Decomposition reaction.



(see example of decomposition rⁿ)

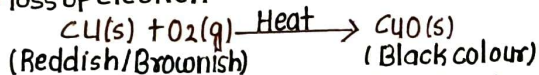
OXIDATION AND REDUCTION

Oxidation

★ if chemical (A) $\begin{cases} \text{Gains oxygen.} \\ \text{Loses Hydrogen.} \end{cases}$

★ it is called oxidation of (A) and (A) is said to be oxidised

★ loss of electron

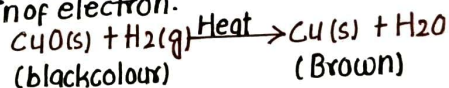


Reduction

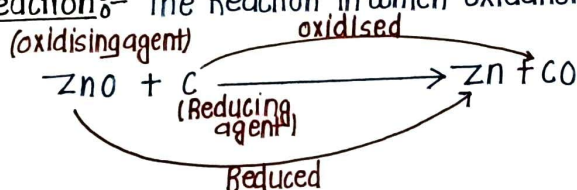
★ if a chemical (B) $\begin{cases} \text{Gains Hydrogen.} \\ \text{Loses oxygen.} \end{cases}$

★ it is called reduction of (B). and (B) is said to be reduced.

★ Gain of electron.



Redox Reaction:- The Reaction in which oxidation and Reduction occurs.



Trick ★ Jiska hoga oxidation wo banega Reducing agent.
★ Jiska hoga Reduction wo banega oxidising agent

PHYSICAL AND CHEMICAL CHANGE

Physical change

- ✓ No chemical Reaction happens.
- ✓ shape, size, state, etc may change.

Examples

- (1) Boiling water from the evaporating dish.
- (2) Melting of ice to give water.
- (3) Melting of wax.
- (4) Crushing a paper cup.
- (5) Crystallisation.

chemical change

- ✓ A chemical reaction happens.
- ✓ shape, size, colour, etc may also change.

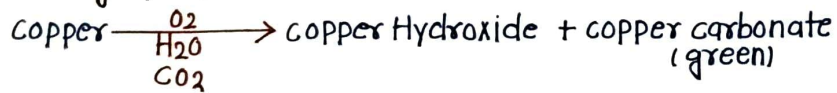
Examples

- (1) Respiration.
- (2) Food Digestion.
- (3) Food Cooking.
- (4) Rusting of iron.
- (5) Curd from milk.
- (6) Fermentation of grapes.
- (7) Burning of paper.

Corrosion :- When a metal is attacked by substances around it such as moisture (water vapour + oxygen), acid etc it is said to be corrode and this process is called corrosion.

(i) Rusting of iron.

(ii) Tarnishing of copper.



(iii) Tarnishing of silver.



Note :- Corrosion is an example of oxidation.

Rancidity :- ✓ The taste or smell of food material containing fat/oil changes when it is left exposed to air for a long time.

✓ Oxidation of fat/oil present in food material causes Rancidity.

✓ prevention

(1) Antioxidants

(2) Airtight container

(3) Bag of chips (flushed with Nitrogen gas)