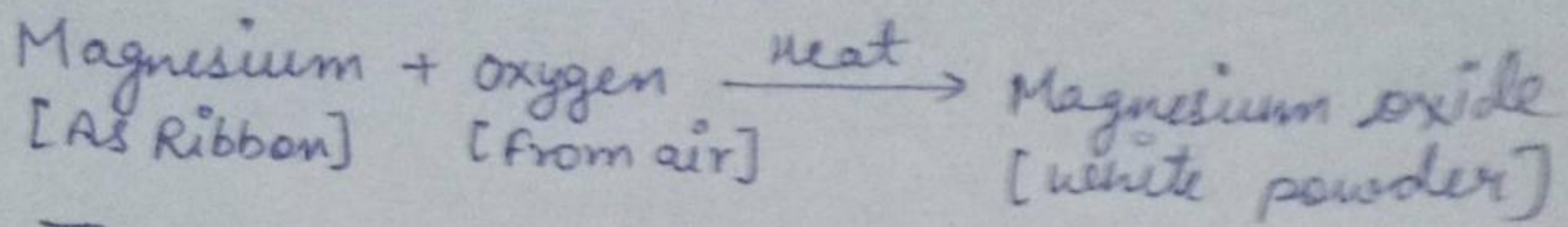


# CHAPTER-1 CHEMICAL REACTIONS AND EQUATIONS

## CHEMICAL REACTIONS:

The processes in which new substances with new properties are formed is called chemical reaction. It also involves chemical changes. During chemical reaction, atoms of one element do not change into those of another element. Only rearrangement of atoms take place in chemical reaction.

for eg:-



\* **Reactants**: The substance which take part in chemical reaction are called reactants. Like magnesium and oxygen are reactants from above example

\* **Products**: The new substance produced as a result of chemical reaction are called products. Like magnesium oxide is product from above example.

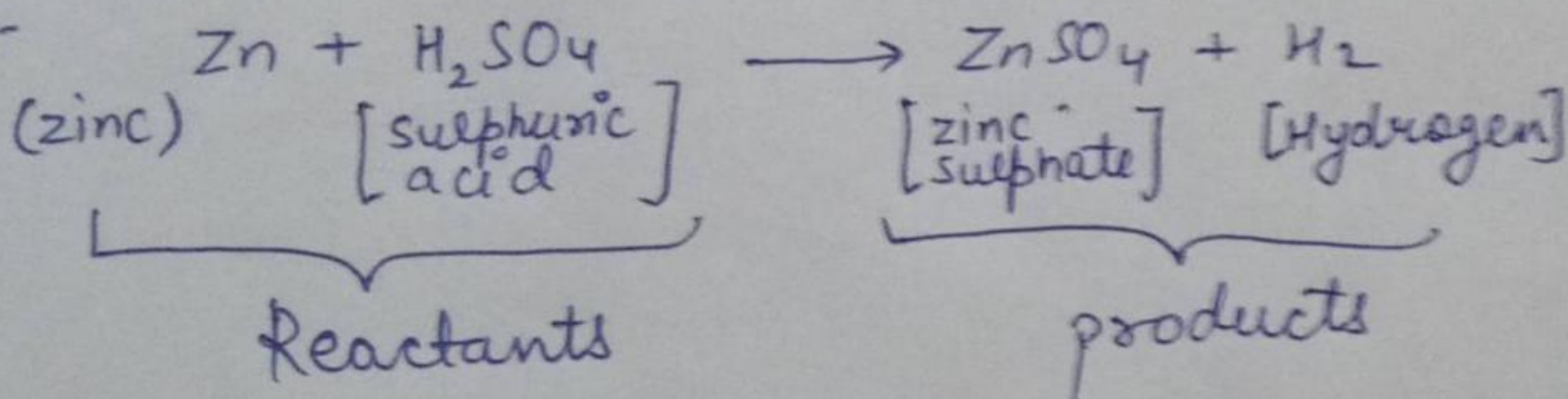
→ **Characteristics of chemical reaction:-**

- (i) Evolution of a gas
- (ii) formation of precipitate
- (iii) change in colour
- (iv) change in temperature
- (v) change in state

→ **CHEMICAL EQUATIONS:-**

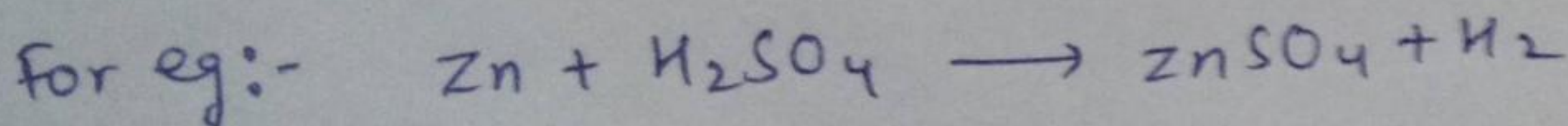
The method of representing a chemical reaction with the help of symbols and formulae of the substance involved in it is known as a chemical reaction.

for eg:-



→ **Balanced chemical Equation:-**

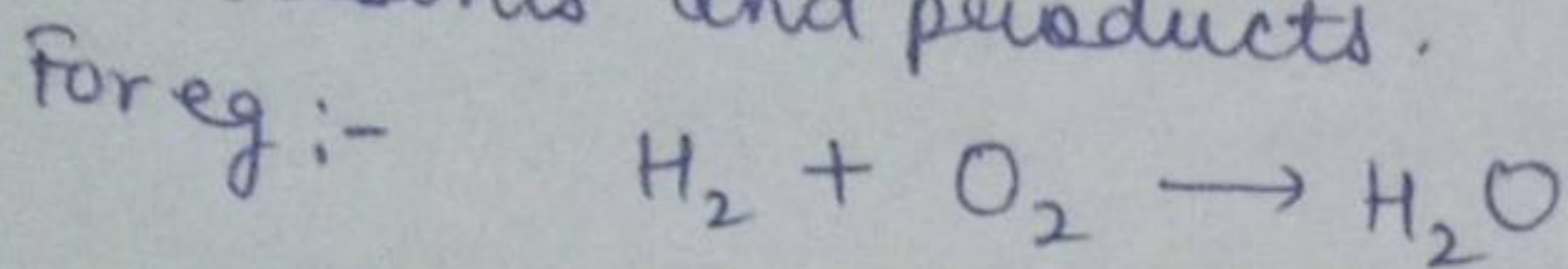
A balanced chemical equation has an equal number of atoms of different elements in reactants and products. This is due to the law of conservation of mass.



	In reactants	In products
No. of Zn atoms :	1	1
No. of H atoms :	2	2
No. of S atoms :	1	1
No. of O atoms :	4	4

Thus, above example is equation is example of Balanced equation

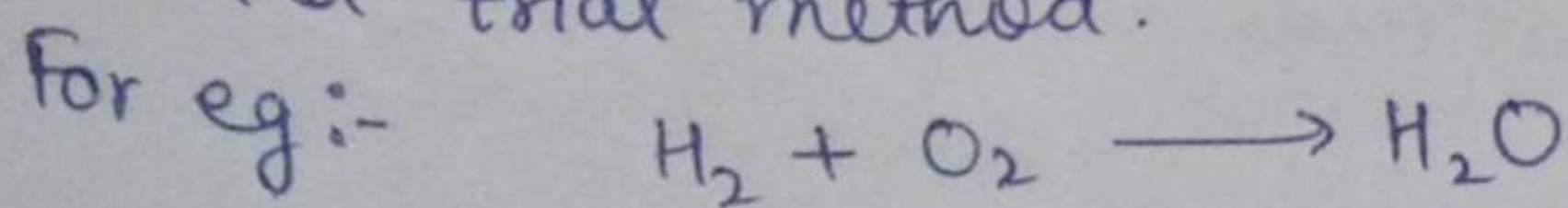
→ Unbalanced equation: An unbalanced equation has an unequal number of atoms of one or more elements in the reactants and products.



	In Reactants	In product
No. of H atoms :	2	2
No. of O atoms :	2	1

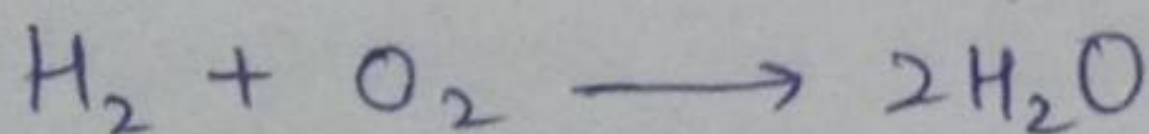
→ Balancing of chemical equation:-

The process of making the ~~no~~ number of different types of atoms equal on both the sides of equation is called balancing of equation. The simple equation is balanced by hit and trial method.



	In Reactants	In product
No. of H atoms :	2	2
No. of O atoms :	2	1

Step 1:- The number of hydrogen atom is equal on both side so multiply LHS by 1 and no. of oxygen are unequal so multiply RHS by 2. So following equation becomes

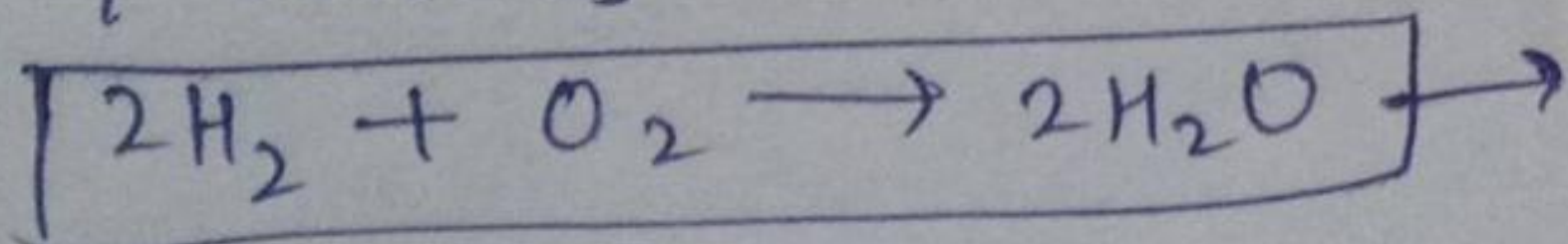


Now,

	In Reactants	In products
No. of H atom :	2	4
No. of O atom :	2	2

Step 2:- Though the number of oxygen atom has become equal but the number of hydrogen atoms has become unequal.

To balance the equation, now multiply  $H_2$  by 2. So following eq<sup>n</sup> becomes

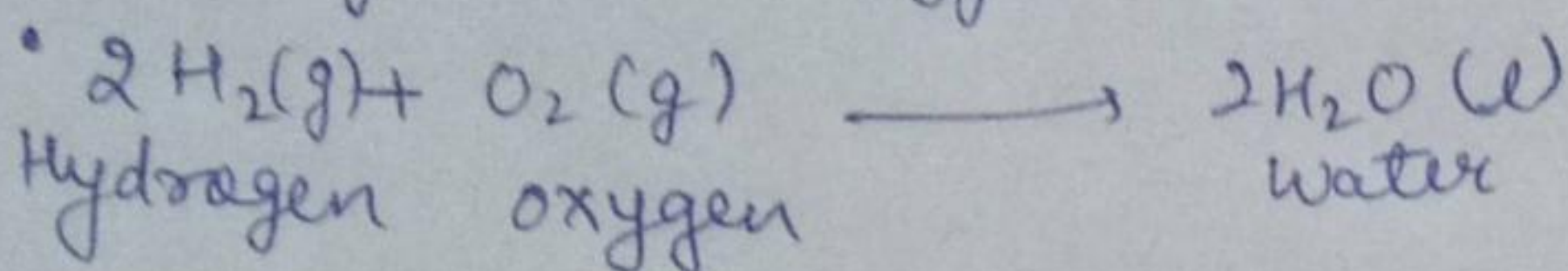
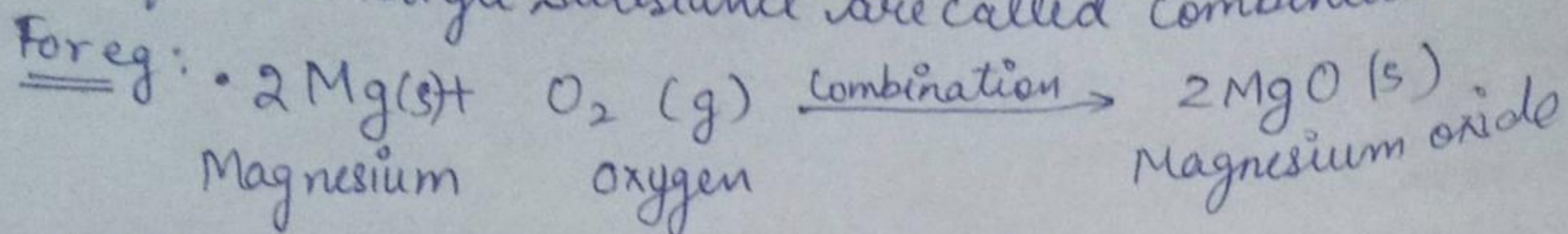


Now it has become balanced chemical equation

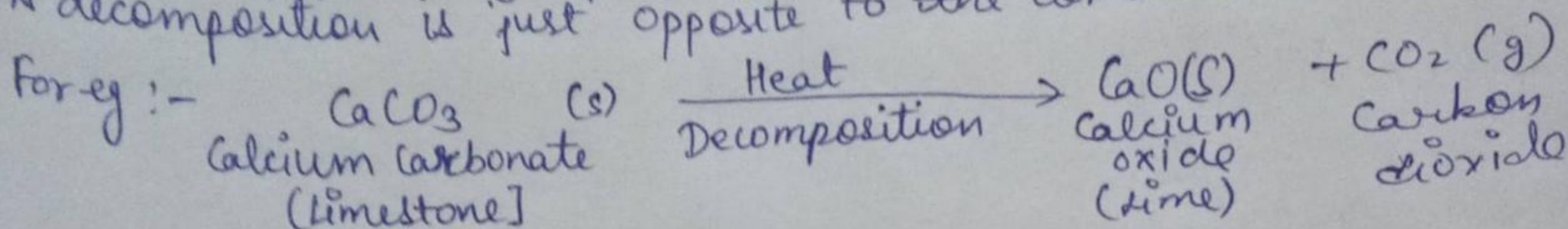
→ Types of Chemical Reactions :-

1. Combination Reaction:

Those reaction in which two or more substance combine to form a single substance are called combination reaction.

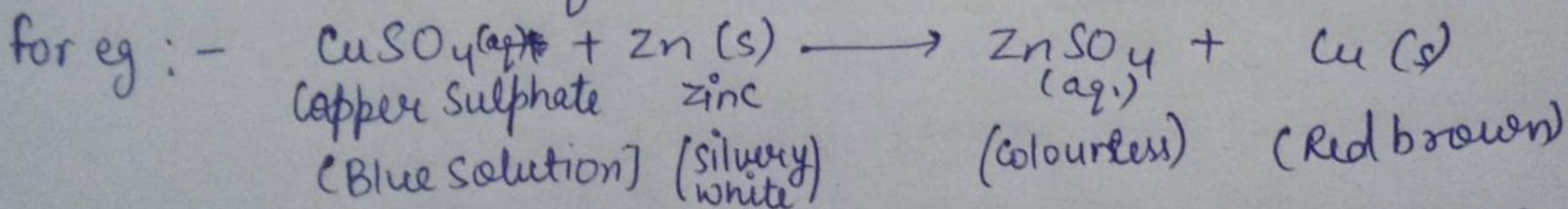


2. Decomposition Reaction: Those reactions in which a compound splits up into two or more simpler substances are known as decomposition reaction. These reaction are carried out by applying heat, light, electricity etc. A decomposition is just opposite to the combination reaction.



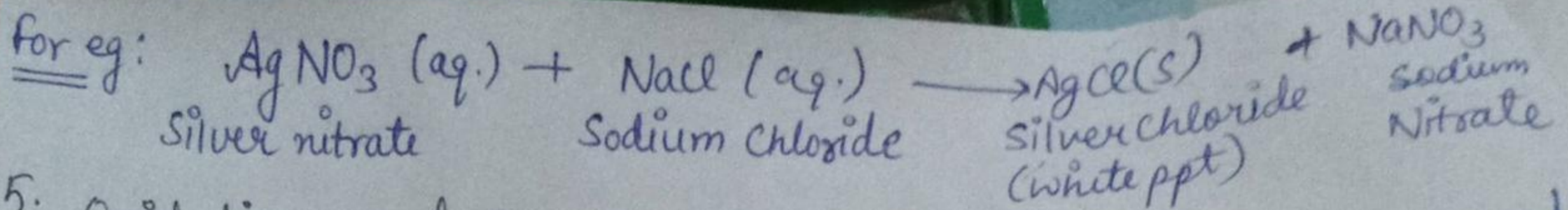
Note:- When decomposition is carried out by heating then it is called thermal decomposition.

3. Displacement Reaction: - Those reaction in which one element takes the place of another element in a compound are known as displacement reaction. In general more reactive element displace a less reactive element from its compound.



This displacement reaction takes place because zinc is more reactive than copper.

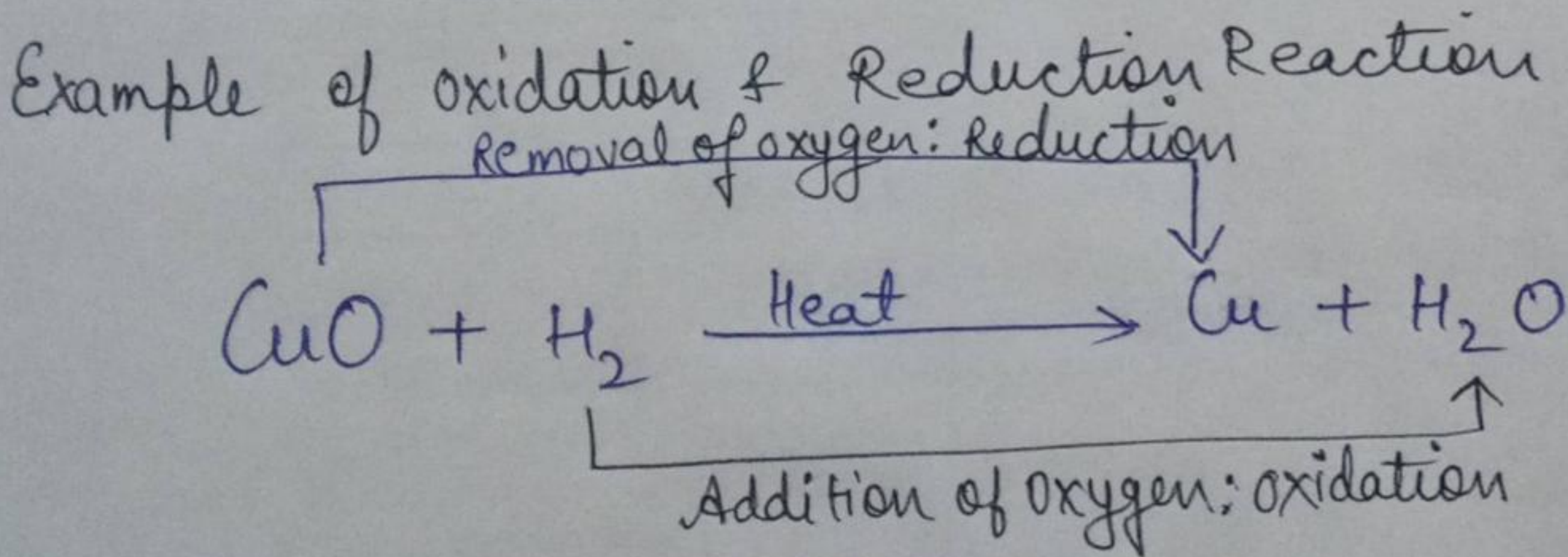
4. Double Displacement Reaction: Those reaction in which two compounds react by an exchange of ions to form two new compounds are called double displacement reactions.



5. Oxidation and Reduction Reaction

- Oxidation: (i) Addition of oxygen to a substance is called oxidation  
 (ii) Removal of hydrogen from substance
- Reduction: (i) Addition of hydrogen is called Reduction  
 (ii) Removal of oxygen is called Reduction
- ~~Oxidizing~~ oxidising agent: (i) The substance which give oxygen for oxidation is called an oxidising agent.  
 (ii) The substance which removes hydrogen is also called oxidising agent.
- Reducing agent: (i) The substance which gives hydrogen for reduction is called a reducing agent.  
 (ii) The substance which removes oxygen is called reducing agent

\* Redox: When reduction and oxidation reaction occurs together in same reaction chemical reaction is called redox reaction



Oxidising agent :- Copper oxide (CuO)

Reducing agent :- H<sub>2</sub>

Substance oxidised: H<sub>2</sub>

Substance reduced: CuO

## → EFFECT OF OXIDATION AND REDUCTION IN EVERYDAY LIFE

Oxidation has damaging effect on metals as well as on food. ~~There~~ The common effect of oxidation in everyday life as follows:

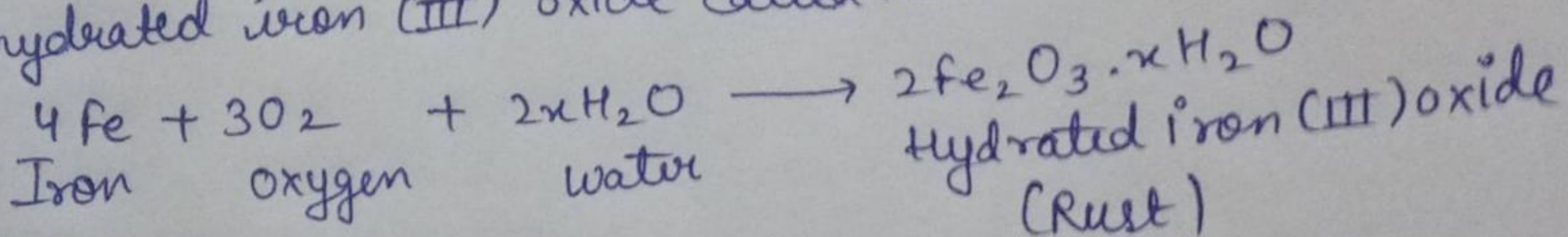
1. Corrosion of metals
2. Rancidity of food

### Corrosion of metals

Corrosion is the process in which metals are eaten up gradually by the action of air, moisture or a chemical on their surface. Rusting of metal is common form of corrosion.

\* for example: Rusting of iron metal

During rusting of iron metal, iron metal is oxidised by ~~process~~ oxygen of air in presence of water to form hydrated iron (III) oxide called Rust.



It is redox reaction

\* Causes of corrosion: Corrosion weakens iron metal and ~~still~~ steel object and structure such as railing, car bodies, bridges and ships etc.

### Rancidity of metals.

The condition produced by aerial oxidation of fats and oils in food marked by unpleasant smell and taste is called rancidity.

The rancidity of food can be prevented or retarded (slowed down) in following ways:-

- (i) Rancidity can be prevented by adding anti-oxidants to foods containing fats and oils.
- (ii) Rancidity can be prevented by packaging ~~for~~ fat and oil containing food in nitrogen gas.
- (iii) Rancidity can be retarded by storing food in air-tight containers.
- (iv) Rancidity can be retarded by storing food away from light.
- (v) Rancidity can be retarded by keeping food in ~~refrigerator~~. refrigerator.