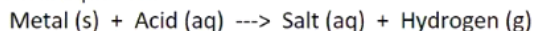


# REACTIVITY-SERIES-2

## 3. Reaction Of Metals With Dilute Hydrochloric Acid -

Many metals react with dilute acid to produce a Salt solution and Hydrogen gas.

General Equation:

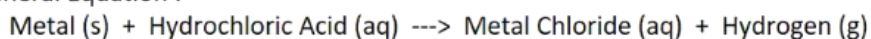


[\*\*\* These metals which react with acid **must be above Hydrogen** in the reactivity series]

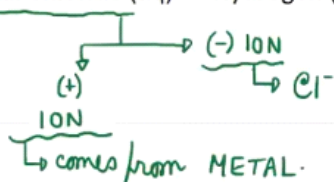
Salt is an ionic compound, which has ionic bonding and contains many oppositely charged ions. In a salt, the cation comes from the Metal / Metal Compound and the anion comes from the acid.

So, when a metal reacts with Hydrochloric acid, it forms Metal Chloride solution (salt) and Hydrogen gas.

General Equation :



[\*\*\* These metals which react with acid **must be above Hydrogen**]

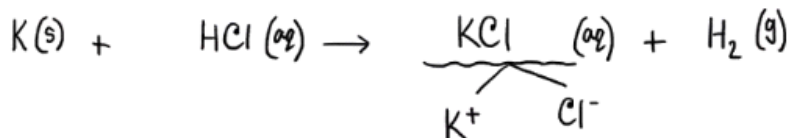


The more reactive metal reacts more vigorously and more violently with dilute acid. So, these reactions of different metals with dilute Hydrochloric acid indicates the reactivity of the metals.

Example:

### a. Reaction With Potassium -

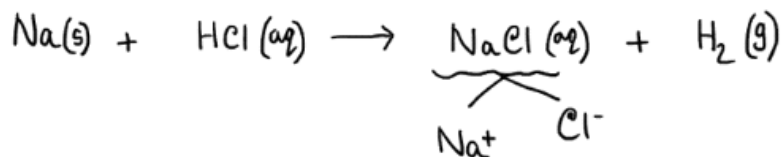
Potassium + Hydrochloric acid  $\rightarrow$  Potassium Chloride + Hydrogen



● Observation : Reacts **explosively**

### b. Reaction With Sodium -

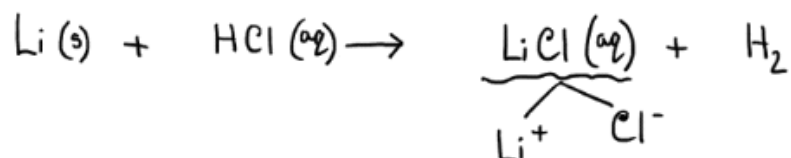
Sodium + Hydrochloric acid  $\rightarrow$  Sodium Chloride + Hydrogen



Observation : Reacts **explosively**

c. Reaction With Lithium -

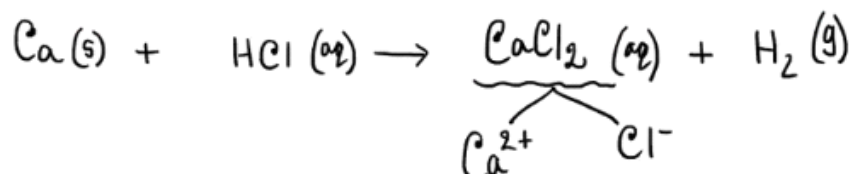
Lithium + Hydrochloric acid  $\rightarrow$  Lithium Chloride + Hydrogen



Observation : Reacts **very vigorously and violent**

d. Reaction With Calcium -

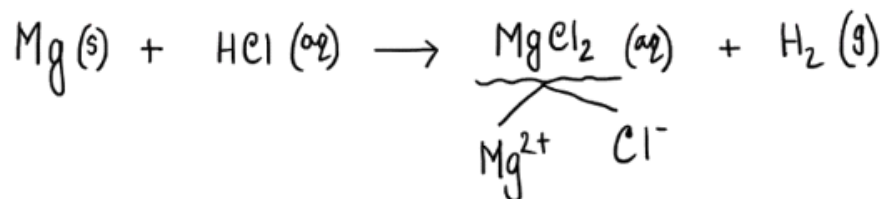
Calcium + Hydrochloric acid  $\rightarrow$  Calcium Chloride + Hydrogen



Observation : Reacts **violently**

e. Reaction With Magnesium -

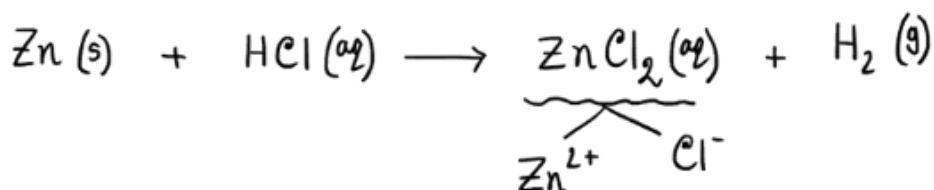
Magnesium + Hydrochloric acid  $\rightarrow$  Magnesium Chloride + Hydrogen



Observation : Reacts **readily**

f. Reaction With Zinc -

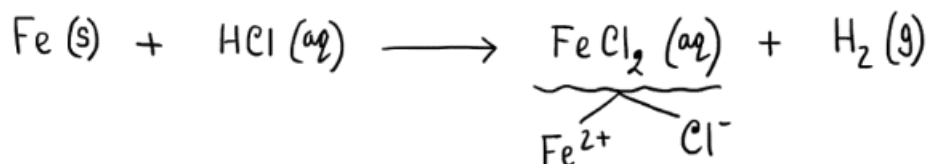
Zinc + Hydrochloric acid  $\rightarrow$  Zinc Chloride + Hydrogen



Observation : Reacts **moderately fast**

g. Reaction With Iron -

Iron + Hydrochloric acid  $\rightarrow$  Iron (II) Chloride + Hydrogen

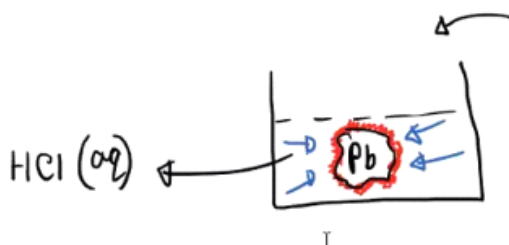


h. Reaction With Lead -

Lead + Hydrochloric acid  $\rightarrow$  Lead (II) Chloride + Hydrogen

$\rightarrow$  INSOLUBLE in water; it is a solid, NOT a solution

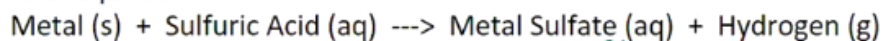
In this reaction, initially, it forms Lead (II) Chloride which is insoluble, which **acts as an insoluble layer** on the metal. So, the Lead cannot any more react with the acid and thus appears not react with the dilute Hydrochloric acid.



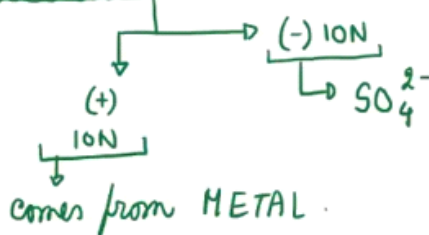
4. Reaction Of Metals With Dilute Sulfuric Acid -

When a metal reacts with Sulfuric acid, it forms Metal Sulfate solution (salt) and Hydrogen gas.

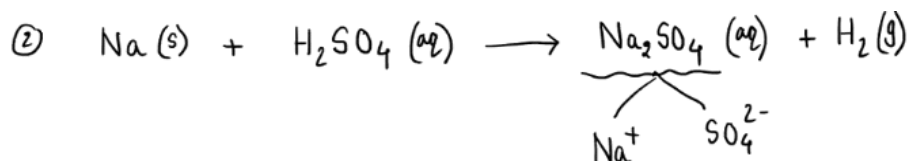
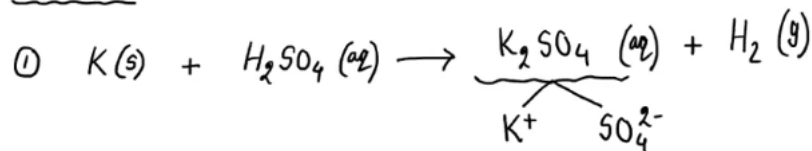
General Equation :

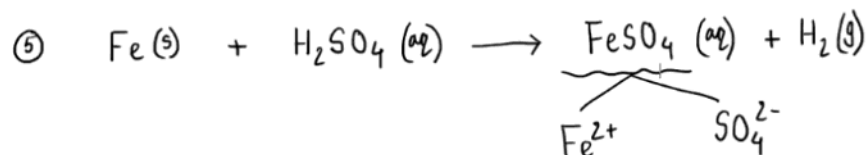
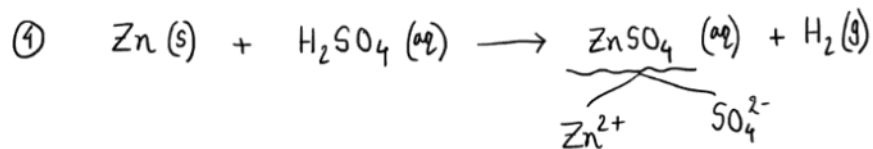
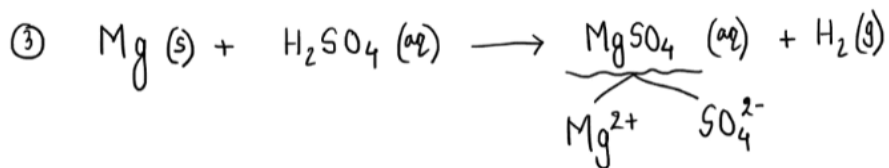


[\*\*\* These metals which react with acid **must be above Hydrogen**]



EXAMPLE

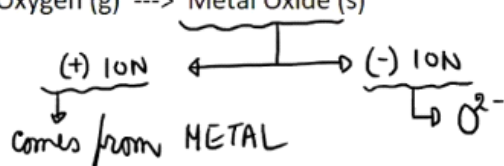
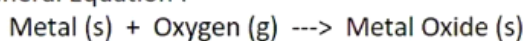




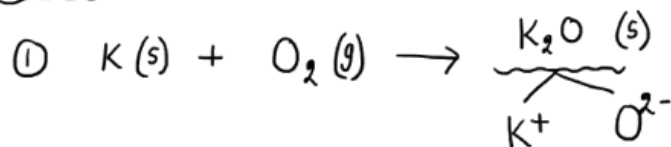
I

4. Reaction Of Metals With Oxygen -  
When a metal reacts with Oxygen, it forms Metal Oxide.

General Equation :



EXAMPLE

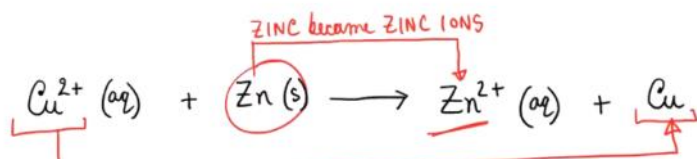


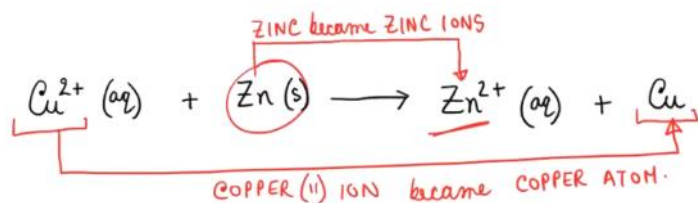
#### 5. Displacement Reaction -

In this reaction, a **more reactive metal** displaces (takes the place of) a **less reactive metal** from its compound (metal oxide / metal salt solution).

In other words, in this reaction, the **more reactive metal** has a **greater tendency** to form **positive ions** compared to a **less reactive metal**.

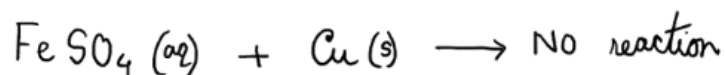
For instance, the reaction between Copper (II) Sulfate solution and Zinc :





So, a more reactive metal forms positive ions **more readily**.

- Since Zinc is more reactive, it forms its positive ion Zinc ions.
- Since Copper is less reactive, it becomes Copper atoms.



When a Copper is placed into an Iron (II) Sulfate solution, no reaction occurs because:

- Copper is less reactive
- So, it has lesser tendency to form ions compared to Iron and thus, it does not displace Iron.