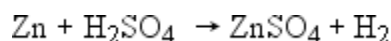


## Acids, Bases and Salts

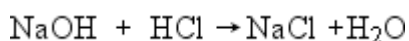
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- **Acid:** Turns blue litmus colour to red
- **Base:** Turns red litmus colour to blue
- Bases which are soluble in water are called alkalis. Example KOH, Mg(OH)<sub>2</sub>
- Turmeric is a natural indicator
- **Reaction of acid with metals**
- In most cases, metals replace hydrogen from acids.



- **Metal oxide + Acid**
- Metal oxide + Acid  $\rightarrow$  Salt + Water
- **Reaction of base with metals**
- $2\text{NaOH} + \text{Zn} \rightarrow \text{Na}_2\text{ZnO}_2$  (sodium zincate) +  $\text{H}_2$
- **Acids with metal carbonate and hydrogen carbonate**
- Carbonate + Acid  $\rightarrow$  Salt + Water +  $\text{CO}_2$
- $\text{Na}_2\text{CO}_3 + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$
- Further on passing the carbon dioxide gas evolved through lime water.
- $\text{Ca(OH)}_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$
- **Acid - Base reaction**

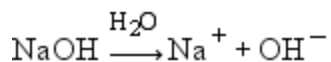
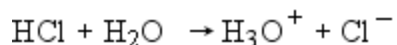
Acid + Base  $\rightarrow$  Salt + Water



- **In water solution**

Acid  $\rightarrow$   $\text{H}^+$  ion ;  $\text{H}^+ + \text{H}_2\text{O} \rightarrow \text{H}_3\text{O}^+$

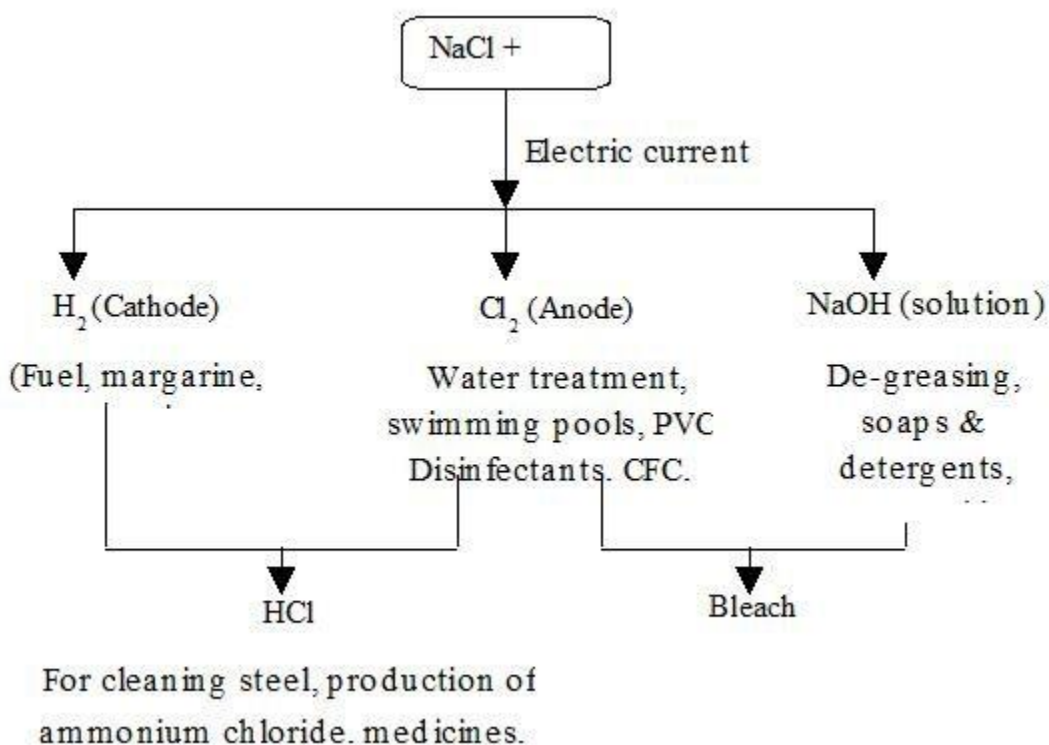
Base  $\rightarrow$   $\text{OH}^-$  ion



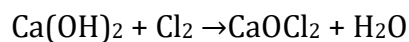
- Higher  $\text{H}^+$  concentration  $\rightarrow$  Strong acid
- Lower  $\text{H}^+$  concentration  $\rightarrow$  Weak acid
- Higher the  $\text{OH}^-$  concentration  $\rightarrow$  Stronger the base
- **pH Measure**
- pH  $\rightarrow$  Measure of acidity  $\rightarrow$  Measure  $\text{H}^+$  concentration on the scale (0 – 14)



- pH 7 → Neutral solution
- pH < 7 → Acidic solution
- pH > 7 → Basic solution
- **Salts' pH = 7**
- Human body pH = 7.0 – 7.8
- Change in pH in body causes → Tooth decay, stomach pain, burning pain (Honey bee sting)
- Plants and animals are sensitive to pH change
- Self defence by animals and plants through chemical warfare
- **Common salt** → NaCl



- **Bleaching powder** →  $\text{CaOCl}_2$
- **Preparation**–



- **Use** –

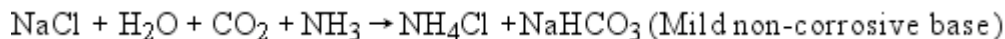
Bleaching of {  
 → cotton in textile industry  
 → wood pulp  
 → Clothes in laundry

Oxidising agent

Disinfecting material

**Baking soda** – (NaHCO<sub>3</sub>) Sodium hydrogen carbonate

- **Preparation –**



- **Use –**

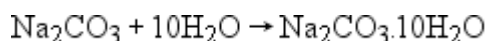
Making baking powder (Baking soda + Mild acid, like tartaric acid)

Ingredient for antacids

Soda-acid fire extinguisher

**Washing soda** – Na<sub>2</sub>CO<sub>3</sub> · 10H<sub>2</sub>O

- **Preparation–**



- **Use –**In glass, soap, paper industries

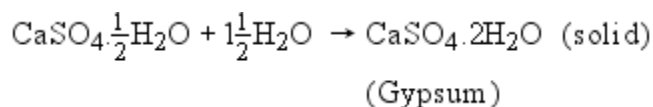
Making sodium compounds such as borax

As domestic cleaning agent

- **Removing permanent hardness of water**

- **Water of crystallisation :** It refers to a fixed number of water molecules present in one formula unit of salt.

- **Example -** In gypsum, the water of crystallisation is 2.



- **Hydrated substances:** Substances containing water of crystallisation for example, hydrated copper sulphate (CuSO<sub>4</sub> · 5H<sub>2</sub>O).
- **Anhydrous substances:** Substances either not containing water of crystallisation or from which water of crystallisation is removed, for example, sodium chloride (NaCl) and anhydrous copper sulphate (CuSO<sub>4</sub>).
- **Drying agents:** Substances that absorb moisture without undergoing a chemical reaction, for example, anhydrous calcium chloride (CaCl<sub>2</sub>).
- **Dehydrating agents:** Substances that remove chemically bonded water from a compound, for example, concentrated sulphuric acid (H<sub>2</sub>SO<sub>4</sub>).

