



## Properties of Acid

### Example-

- Sour taste
- Turns Blue litmus to red
- **React with carbonates releasing CO<sub>2</sub>**

**Metal carbonate + Acid  $\Rightarrow$  Salt + Carbon dioxide + Water**

**Examples:** Hydrochloric acid gives carbon dioxide gas, sodium chloride along with water when reacts with sodium carbonate.



- **React with metal bi carbonates to form carbon dioxide, salt and water**

**Acid + Metal hydrogen carbonate  $\Rightarrow$  Salt + Carbon dioxide + Water**

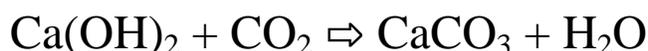
**Examples:** Hydrochloric acid gives carbon dioxide, sodium chloride and water when it reacts with sodium bicarbonate.



Sodium bicarbonate is also known as sodium hydrogen carbonate, baking soda, baking powder, bread soda and bicarbonate of soda.

**Test for evolution of carbon dioxide gas:** Carbon dioxide turns lime water milky when passed through it. This is the characteristic test for carbon dioxide gas.

This happens because of formation of white precipitate of calcium carbonate.



But when excess of carbon dioxide is passed through lime water, it makes milky colour of lime water disappear. This happens because of formation of calcium hydrogen carbonate. As calcium hydrogen carbonate is soluble in water, thus the milky colour of solution mixture disappears.



**Reaction of acid with marble and egg shell:** Since, marble and egg shell are made of calcium carbonate, hence when acid is poured over marble or egg shell, bubbles of carbon dioxide are formed.

### **Acid & Base and Fire Extinguisher**

Metal carbonate or metal hydrogen carbonate and acid are used in fire extinguisher to produce carbon dioxide gas. Acid and metal carbonate or bicarbonate are kept in separate chambers in a fire extinguisher. On emergency they are allowed to react with one another. The carbon dioxide gas so produce is poured over fire. As carbon dioxide does not support burning, it puts off the fire.

- **Act as electrolytes in solution** - Acids conduct electricity in their aqueous solution because of dissociation of hydrogen ion
- **React with metals release hydrogen gas**



**Example:** Hydrogen gas and zinc chloride are formed when hydrochloric acid reacts with zinc metal.



**Test for hydrogen gas:** The gas evolved after reaction of acid with metal can be tested by bringing a lighted candle near it. If the gas burns with pop sound, then it confirms the evolution of hydrogen gas. Burning with pop sound is the characteristic test for hydrogen gas.

- **Acids react with bases to form salt and water**



- **Acids react with metal oxides to form salt and water**



- Acids have corrosive nature

- **Produce hydrogen ions(H<sup>+</sup>) in water-** Hydrogen ion can not exist alone, it combine with water to form hydronium ion.



**Types of Acids:** Acids are divided into two types on the basis of their occurrence – Natural acids and Mineral acids.

- **Natural Acid:** Acids which are obtained from natural sources are called natural acid or organic acid.
- **Mineral Acids:** Acids that prepare from mineral are known as mineral acids, inorganic acids, man-made acids or synthetic acid, such as hydrochloric acid, sulphuric acid, nitric acid, etc.

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### Organic Acids & Source

Acid	Source
Acetic acid	Vinegar
Ascorbic acid	Guava, amla
Citric acid	Lemon, orange and other citrus fruits
Lactic acid	Sour milk, curd
Methanoic acid	Ant sting, nettle sting
Oxalic acid	Tomato
Tartaric acid	Tamarind

➤ **On the basis of their strength, acids are classified as :**

**a. Strong acids:** Completely dissociate into its ions in aqueous solutions.

Example: Nitric acid (HNO<sub>3</sub>), sulphuric acid (H<sub>2</sub>SO<sub>4</sub>), hydrochloric acid (HCl).

**b. Weak acids:** Weak acids are those acids which do not completely dissociate into its ions in aqueous solutions. For example: carbonic acid (H<sub>2</sub>CO), acetic acid (CH<sub>3</sub>COOH).

➤ **On the basis of their concentration, acids are classified as :**

**a. Dilute acids:** Have a low concentration of acids in aqueous solutions.

**b. Concentrated acids:** Have a high concentration of acids in aqueous solutions.

## Properties of Base

### Example-

- Bitter taste
- Water soluble bases are called alkalies
- Turns Red litmus to blue
- Feels soapy on touch
- Act as electrolytes in solution
- Produce hydroxide ions(OH<sup>-</sup>) in water
- React with metals release hydrogen gas



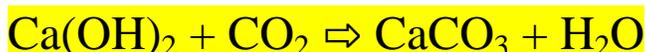
**Example:** Sodium hydroxide gives hydrogen gas and sodium zincate when reacts with zinc metal.



- **React with non metallic oxides to form Salt and water**



**Example:** Calcium hydroxide gives calcium carbonate and water when it reacts with carbon dioxide.



### **Ph Scale**

pH is a scale which quantifies the concentration of hydrogen ion in a solution. The range of pH scale is between 0 to 14.

In pH scale ‘p’ stands for ‘potenz’. Potenz is a German word which means ‘power’ or ‘potential’. Here; ‘H’ stands for hydrogen ion. Thus, pH means the potential of hydrogen or power of hydrogen.

<b>pH =7</b>	Neutral Solution	$\text{H}_3\text{O}^+ = \text{OH}^-$
<b>pH &gt;7</b>	Basic Solution	$\text{H}_3\text{O}^+ < \text{OH}^-$
<b>pH &lt;7</b>	Acidic Solution	$\text{H}_3\text{O}^+ > \text{OH}^-$

### **Importance of pH in everyday life**

- Our body works within the pH range of 7 to 7.8
- Plants require a specific Ph for their healthy growth
- pH of our stomach is acidic
- Tooth decay starts when the pH of the mouth is lower than 5.5.
- Bee sting have formic acid