

# CHEMISTRY STUDY MATERIALS FOR CLASS 10 (NCERT Based: Revision of Chapter -02)

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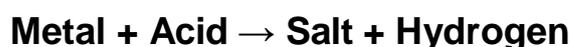
DATE:- 08 /09/2020

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## Acids, Bases and Salts

### Chemical Properties of Acids

**Reaction of Acids with Metal:** Acids give hydrogen gas along with respective salt when they react with a metal.



#### Example:

- Hydrogen gas and zinc chloride are formed when hydrochloric acid reacts with zinc metal.  
$$\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$$
- Hydrogen gas and sodium chloride are formed when hydrochloric acid reacts with sodium metal.  
$$2\text{Na} + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2$$
- Hydrogen gas and iron chloride are formed when hydrochloric acid reacts with iron.  
$$\text{Fe} + 2\text{HCl} \rightarrow \text{FeCl}_2 + \text{H}_2$$
- Hydrogen gas and zinc sulphate are formed when zinc metal reacts with sulphuric acid  
$$\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$$

**REACTION OF ACIDS WITH METAL CARBONATE:** Acids give carbon dioxide gas and respective salts along with water when they react with metal carbonates.



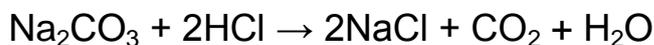
#### Examples:

- Sulphuric acid gives calcium sulphate, carbon dioxide gas, calcium sulphate and water when it reacts with calcium carbonate.  
$$\text{CaCO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{CaSO}_4 + \text{CO}_2 + \text{H}_2\text{O}$$
- Sulphuric acid gives sodium sulphate, carbon dioxide gas and water when it reacts with sodium carbonate.  
$$\text{Na}_2\text{CO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{CO}_2 + \text{H}_2\text{O}$$

- Hydrochloric acid gives carbon dioxide gas, calcium chloride and water when it reacts with calcium carbonate.



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



- Hydrochloric acid gives carbon dioxide, magnesium chloride and water when it reacts with magnesium carbonate.

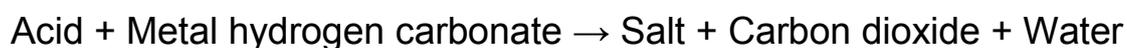


- Nitric acid gives sodium nitrate, water and carbon dioxide gas when it reacts with sodium carbonate.



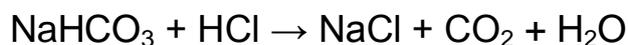
### **Reaction of Acid with Hydrogen Carbonates (Bicarbonates):**

Acids give carbon dioxide gas, respective salt and water when they react with metal hydrogen carbonate.



### **Examples:**

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



- Sulphuric acid gives sodium sulphate, carbon dioxide gas 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.

The gas evolved because of reaction of acid with metal carbonate or metal hydrogen carbonate turns lime water milky. This shows that the gas is 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 Marbles 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.

### Uses of Acids

- Sulphuric acid (King of chemicals) is used in car battery and in the preparation of many other compounds.
- Nitric acid is used in the production of ammonium nitrate which is used as fertilizer in agriculture.
- Hydrochloric acid is used as cleansing agent in toilet.
- Tartaric acid is a constituent of baking powder.
- Salt of benzoic acid (sodium benzoate) is used in food preservation.
- Carbonic acid is used in aerated drinks.

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