INDIAN SCHOOL AL WADI AL KABIR

Class: X	**Department: SCIENCE 2020 - 2021**	**Date of completion: - 25.10.2020**
HANDOUTS	**CHAPTER: ACIDS, BASES AND SALTS - SALTS**	**Note:** **A4 FILE FORMAT**
Name of the student:	**Class & Sec:**	**Roll No:**

SALTS

- Salts are formed when acids react with bases.
  Acid + Base → Salt + Water
- A salt is a compound formed from an acid by the replacement of the hydrogen in the acid by a metal.
- The name of the salt consists of two parts: The first part of the name of salt is derived from the name of the base, and the second part of the name of the salt comes from the name of acid.
- Eg:- The name 'sodium chloride' comes from sodium hydroxide base and hydrochloric acid.
  - The salts of hydrochloric acid are called chlorides
  - The salts of sulphuric acid are called sulphates.
  - The salts of nitric acid are called nitrates.
  - The salts of carbonic acid are called carbonates.
  - The salts of acetic acid are called acetates.

SOME COMMON EXAMPLES OF SALTS

	SALTS		DERIVED FROM	
	NAME	FORMULA	BASE	ACID
1.	Potassium sulphate	K_2SO_4	KOH	H_2SO_4
2.	Sodium sulphate	Na_2SO_4	NaOH	H_2SO_4
3.	Magnesium sulphate	$MgSO_4$	$Mg(OH)_2$	H_2SO_4
4.	Potassium chloride	KCl	KOH	HCl
5.	Calcium nitrate	$Ca(NO_3)_2$	$CaO/Ca(OH)_2$	HNO_3

- Salts having the same positive or negative ions are said to belong to a family.
  Eg:-
- Sodium chloride(NaCl) and sodium sulphate(Na_2SO_4) belong to the same family of salts called sodium salts.(both contain same positively charged ions, sodium ions)
- Sodium chloride(NaCl) and potassium chloride(KCl) belong to the same family called chloride salts.(both contain same negatively charged ions, chloride ions.)

CLASSIFICATION OF SALTS

1. **Neutral salt**
2. **Acidic salt**
3. **Basic salt**

Neutral salt:-

A **neutral salt** is formed when a strong base reacts with a strong acid.

Eg:-

1. Sodium chloride(NaCl)- formed from strong acid HCl and strong base NaOH
2. Potassium sulphate(K_2SO_4)- formed from strong acid H_2SO_4 and strong base KOH

Acidic salt:-

An acidic salt is formed when a strong acid reacts with a weak base.

Eg:-

1. Ammonium chloride (NH_4Cl)- is the salt of strong acid HCl and weak base NH_4OH.

2. Ammonium sulphate, $(NH_4)_2SO_4$- is the salt of strong acid H_2SO_4 and weak base NH_4OH.

Basic salt:-

A basic salt is formed when a strong base reacts with a weak acid.

Eg:-

1. Sodium carbonate, Na2CO3- is the salt of strong base NaOH and weak acid H_2CO_3.

2. Sodium acetate, CH_3COONa- is the salt of strong base NaOH and weak acid CH_3COOH

pH of salts:-

- The salt of a strong acid and a strong base will be neutral in nature. pH = 7 (approx.)
- The salt of a weak acid and a strong base will be basic in nature. pH > 7.(the solution of this salt turns red litmus blue.)
- The salt of a strong acid and a weak base will be acidic in nature. pH < 7.(the solution of this salt turns blue litmus red.)

CHEMICALS FROM COMMON SALT

COMMON SALT-NaCl

- The chemical name of common salt is sodium chloride. It is a white coloured substance.

PREPARATION

- By the combination of sodium hydroxide and hydrochloric acid.
- Common salt is obtained from sea water by the process of evaporation
- Rock salt (brown due to impurities) is mined from the underground deposits.

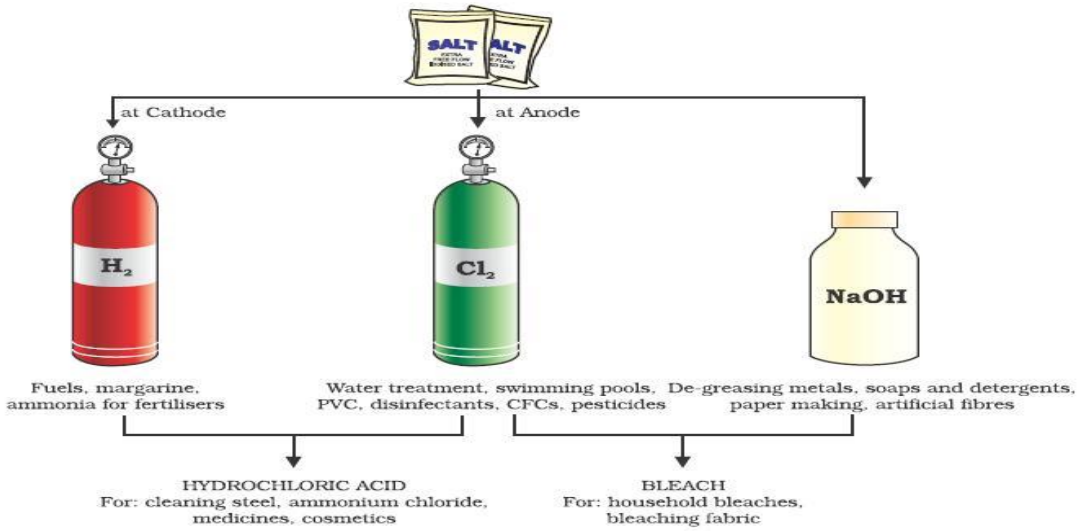
CHEMICALS FROM COMMON SALT

1. **SODIUM HYDROXIDE(caustic soda)**
   PREPARATION:-
   It is produced by the electrolysis of concentrated aqueous solution of sodium chloride (brine).
   This process is called **chlor-alkali process.**

$$2NaCl(aq) + 2H_2O(l) \rightarrow 2NaOH(aq) + Cl_2(g) + H_2(g)$$

Chlorine gas is given off at the anode and hydrogen gas at the cathode. Sodium hydroxide solution is formed near the cathode.

Important products from the chlor-alkali process



2. BLEACHING POWDER-$CaOCl2$

Preparation:-

Bleaching powder is produced by the action of chlorine on dry slaked lime.(Chlorine gas is obtained during the electrolysis of aqueous sodium chloride ie, brine)

$$Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$$

USES OF BLEACHING POWDER

- For bleaching
  Cotton and linen in textile industry
  Wood pulp in paper factories
  Washed clothes in laundry.
- As an oxidising agent in chemical industries.
- For disinfecting drinking water.

3. BAKING SODA (Sodium hydrogencarbonate)

- It is a basic salt.

Preparation:-

$$NaCl + H_2O + CO_2 + NH_3 \rightarrow NH_4Cl + NaHCO_3$$

On heating, $NaHCO_3$ decomposes to give Na_2CO_3, H_2O and CO_2

$$\underset{\text{(Sodium hydrogencarbonate)}}{2NaHCO_3} \xrightarrow{\text{Heat}} \underset{\text{(Sodium carbonate)}}{Na_2CO_3} + H_2O + CO_2$$

USES OF BAKING SODA

1. For making baking powder
(A mixture of baking soda and a mild edible acid such as tartaric acid)
    - When baking powder is heated or mixed with water, CO_2 gas is released which causes bread or cake to rise making them soft and spongy.

   $NaHCO_3 + H^+ \rightarrow CO_2 + H_2O$ + Sodium salt of acid.
2. As an ingredient in antacids.
3. Used in soda- acid fire extinguishers.

4. WASHING SODA ($Na_2CO_3.10H_2O$)

- It is a basic salt.

Preparation:- It is prepared by the recrystallisation of sodium carbonate.(Sodium carbonate is obtained by heating baking soda)

$$\underset{\text{(Sodium hydrogencarbonate)}}{2NaHCO_3} \xrightarrow{\text{Heat}} \underset{\text{(Sodium carbonate)}}{Na_2CO_3} + H_2O + CO_2$$

$$\underset{\text{(Sodium carbonate)}}{Na_2CO_3} + 10H_2O \rightarrow Na_2CO_3.10H_2O$$

USES OF WASHING SODA

1. Used in glass, soap and paper industries.
2. Used in the manufacture of sodium compounds such as borax.
3. Used as a cleaning agent for domestic purposes.
4. Used for removing permanent hardness of water.

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