

CHEMISTRY STUDY MATERIALS FOR CLASS 10

(NCERT Based notes of Chapter -02)

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DATE:- 05/05/2021

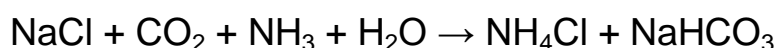
ACIDS, BASES AND SALTS

IMPORTANT CHEMICALS FROM SODIUM CHLORIDE:

BAKING SODA (NaHCO_3)

Baking soda is another important product which can be obtained using byproducts of chlor-alkali process. The chemical name of baking soda is sodium hydrogen carbonate (NaHCO_3) or sodium bicarbonate. Bread soda, cooking soda, bicarbonate of soda, sodium bicarbonate or simply bicarbonate, etc. are some other names of baking soda.

Baking soda is obtained by the reaction of brine with carbon dioxide and ammonia. This is known as Solvay process.



In this process, calcium carbonate is used as the source of CO_2 and the resultant calcium oxide is used to recover ammonia from ammonium chloride.

PROPERTIES OF SODIUM BICARBONATE:

- Sodium bicarbonate is white crystalline solid, but it appears as fine powder. Sodium hydrogen carbonate is amphoteric in nature.
- Sodium hydrogen carbonate is sparingly soluble in water.
- Thermal decomposition of sodium hydrogen carbonate (baking soda).
- When baking soda is heated, it decomposes into sodium carbonate, carbon dioxide and water.



Sodium carbonate formed after thermal decomposition of sodium hydrogen carbonate; decomposes into sodium oxide and carbon dioxide on further heating.



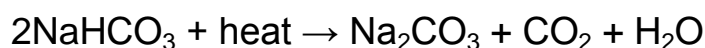
This reaction is known as dehydration reaction.

USE OF BAKING SODA:

- Baking soda is used in making of baking powder, which is used in cooking as it produces carbon dioxide which makes the batter soft and spongy.
- Baking soda is used as antacid.
- Baking soda is used in toothpaste which makes the teeth white and plaque free.
- Baking soda is used in cleansing of ornaments made of silver.
- Since, sodium hydrogen carbonate gives carbon dioxide and sodium oxide on strong heating, thus it is used as fire extinguisher.

BAKING POWDER:

Baking powder produces carbon dioxide on heating, so it is used in cooking to make the batter spongy. Although baking soda also produces carbon dioxide on heating, but it is not used in cooking because on heating; baking soda produces sodium carbonate along with carbon dioxide. The sodium carbonate; thus produced; makes the taste bitter.



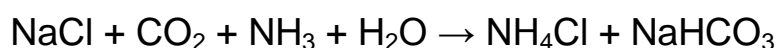
Baking powder is the mixture of baking soda and a mild edible acid. Generally, tartaric acid is mixed with baking soda to make baking powder.



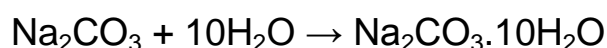
When baking powder (mixture of baking soda and an edible acid) is heated, the sodium carbonate formed because of heating of baking soda neutralizes after reacting with tartaric acid and sodium tartarate salt is formed. The smell of sodium tartarate is pleasant and taste is good. This makes the cake or any other food tasty.

WASHING SODA (SODIUM CARBONATE)

Sodium carbonate is manufactured by the thermal decomposition of sodium hydrogen carbonate obtained by Solvay process.



The sodium carbonate obtained in this process is dry. It is called soda ash or anhydrous sodium carbonate. Washing soda is obtained by rehydration of anhydrous sodium carbonate.



Since there are 10 water molecules in washing soda, hence it is known as Sodium bicarbonate decahydrate.

Sodium carbonate is a crystalline solid and it is soluble in water when most of the carbonates are insoluble in water.

USE OF SODIUM CARBONATE:

- It is used in cleaning of cloths; especially in rural areas.
- In making of detergent cake and powder.
- In removing permanent hardness of water.
- It is used in glass and paper industries.

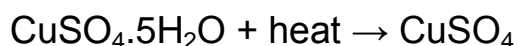
Water of crystallization: Many salts contain water molecule and are known as hydrated salts. The water molecule present in salt is known as water of crystallization.

Examples:

COPPER SULPHATE PENTAHYDRATE (CuSO₄.5H₂O)

Blue colour of copper sulphate is due to presence of 5 molecules of water.

When copper sulphate is heated, it loses water molecules and turns into grey-white colour, which is known as anhydrous copper sulphate. After adding water; anhydrous copper sulphate becomes blue again.

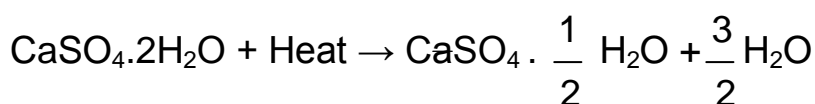


FERROUS SULPHATE HEPTAHYDRATE (FeSO₄.7H₂O)

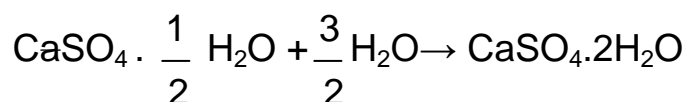
The green colour of Ferrous sulphate heptahydrate; commonly known as ferrous sulphate; is due to the presence of 7 molecules of water in it.

PLASTER OF PARIS

Plaster of Paris is obtained by heating of gypsum, a hydrated salt of calcium.



After addition of water Plaster of Paris is again converted into gypsum.



Plaster of Paris is used in making of toys, designer false ceiling, etc. Doctors use Plaster of Paris to set the fractured bone.
