Medicinal Chemistry
The first stage
College of Dentistry

By

Assistant Lecturer

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Preparation of different types of solutions

Experiment (7)

An analysis of a mixture of Na_2CO_3 and NaOH using two indicators and a standard HCl solution

Theory:

1- When a known volume of the mixture is titrated with HCl in presence of ph. ph., the acid reacts with all the sodium hydroxide and with only half of the carbonate.

V1 = all hydroxide + 1/2 the carbonate

2- When a known volume of the mixture is titrated with HCl in presence of M.O., the acid reacts with all the hydroxide and all the carbonate.
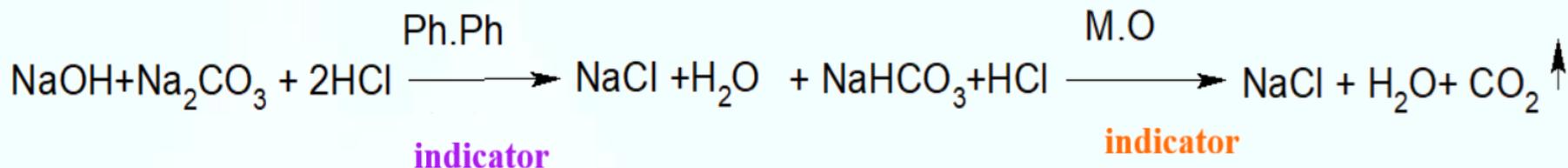
V2 = all hydroxide + all carbonate

Volume of HCl = 1/2 carbonate = V2 – V1 = V ml

Volume of HCl = all carbonate = 2V ml

Volume of HCl = NaOH = V2 - 2V ml

General interaction

$$NaOH + Na_2CO_3 + 2HCl \xrightarrow{\text{Ph.Ph}} NaCl + H_2O + NaHCO_3 + HCl \xrightarrow{\text{M.O}} NaCl + H_2O + CO_2 \uparrow$$

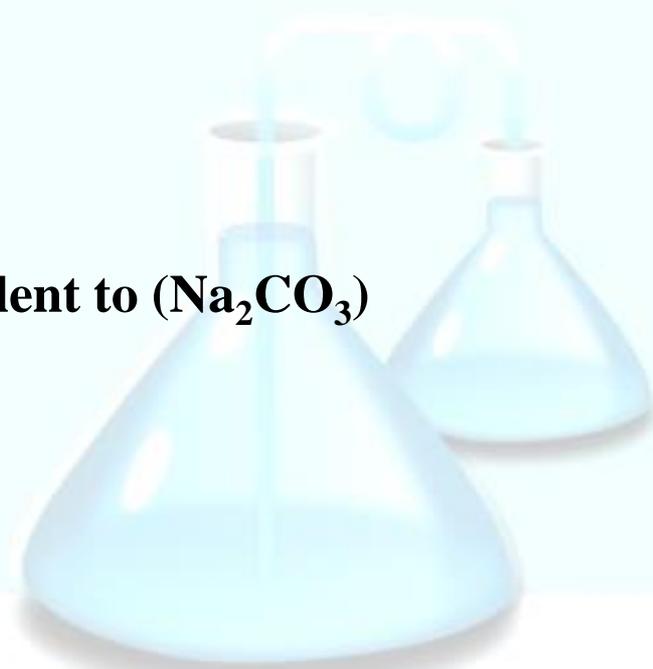indicator   indicator

Calculations:

• In the case of Na_2CO_3:

- Calculate the concentration of (Na_2CO_3).

- Calculate the volume of acid (HCl) that is equivalent to (Na_2CO_3)

$V_1 = 2Vy$

$N_{HCl} \times V_{HCl} = N_{Na2CO3} \times V_{Na2CO3}$

- **In the case of NaOH:**

- Calculate the volume of acid equivalent (NaOH).

$V_2 = V_X - V_y$

$V_2 = V_X (1/2\ Na_2CO_3 + NaOH) - V_y (1/2\ Na_2CO_3)$

$N_{HCl} \times V_{HCl} = N_{NaOH} \times V_{NaOH}$

Experiment (8)

Precipitation titration

Determination of chloride ion by Mohr method

Precipitation titration: is titration depend upon the combination of ions to form a simple precipitate. Mohr method is a method depend upon formation a colored precipitate for the determination of chloride ion.

Chloride ion, is reacted with silver nitrate solution to form AgCl precipitate.

$$AgNO_3 + NaCl \longleftrightarrow AgCl + NaNO_3$$

A small quantity of potassium chromate (K_2CrO_4) solution is added to serve as indicator. The first excess of titrant results in the formation of a red silver chromate precipitate which signal the end point.

$$2AgNO_3 + K_2CrO_4 \longleftrightarrow Ag_2CrO_4 + 2KNO$$

Calculate

$$N_{Cl^-} \times V_{Cl^-} = N_{Ag^+} \times V_{Ag^+}$$

Concentration of [Cl-](ppm) = $N_{Cl^-} \times$ eq.wt $\times 1000$

Thank You For Listening