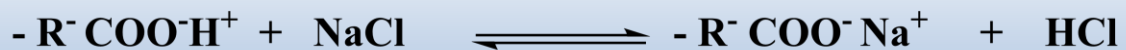## Experiment No.1

Calibration NaOH by using positive ion exchanger

The theoretical part

The cation exchanger contains effective sites that are rich with positive ions which are usually of the H + form, this positive ion can be changed by another positive ion such as Na $^+$ or K $^+$, where it replaces or replaces the hydrogen proton with the similar metal ions in the charge when we added saline solution such as NaCl, KCl.

$$- R^-SO3\ H^+\ +\ NaCl\ \rightleftharpoons\ - R^-SO3Na^+\ +\ HCl$$

$$- R^-\ COO^-H^+\ +\ NaCl\ \rightleftharpoons\ - R^-\ COO^-\ Na^+\ +\ HCl$$

So When a sodium chloride (NaCl) or potassium chloride (KCl) solution is passed on (H$^+$_Form) cation exchanger, the exchange between sodium ions (Na$^+$) and hydrogen ions (H$^+$) will be as follows:

$$R^-\ H^+\ +\ NaCl\ \rightleftharpoons\ R^-\ Na^+\ +\ HCl$$

The solution that is flow from the column is acid (HCl) and from the calibration of this acid with sodium hydroxide we can be known the number of the meq. of the acid or hydrogen and we can calculate the normality of the base (NaOH), the unknown standard.

Materials

1. HCl hydrochloric acid (3N).
2. $AgNO_3$ silver nitrate (0.1 N).
3 – NaCl sodium chloride.
4 – Methyl orange.
5 - NaOH ز

Procedure

1. Carefully weigh (0.1) g from sodium chloride salt (NaCl) and dissolve it with a little amount of the distilled water,Then add it to the activated column and leave (2) ml of distilled water above the resin.

2. Collect the first amount of washing water from the column and check it by adding of the methyl orange indicator when a pink color appears, add another amount of the distilled water to the column and collect it from the column in the conical flask then also check it by use the methyl orange indicator and repeat this process until the pink color disappearance.

3. Calibrate the solution in the conical flask with the sodium hydroxide in the burette.

Procedure

No. of Meq. HCl   =   No. of Meq. NaCl   =   No.of Meq. NaOH

$$\frac{\text{Wt of NaCl}}{\text{Eq.Wt of NaCl}} \times 1000 = \underset{?}{N\,(NaOH)} \times \underset{\text{from burette}}{V\,(NaOH)}$$