

جامعة الانبار

كلية : الصيدلة

قسم : الكيمياء الصيدلانية

اسم المادة باللغة العربية: الكيمياء اللاعضوية

اسم المادة باللغة الإنكليزية: **Inorganic Chemistry lab**

المرحلة: الثالثة

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عنوان المحاضرة باللغة العربية: تجربة تحضير ومعايرة حامض الهيدروكلوريك

عنوان المحاضرة باللغة الإنكليزية: **Preparation and standardization 0.1N**

**Hydrochloric acid**

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## **Analytical chemistry**

1. **Qualitative:** study and determine the type of materials.
2. **Quantitative:** study the quantity of materials.

## **Types of analytical methods**

1. Volumetric analysis: the volume of the solution of known concentration is measured that required to react with the analyte.
2. Gravimetric analysis: the weight of the reagent is measured.
3. Coulometric : the reagent is direct electrical current needed to react completely with the analyte. The time required to complete the electrochemical reaction is measured.

**Standard solution:** is the solution of known normality or molarity.

**Primary standard:** is ultra pure compound that serve as reference material in the titration analysis and its properties are:

1. Highly pure
2. stable atmospherically
3. has no water of hydration
4. low cost

5. good solubility in the titration medium
6. reasonable molecular weight to avoid weighing error.

**Secondary standard:** is a compound whose purity has been established by chemical analysis and can serve as reference material in the titrimetric analysis.

**Titration:** is the process of adding slowly the standard reagent to the analyte until the reaction is judged to be complete.

Equivalent point (theoretical): is the point in the titration when the amount of the standard reagent is equivalent to the amount of the analyte.

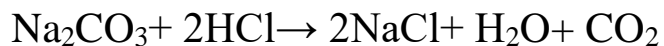
**End point** (experimental or practical): is the point in the titration when physical change occurs that is associated with chemical equivalence.

## **Preparation and standardization 0.1N Hydrochloric acid**

### **Introduction:**

Standard solution is a solution of known normality and molarity. Standardization is a process (titration with standard solution) used to determine the normality or molarity of solution.

Chemical equations:



**Procedure:** Preparation of 0.1N HCl: Dilute 2.2 ml of HCl to 250 ml. Standardization of 0.1N HCl: Fill the burette with 0.1N  $\text{Na}_2\text{CO}_3$  (primary standard solution which is prepared by weighing exactly 1.325g of  $\text{Na}_2\text{CO}_3$  and dilute it to 250ml of distilled water in a volumetric flask). Transfere 10 ml of the prepared HCl solution into a conical flask then add 2 drops of methyl orange as indicator. Orange color is obtained. Titrate with  $\text{Na}_2\text{CO}_3$  standard solution drop wise with mixing after each addition until a yellow color is obtained.

**Calculation:**

How to prepare 250ml of 0.1N HCl?

$$N(\text{HCl}) = \frac{\text{s.g} * \% \frac{W}{W} * 1000}{\text{Eq wt of HCl}}$$

s.g of conc. HCl= 1.18

M.wt of HCl= 36.5g

The %w/w of HCl from the reagent bottle

$NV(\text{conc. HCl}) = NV(\text{dil. HCl})$

Determination of the normality of the prepared HCl solution:

$NV(\text{HCl}) = NV(\text{Na}_2\text{CO}_3)$