

# Chemistry Lab Report

**Exp No:** 01

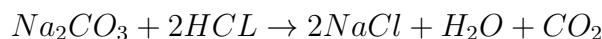
**Exp Name:** Standardization of  $HCl$  using 100mL of 0.1(M)  $Na_2CO_3$ .

**Equipments:** 1. Burette(500mL) 2. Conical flask(250mL) 3. Funnel 4. Wash bottle  
5. Pipette 6. Burette stand.

**Theory:** Titration is a common laboratory method of quantitative chemical analysis to determine the concentration of an identified analyte (a substance to be analyzed). A reagent, termed the titrant or titrator, is prepared as a standard solution of known concentration and volume. The titrant reacts with a solution of analyte to determine the analyte's concentration. The volume of titrant that reacted with the analyte is termed the titration volume.

**Chemicals:** 1.  $HCl$  2.  $Na_2CO_3$  3. Distilled water 4. Indicator(Methyl orange).

**Chemical Reaction:**



Now,

$$e_1 S_1 V_1 = e_2 S_2 V_2 \Rightarrow S_2 = \frac{e_1 S_1 V_1}{e_2 V_2} \dots \dots \dots (1)$$

Where,  $e_1 = 2$ ,  $e_2 = 1$

$S_1$  = concentration of  $Na_2CO_3$

$S_2$  = concentration of  $HCl$

$V_1$  = volume of  $Na_2CO_3$

$V_2$  = volume of  $Na_2CO_3$

**Description:**

- 01.** 0.1(M) $Na_2CO_3$  solution preparation: At first we weight 1.061g, then we take it into a 250mL flask and mixed it with 250ml distilled water. After mixing it for some time, it's ready for experimental work.
- 02.** Standardization of  $HCl$  solution: At first fil the burette with  $HCl$  solution and record the initial burette reading. Then take 10mL $Na_2CO_3$  in conical flask and mix it up with 1/2 drops of Methyl Orange.
- 03.** Determination: Mix  $HCl$  with  $Na_2CO_3$  drop by drop carefully until  $Na_2CO_3$  solution changes it's color. When  $Na_2CO_3$  changes it's color that means it's the end point of our titration. Now mark the reading for  $HCl$  from burette for our further calculation.

**Data Table:**

Burette $HCl$ volume				
$SN$	$V_{1Na_2CO_3}$	$Initial_{(mL)}$	$Final_{(mL)}$	$Diff_{initial-final}$
01	$10mL$	$0mL$	$21.6mL$	$21.6mL$
02	$10mL$	$21.6mL$	$49.9mL$	$21.3mL$

**Calculation:**

From the table, Mean value of  $HCl = \frac{21.6+21.3}{2} = 21.45mL$

From equation (1) we get,  $S_2 = \frac{e_1 S_1 V_1}{e_2 V_2} = \frac{2 \times 0.100094 \times 100}{21.45} = 0.93327 \text{ M}$

**Result:** The concentration of  $HCl$  is **0.93327 M**.

**Discussion:** The molarity of  $HCl$  may not be totally correct for some certain chemical fault.

**Precaution:**

**01.** Usually an air bubble is present in the nozzle of the burette. It must be removed before taking the initial reading.

**02.** There should not be any kind of leakage from the burette during titration.

**03.** Always add acid to water.

**04.** Don't let base level in burette to reach zero.