

## Experiment NO. (2)

### Preparation and Standardization of Sodium Hydroxide

Sodium hydroxide, also known as lye and caustic soda is an inorganic compound with the formula  $\text{NaOH}$ . It is a white solid ionic compound consisting of sodium cations  $\text{Na}^+$  and hydroxide anions  $\text{OH}^-$ .

Sodium hydroxide is a highly caustic base and alkali that decomposes proteins at ordinary ambient temperatures and may cause severe chemical burns. It is highly soluble in water, and readily absorbs moisture and carbon dioxide from the air. It forms a series of hydrates  $\text{NaOH} \cdot n\text{H}_2\text{O}$ . The monohydrate  $\text{NaOH} \cdot \text{H}_2\text{O}$  crystallizes from water solutions between 12.3 and 61.8 °C. The commercially available "sodium hydroxide" is often this monohydrate, and published data may refer to it instead of the anhydrous compound.

As one of the simplest hydroxides, sodium hydroxide is frequently used alongside neutral water and acidic hydrochloric acid to demonstrate the pH scale to chemistry students.

Sodium hydroxide is used in many industries: in the manufacture of pulp and paper, textiles, drinking water, soaps and detergents, and as a drain cleaner. Worldwide production in 2004 was approximately 60 million tons, while demand was 51 million tons.



## The Required Reagents

25ml of Sodium Carbonate ( 0.5M).

0.72g of calcium hydroxide.

Distilled water.

Phenolphthalein as indicator 2-3 drops.

Hydrochloric acid (HCl 0.1M).

## Procedure

- 1- Add 0.72g of Calcium Hydroxide to 25ml of Sodium Carbonate (0.5M) in a small beaker
- 2- Mark the level of mixture in the beaker then heat it for 10 minute
- 3- Add 25ml of Distilled water to the mixture
- 4- Turn the mixture to graduated cylinder (100ml) and record the height of precipitate column in different times from the time of transferring mixture to the cylinder ( 1,2,3,4,6,8) minute .leave the mixture to the next laboratory
- 5- Take 10ml of filtrate solution by using pipette to the conical flask then add 2-3 drops of Phenolphthalein as indicator and then titrate against the standard solution Hydrochloric acid (HCl 0.1M).
- 6- Record volume downward from the acid at the end point. and re-experiment to get two readings close

## Questions

- 1- Write the balance equation of this reaction?
- 2- Draw a graph between height of precipitate column against times?
- 3- Give the reason why the mixture leaves to the next laboratory with cover it ?
- 4- Prepare 0.1M standard solution Hydrochloric acid?
- 5- Calculate the concentration of sodium hydroxide?
- 6- Give the percentage of yield?
- 7- Prepare 0.5M of Sodium Carbonate?