AVAILABLE LIME

Quicklime (AS 4489)

Reagents

1. **Neutralised Sugar Solution**

   (i)   Dissolve 385 g of sugar in 615 mL of CO_2 free water.
   (ii)   Add several drops of phenolphthalein indicator then add 0.4 M
          NaOH dropwise until a faint pink colour persists.
   (iii) This solution should not be used more than 48 hours after preparation.

2. **Phenolphthalein (4%)**

   (i)   Dissolve 4 g of dry phenolphthalein in 100 mL of 95% alcohol.

3. **Standard Hydrochloric Acid (1 M) (may also be purchased pre-made)**

   (i)   Prepare a solution of 83 mL of Hydrochloric Acid to 1 L of CO_2 free
          water.
   (ii)   Weigh accurately to the nearest 0.1 mg, 4.4 g of Na_2CO_3 and transfer
          to a 500 mL flask.
   (iii) Dissolve in approximately 50 mL of CO_2 free water. Add 2 drops of
          0.1% Methyl Red in alcohol.
   (iv)   Titrate with the HCl until the first appearance of   red colour, and
          boil the solution to discharge the colour.
   (v)   Cool to room temperature and alternate titration, boiling and cooling
          until the first appearance of a red colour that is not discharged on
          further boiling.
   (vi)   Calculation:

   Molarity of HCl = Mass in g. of Na_2CO_3 used $\times$ 18.87/HCl (mL)

Procedure

(i)   Grind sample to **completely pass 150µm** screen.

(ii)   Accurately weigh approximately 2.804 g. of sample into a **dry** 500 mL Erlenmeyer flask, and record weight.

(iii)   Disperse in a small amount (<5 mL) of methylated spirit. Add approximately 50 mL of **boiling** water and immediately place on hotplate.

(iv)   Boil actively for at least 1 minute to complete slaking.

(v)   Remove from hotplate, stopper loosely and cool in water bath.

(vi)   Add 50 mL of the neutralised sugar solution, stopper flask and swirl.

(vii)   Let stand for 15 minutes (10 minimum, 30 maximum), swirling at 5 minute intervals. Add 4 or 5 drops of phenolphthalein solution.

(viii) Titrate **rapidly** to end point with the standard HCl from a 100 mL burette. When the first complete disappearance of the pink colour is noted, read the end point.

Calculation

$$\% \text{ Available Lime} = \frac{2.804 \times \text{molarity of HCl} \times \text{Titre (mL)}}{\text{sample weight (g)}}$$

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