

Edexcel International Chemistry

A-level

Practical 4

Preparation of a Standard Solution
and Titration



Aim

Prepare a **standard solution** from a solid acid salt and find the concentration of a solution of NaOH by **titration** using your prepared standard solution.

Method - preparing the standard solution

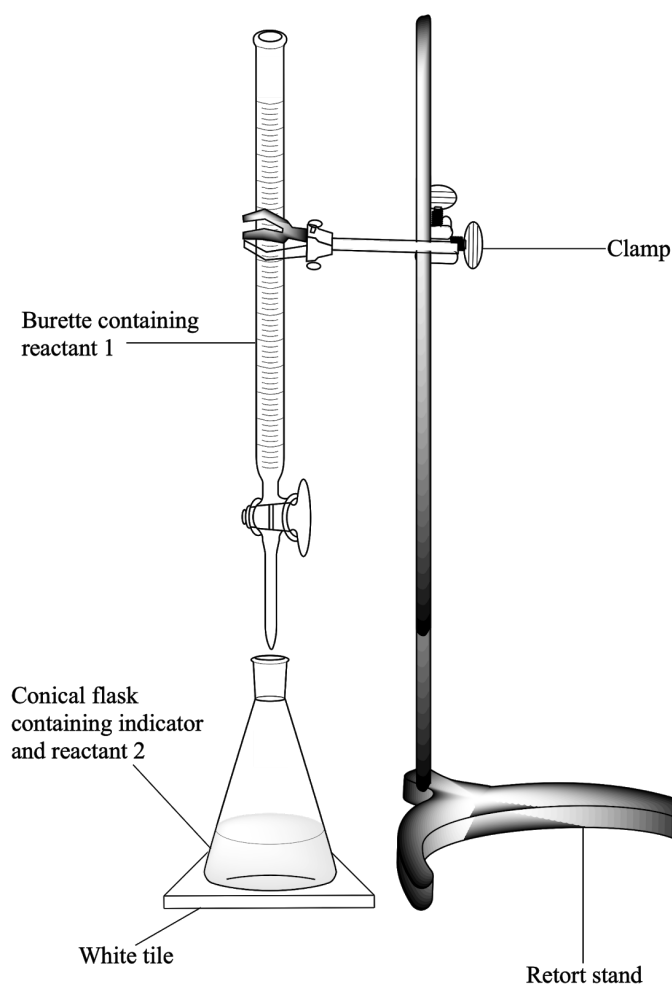
1. Weigh an empty weighing bottle before adding approximately 3g of the required acid salt.
2. Reweigh the weighing bottle and calculate the mass of acid that was added.
3. Transfer the solid to a 100 cm³ beaker.
4. Add approximately 50 cm³ of distilled water to the acid and stir with a glass rod so it dissolves.
5. Using a funnel, transfer the solution to a graduated 250 cm³ volumetric flask. Wash the rod and sides of the beaker into the graduated volumetric flask and fill with distilled water to the 250 cm³ mark.
6. Stopper the flask, then mix thoroughly by inverting and shaking vigorously. This is the standard solution.

Method - titration

1. Measure out 25 cm³ of the sodium hydroxide solution with an unknown concentration into a 100 cm³ conical flask.
2. Add a few drops of a suitable indicator such as phenolphthalein and place a white tile beneath the flask.
3. Using a funnel, fill a burette with the standard solution of acid you have prepared. Record the start volume in the burette.
4. Turn the tap and slowly add the acid while swirling the conical flask. Add the acid more slowly as you near the neutralisation point.
5. Stop adding acid when there is a colour change (this will vary depending on the indicator used).
6. Record the end volume in the burette to the nearest 0.05 cm³ and calculate the volume of acid needed to neutralise 25 cm³ of the sodium hydroxide solution.
7. Repeat the titration until you obtain concordant titres - titres within 0.1 cm³ of each other.



Apparatus set-up



Errors

- Be careful not to **lose any solid** when transferring from the weighing bottle to the beaker.
- When weighing out the solid, **weigh by difference** and then calculate the mass of a solid in a beaker:

$$\text{mass of (weighing bottle + beaker)} - (\text{mass of the bottle after emptying solid})$$

Key Points

- Acid must have a **high molar mass** (to reduce weighing errors).
- Sample must be **pure**.
- Sample must not be **air sensitive** or react with air components (e.g. by absorbing CO_2 or H_2O).

