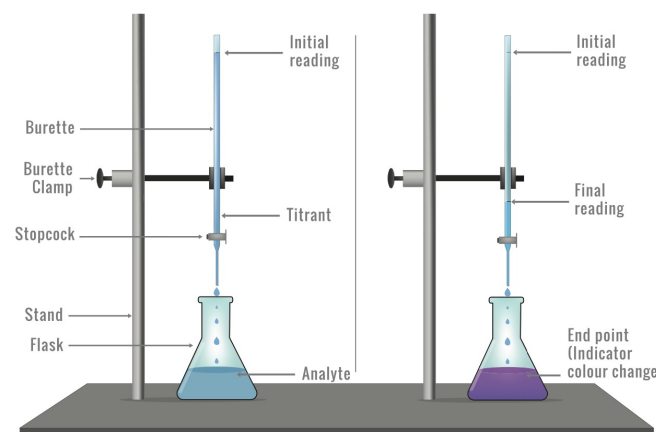


Volumetric Analysis - Titration

- Volumetric Analysis – Titration
- Uses
- How Titration is Done
- Equipment Used
- Titration Calculation Problems



$$\frac{C_a V_a}{\text{Coeff a}} = \frac{C_b V_b}{\text{Coeff b}}$$

Preview File

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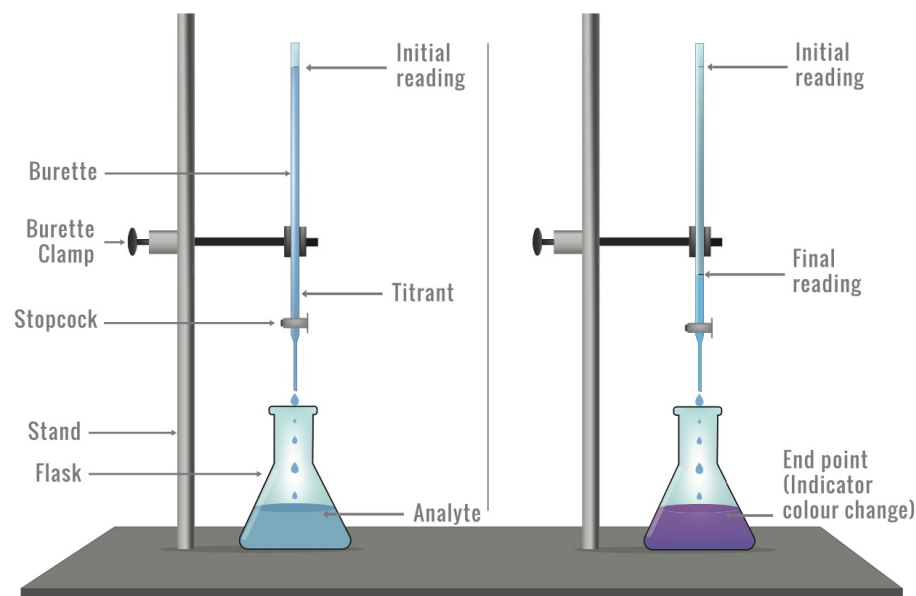
- Some slides appear blank because they have been removed
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Volumetric Analysis

- _____
- Commonly used to determine the concentration of acids or bases by performing a neutralization reaction
- Titration – The name of the experimental procedure



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Titration – How it's done

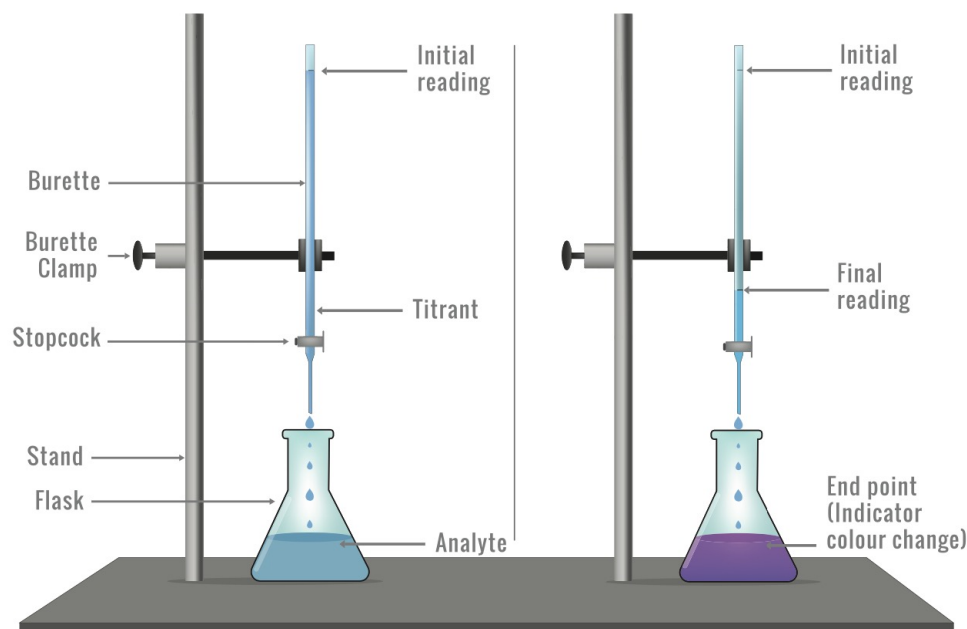
- Acid–base titrations
- To determine when neutralization has occurred, a pH indicator like phenolphthalein is added to the titration chamber
- _____



Phenolphthalein in solution

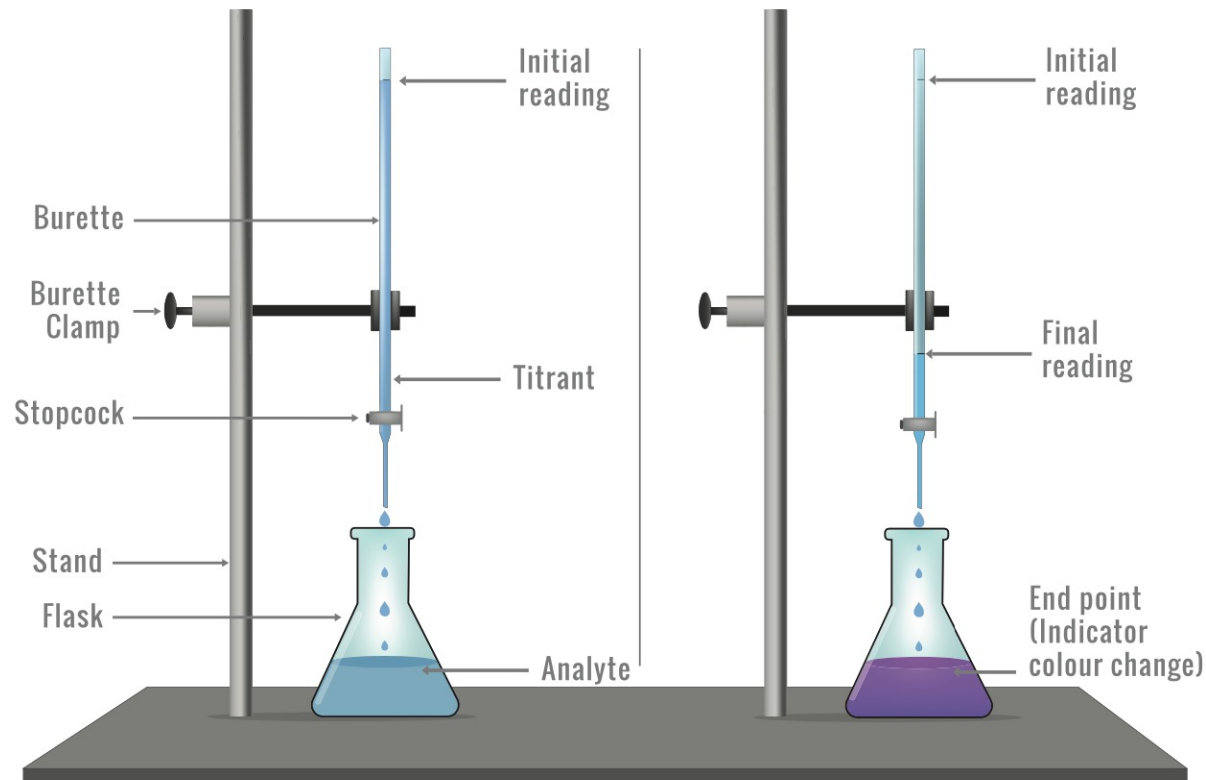
Titration – How it's done

- _____
- You determine the volume of the second reactant needed using titration (initial – final reading)
- Using these values you can calculate the unknown concentration



The Equipment

- Flask – where the unknown solution is placed
- _____



Titration Procedure

1. Fill the burette to near the top with the titrate solution of known quantity and concentration.
2. Use
3. Add 2-3 drops of the indicator.
4. Note
5. Add the titrate from the burette slowly to the flask, swirling the flask to ensure mixing. Once the indicator colour change remains for longer periods of time, reduce the flow.
6. Stop the addition of the titrate as soon as the colour change remains permanent. Record the burette reading.
7. The difference between the initial and final burette reading is the amount of titrate added.

Why Titrate?

- Solution stoichiometry can be used to solve for the concentration of an unknown solution
- The number of

- The formula:

C = concentration, V = Volume, a = acid, b = base, Coeff = Coefficient

$$\frac{C_a V_a}{\text{Coeff a}} = \frac{C_b V_b}{\text{Coeff b}}$$

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Check Your Understanding

In a titration, 10.00 mL of sodium hydroxide solution was neutralized by 16.36 mL of sulfuric acid (0.1286 mol/L).

Step 1: Write a balanced chemical equation

Step 2: Determine the unknown concentration of NaOH

$$\frac{C_a V_a}{\text{Coeff a}} = \frac{C_b V_b}{\text{Coeff b}}$$

- Titrations are tricky work - you must drop small amounts at a time (often ending with only one drop at a time)
- Often titrations are done more than once for accuracy
- _____

Check Your Understanding

In a titration, 15 mL samples of H_3PO_4 were neutralized with a 1.5 M solution of KOH. Determine the concentration of the H_3PO_4 solution, given the following information.



	Trial 1	Trial 2	Trial 3
Initial (mL)	49	39.5	30
Final (mL)	39.5	30	19.5
Titrant added	9.5	9.5	10.5