



Organic Chemistry Laboratory Experiment

2nd stage

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Lecture 2: Distillation

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Theory

Purpose: Purification of liquid organic compounds.

Distillation is the process where a liquid is heated until it boils and changes into vapor. The vapor is then condensed back into liquid in another part of the apparatus. This process involves boiling (evaporation) and condensation using a condenser.

Types of distillation:

1. Simple Distillation
2. Fractional Distillation
3. Steam Distillation
4. Vacuum Distillation

Simple Distillation

This method is widely used in laboratories in the following cases:

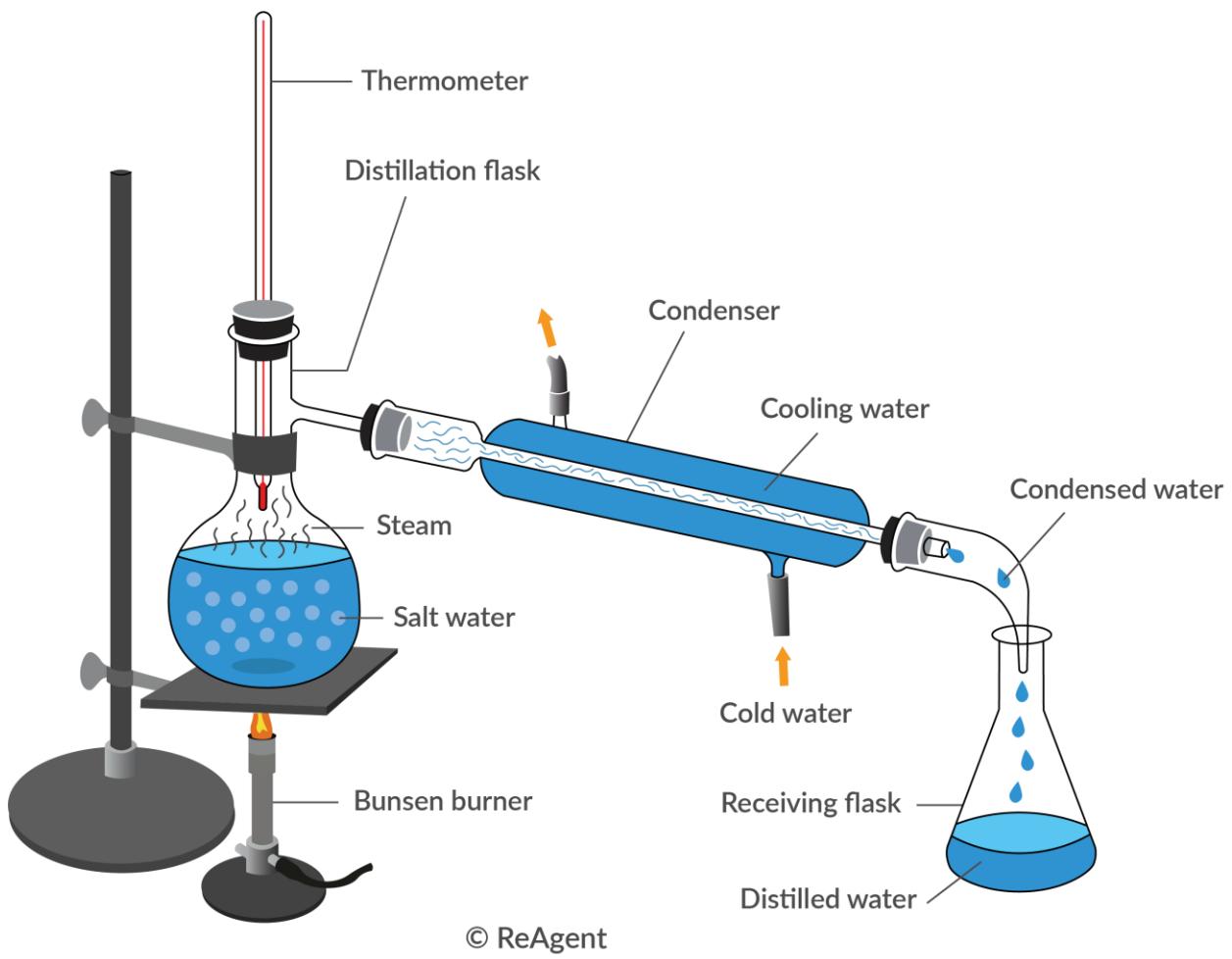
1. Separating liquids from solid impurities (purification).
2. Separating liquids that have a large difference in boiling points (more than 25–30 °C).
3. Measuring the boiling point of liquids.

Important note:

Always use boiling chips to get smooth boiling and to avoid sudden bumping.

Apparatus and materials

1. Round-bottom flask
2. Condenser
3. Thermometer
4. Heater
5. Conical flask (receiver)
6. Stand
7. Boiling chips
8. Clamp
9. Water containing potassium permanganate (impure sample)



Procedure

1. Put 50 ml of the liquid to be distilled (water + potassium permanganate) into the round-bottom flask, and add a few boiling chips.
2. Place the thermometer so that its bulb is aligned with the side opening of the distillation head.
3. Set up the apparatus as shown in the figure.

4. Heat the distillation flask. The liquid boils, vapor passes into the condenser, condenses into liquid again, and collects in the receiving flask. This gives the purified liquid.

5. Continue distillation until all liquid evaporates.

6. Record the boiling temperature.

7. Calculate the percentage purity as:

Calculations

$$\text{Purity} = (\text{volume of distilled liquid} / \text{original volume}) \times 100$$

Discussion

1. What is the main purpose of distillation?

2. What happens to a liquid during boiling?

3. Why do we need a condenser in distillation?

4. Why should we use boiling chips?

5. What is the difference between simple distillation and fractional distillation?