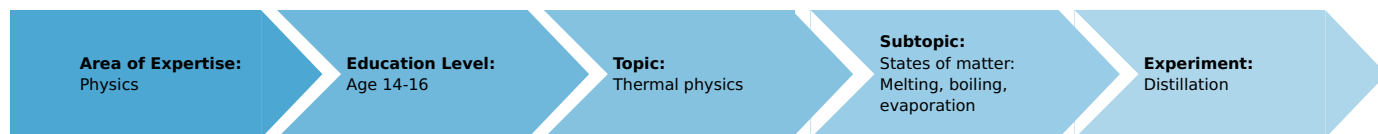


Distillation (Item No.: P1045000)

Curricular Relevance



Difficulty



Intermediate

Preparation Time



10 Minutes

Execution Time



10 Minutes

Recommended Group Size



2 Students

Additional Requirements:

- Butane burner, Labogaz 206 type 32178-00
- Butane cartridge C206, without valve 47535-00
- Glycerol, 250 ml 30084-25
- Boiling beads, 200 g 36937-20
- Potassium permanganate, chem. pur., 250 g 30108-25
- Matches

Experiment Variations:

Keywords:

Task and equipment

Information for teachers

Additional Information

Coloured water is brought to a boil and the water vapour is conducted into a cooled test tube. The colour and quantity of water before and after distillation are observed.

Remark

The glass tube holder should be pushed down so that it rests across the mouth of the test tube to help keeping it in the correct position.

Distillation (Item No.: P1045000)

Task and equipment

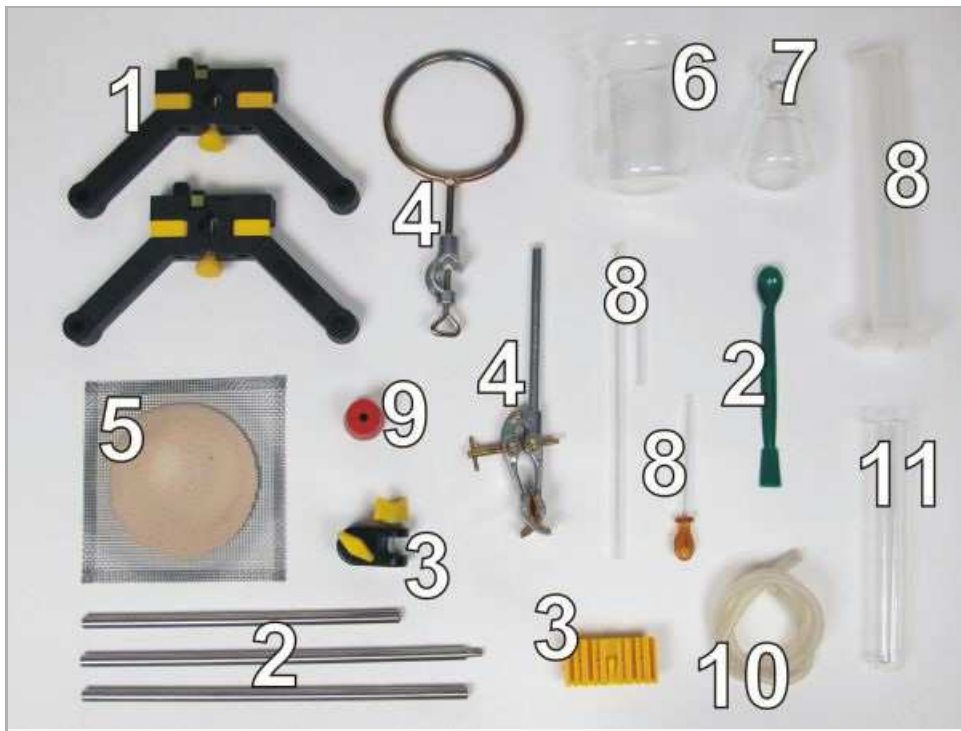
Task

What happens during distillation?

Bring coloured water to a boil and collect the resulting water vapour.



Equipment



Position No.	Material	Order No.	Quantity
1	Support base, variable	02001-00	1
2	Support rod, stainless steel, l = 250 mm, d = 10 mm	02031-00	1
3	Support rod, stainless steel, l = 600 mm, d = 10 mm	02037-00	1
4	Spoon, w. spatula end, 18 cm, plastic	38833-00	1
5	Boss head	02043-00	1
6	Glass tube holder with tape measure clamp	05961-00	1
7	Ring with boss head, i. d. = 10 cm	37701-01	1
8	Universal clamp	37715-00	1
9	Wire gauze with ceramic, 160 x 160 mm	33287-01	1
10	Glass beaker DURAN®, short, 400 ml	36014-00	1
11	Erlenmeyer flask 100 ml, wide-neck SB 29	36428-00	1
12	Graduated cylinder 100 ml, PP transparent	36629-01	1
13	Glass tubes, l. 250 mm, pkg. of 10	36701-68	(1)
14	Glass tube, straight, l=80 mm, 10/pkg.	36701-65	(1)
15	Pipette with rubber bulb	64701-00	1
16	Rubber stopper 26/32, 1 hole 7 mm	39258-01	1
17	Silicone tubing i.d. 7mm	39296-00	1
18	Test tube, 200x30 mm, DURAN	36304-01	1
Additional material			
19	Butane burner, Labogaz 206 type	32178-00	1
20	Butane cartridge C206, without valve	47535-01	1
21	Glycerol, 250 ml	30084-25	1
22	Boiling beads, 200 g	36937-20	1
23	Potassium permanganate, chem. pur., 250 g	30108-25	1
24	Matches		

Set-up and procedure

Set-up

Attention!

1. Hot water vapour is conducted through the tubing and the glass tubes! Always hold the tube in the way that its end points straight down.
2. During the heating of the water the support ring and the wire gauze get extremely hot!
3. Always insert the thermometer or glass tubes in the rubber stopper using glycerol.

Setup

- Set up the support stand according to the following pictures. The wire gauze should be only 1 cm above the burner's opening so that the water boils strongly.



Fig. 1



Fig. 2

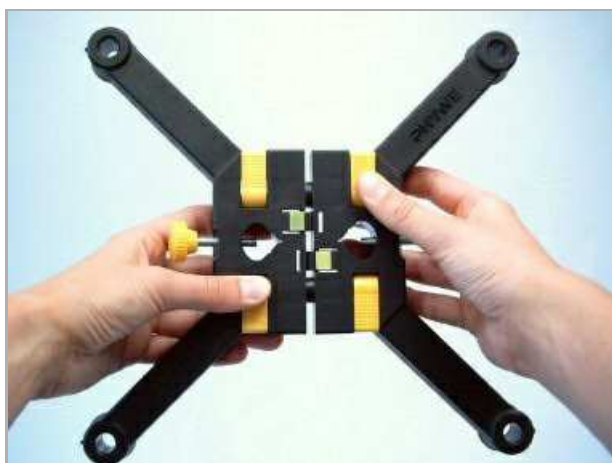


Fig. 3



Fig. 4a



Fig. 4b



Fig. 5

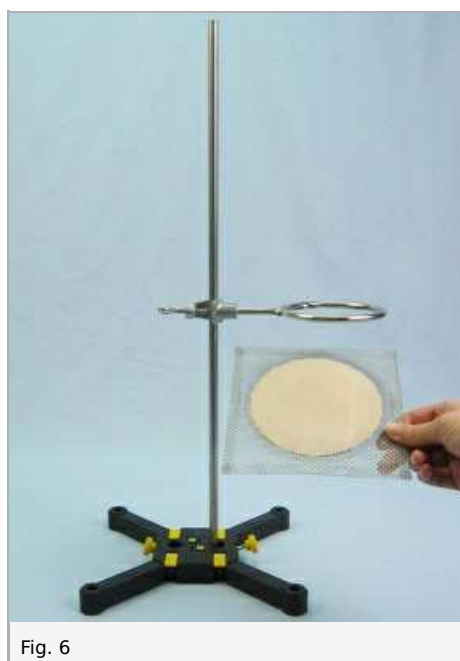


Fig. 6

- Insert the small tube in the stopper.

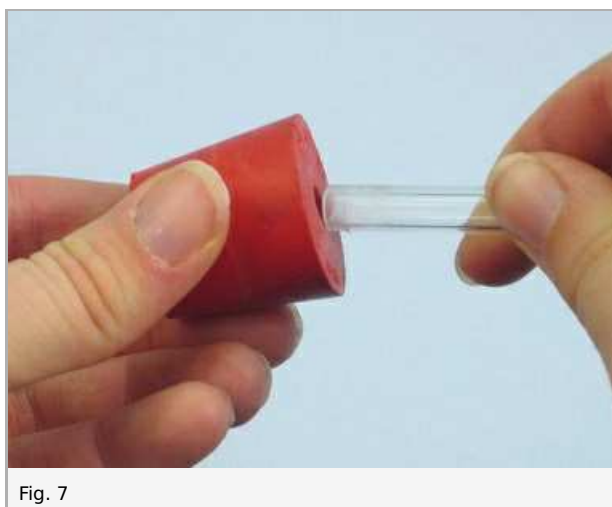


Fig. 7

- Pour exactly 100 ml of water into the Erlenmeyer flask, add two beads and several grains of food colouring.



Fig. 8



Fig. 9



Fig. 10

- Seal the flask with the stopper.
- Place the Erlenmeyer flask onto the wire gauze and clamp it into place with the universal clamp.



Fig. 11

- Slip a piece of silicone tubing (about 50 cm) over the end of the short glass tube and insert the long tube into the other end of the tubing.



Fig. 12



Fig. 13



Fig. 14

- Using the glass tube holder, hold the long glass tube perpendicularly.
- Insert the glass tube far into the test tube which is in a beaker containing about 200 ml of cold water.

Procedure

- Note the initial volume of the coloured water V_0 (report).
- Heat the coloured water in the Erlenmeyer flask.
- The water should boil about 3 min.
- Compare the liquids in the Erlenmeyer flask and the test tube and record your observations.
- Turn off the burner.
- Lift the Erlenmeyer flask by moving the bosshead to a position somewhat above the hot wire gauze so that the flask can cool more quickly.
- Measure the volume of water V_1 in the test tube and record the value.
- Measure and record the final volume of water V_2 in the Erlenmeyer flask with the graduated cylinder. To do so remove the universal clamp from the bosshead and use it as a handle for pouring.

Report: Distillation

Result - Observations 1

Note down the colour of the water in the Erlenmeyer flask:

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Result - Observations 2

Note down the colour of the water in the test tube:

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Result - Observations 3

Initial volume (Erlenmeyer flask): $V_0 =$ ml.

Final volume (test tube): $V_1 =$ ml.

Final volume (Erlenmeyer flask): $V_2 =$ ml.

Evaluation - Question 1

Compare the quantities of water (V_0, V_1, V_2). How are they related?

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Evaluation - Question 2

What processes are involved in distillation?

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Evaluation - Question 3

What is the effect of distillation in this experiment?

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Evaluation - Question 4

List several examples of distillation.

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