

Detection of methanol (Item No.: P7186200)

Task and equipment

Information for teachers

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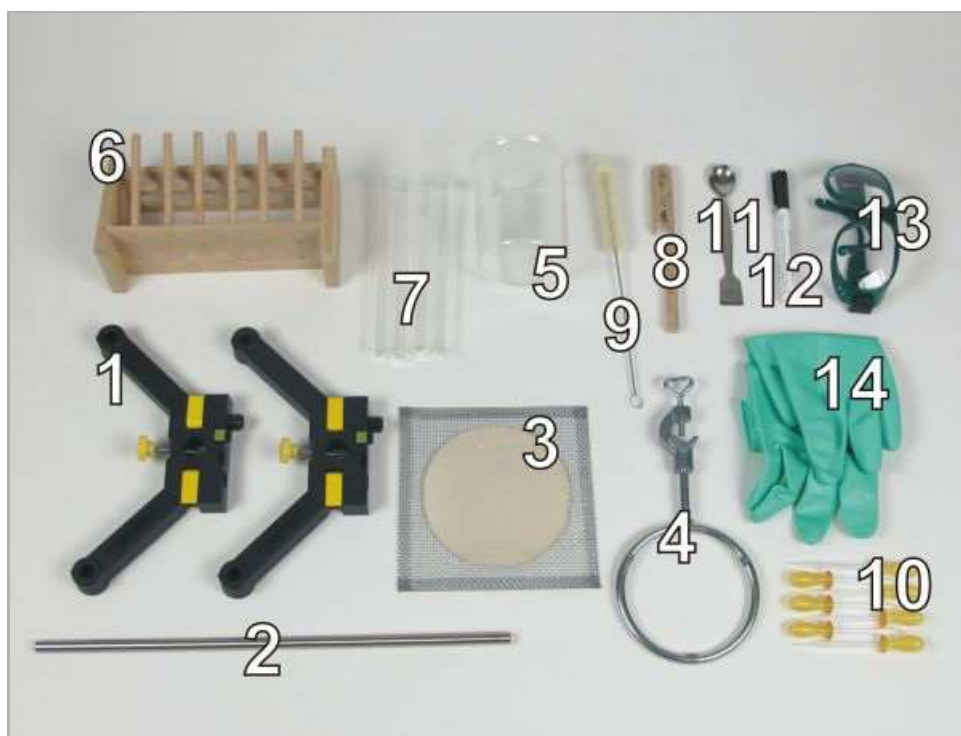
Task

Which spirits contain methanol?

Detect methanol in alcoholic drinks.



Equipment



Position No.	Material	Order No.	Quantity
1	Support base, variable	02001-00	1
2	Support rod, stainless steel, l=370 mm, d=10 mm	02059-00	1
3	Ring with boss head, i. d. = 10 cm	37701-01	1
4	Wire gauze with ceramic, 160 x 160 mm	33287-01	1
5	Glass beaker DURAN®, short, 400 ml	36014-00	1
6	Test tube rack for 12 tubes, holes d= 22 mm, wood	37686-10	1
7	Test tube, 180x18 mm, 100 pcs	37658-10	(4)
8	Test tube holder, up to d 22mm	38823-00	1
9	Test tube brush w. wool tip, d 25mm	38762-00	1
10	Pipette with rubber bulb	64701-00	7
11	Spoon, special steel	33398-00	1
12	Labor pencil, waterproof	38711-00	1
13	Protecting glasses, clear glass	39316-00	1
14	Rubber gloves, size S (7)	39325-00	1
	Butane burner f. cartridge 270+470	47536-00	1
	Butane cartridge CV 300 Plus, 240 g	47538-01	1
	Compact Balance, OHAUS TA 302, 300 g / 0.01 g	49241-93	1
	Ethanol extra pure ab. 95% 1000 ml	30008-70	1
	Potassium permanganate, chem. pur., 250 g	30108-25	1
	Methanol 500 ml	30142-50	1
	Ortho-phosphoric acid 85% 250 ml	30190-25	1
	Sulphuric acid, 95-98% 500 ml	30219-50	1
	Oxalic acid cryst. 100 g	30268-10	1
	Water, distilled 5 l	31246-81	1
	Schiff's reagent 250 ml	31827-25	1
	Boiling beads, 200 g	36937-20	1
Additional material			
	Corn schnapps		
	Fruit brandy		

Set-up and procedure

Set-up

Hazards

- Methanol is poisonous.
- Sulphuric acid, phosphoric acid and oxalic acid are corrosive.
- Avoid any bodily contact with the chemicals.
- Methanol and ethanol are highly inflammable. Extinguish all open flames before handling them.
- Wear protective glasses and protective gloves!
- Solid potassium permanganate promotes fires. Avoid any contact with combustible substances.



Setup

Number four test tubes from 1 to 4 and stand them next to each other in the test tube rack (Fig. 1).



Fig. 1

Assemble the stand as shown in figures 2 to 6. Fasten the support ring to the support rod and place the wire gauze on it. Adjust the height of the support ring so that the flame of the burner just reaches the wire gauze.



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6

Half-fill a 400 ml beaker with water and add a few boiling stones. Heat it to boiling, then put it aside. Extinguish the bunsen burner flame!



Fig. 7

Procedure

Use pipettes to fill the following liquids in the test tubes:

Test tube	Liquid
1	10 drops of ethanol
2	9 drops of ethanol 1 drop of methanol
3	10 drops of fruit brandy
4	10 drops of corn schnapps



Fig. 8

Pipette potassium permanganate/phosphoric acid solution into each test tube to a height of 2 cm. Allow the test tubes to stand in the test tube rack for 10 minutes.



Fig. 9

Successively pipette sulphuric acid/oxalic acid dropwise into each test tube under a slight swirling action (from the wrist) until each solution is decolourized.

Now pipette Schiff's reagent into each test tube to a height of 5 cm. Place the test tubes in the hot water bath for 10 minutes.

Waste disposal

Pour the solutions into the container for halogen-free organic solvents.

Report: Detection of methanol

Result - Table 1

Note your observations in the following table.

Test tube	Liquid	Reaction with Schiff's reagent
1	Ethanol	1
2	Ethanol / Methanol	1
3	Fruit brandy	1
4	Corn schnapps	1

Evaluation - Question 1

Draw conclusions from your observations.

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Evaluation - Question 2

Formulate the redox reaction of potassium permanganate with oxalix acid in sulphuric acid solution.

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Evaluation - Question 3

Why should foods contain as little methanol as possible?

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Evaluation - Question 4

Complete the following statements:

1. Simple fruit brandies contain clearly detectable amounts of
2. Methanol can be detected with and
3. Methanol is and leads to irrevocable loss of

Evaluation - Question 5

Why is the consumption of spirits of unknown origin very dangerous and which precautionary measures are necessary before drinking, so that no harm to health ensues.
