Alco test-tubes (Item No.: P7171800)

Curricular Relevance

Area of Expertise: Chemie
Education Level: Klasse 7-10
Topic: Organische Chemie
Subtopic: Sauerstoffhaltige organische Verbindungen
Experiment: Alco-Test-Röhrchen

Difficulty	Preparation Time	Execution Time	Recommended Group Size
Easy	10 Minutes	10 Minutes	2 Students

Additional Requirements:

Experiment Variations:

Keywords:

organic compounds, alkanols, alco test tubes

Task and equipment

Information for teachers

Learning objectives

- Alcohols can be oxidized by oxidizing agents.
- The presence of alcohol can be detected by the use of coloured oxidizing agents

Notes on setup and procedure

Preparation:
Alco test-tubes are commercially available. Use the fruit wine which was prepared in a previous experiment (P7171600) or other alcoholic beverages.

Remarks on the students experiments:
Ensure that the pumping is carried out at an even rate and not too strongly. Should a test-tube break, the working area must be immediately cleaned by the teacher (wear protective gloves!).



Hazards

- Alco test-tubes contain poisonous substances. Do not break the tubes, do not touch the contents!
- Chromates act as irritants to eyes and mucous membranes, they are carcinogenic! Wear protective glasses!
- To make glass/rubber connections, wet the glass with glycerol so that it can be easily inserted!

Notes

The Alco test-tube contains mainly the sulphate of potassium dichromate (acidified with sulphuric acid), which is reduced to potassium sulphate and chromium sulphate:

$Cr^{6+} + 3\ e^- \rightarrow Cr^{3+}$

Remarks on the method

In a parallel test air could be pumped through water to show that ethanol is the reducing agent. In the context of this experiment the danger of "drinking and driving" could be discussed.

Waste disposal

Collect the test-tubes in a plastic bag and dispose of them in the container for poisonous (carcinogenic) heavy metals (chromium, mercury etc.) waste.

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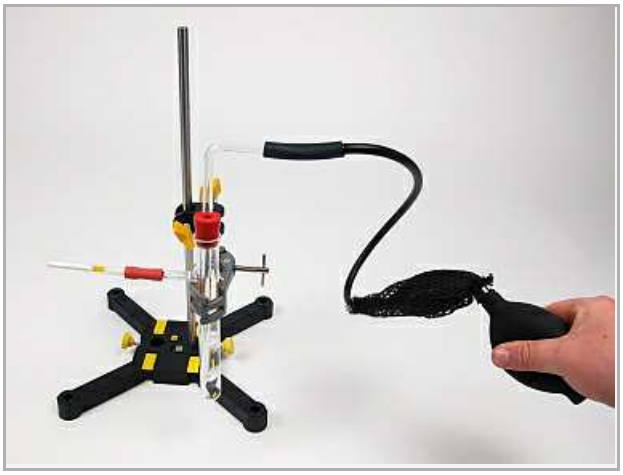
Task and equipment

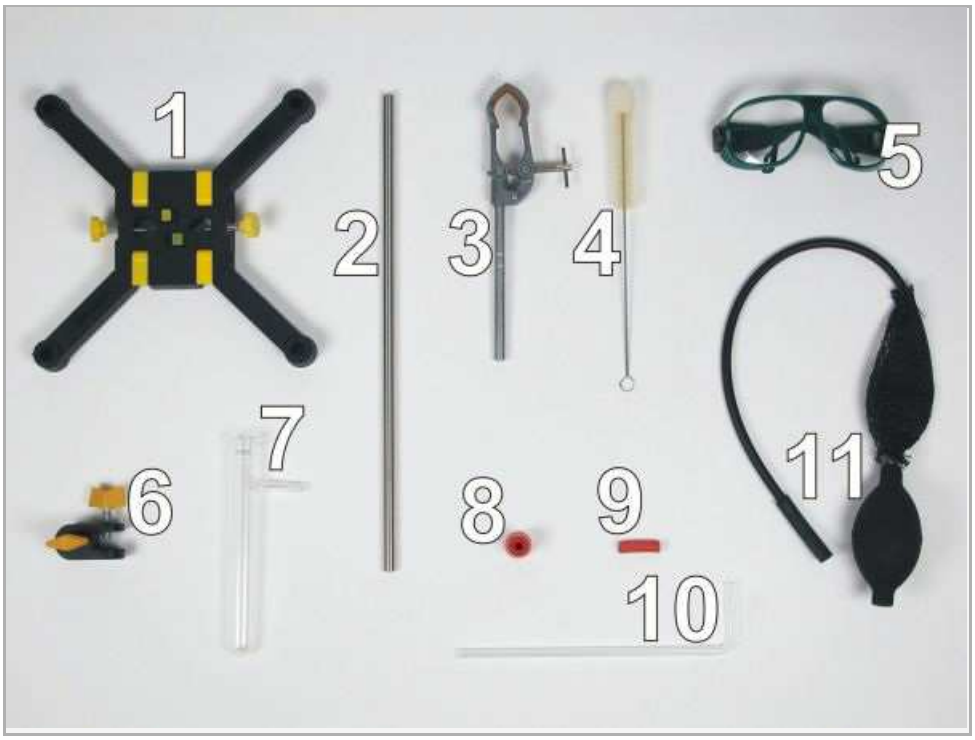
Task

How can ethanol be detected?

Examine alcoholic beverages using an Alco test-tube.



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	Universal clamp	37715-00	1
4	Test tube brush w. wool tip,d25mm	38762-00	1
5	Protecting glasses, clear glass	39316-00	1
6	Boss head	02043-00	1
7	Test tube,180x20 mm,side arm,PN19	36330-00	1
8	Rubber stopper, d = 22/17 mm, 1 hole	39255-01	1
9	Rubber tubing, i.d. 6 mm	39282-00	1
10	Glass tubes,right-angled, 10	36701-59	(1)
11	Rubber bulb, double	39287-00	1
	Glycerol, 250 ml	30084-25	1
Additional material			
	Alco test tube		
	Alcoholic beverages		

Set-up and procedure

Set-up

Hazards

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Setup

Set up the stand as shown in Fig. 1 and fix the side-arm test tube vertically in the clamp.

Fig. 1

Ease the long arm of the right-angled glass tube carefully through the rubber stopper (wet with glycerol). Carefully, without using force connect the Alco test-tube to the side-arm of the test tube using a piece of rubber tubing (Fig. 2).

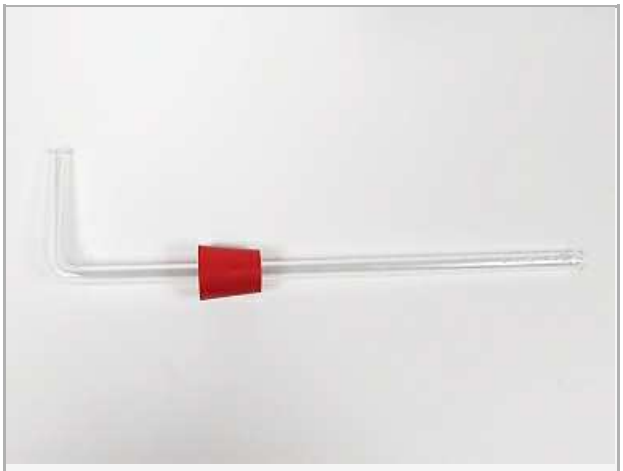

Fig. 2

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Procedure

Fill the test tube one third full with alcoholic liquid (Fig. 3). Close the test tube with the rubber stopper and carefully put the right-angled tube into the stopper, so that the long arm dips into the liquid.

Fig. 3

Connect the short arm of the right-angled tube to the double rubber bulb (Fig. 4). Carefully and as steady as possible pump a flow of air through the liquid (Fig. 5).

Fig. 4

Fig. 5

Waste disposal

Dispose of the Alco test-tube as poisonous/carcinogenic heavy metals waste.

Report: Alco test-tubes

Result - Observations

Note the observations you make.

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Evaluation - Question 1

Draw conclusions from your observations, thereby answer the question in the header and name the application for which the test-tubes are used mostly.

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Evaluation - Question 2

Chromates are oxidizing agents. Explain the reaction which took place.

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Evaluation - Question 3

Name further properties of ethanol which are shown by this experiment.

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