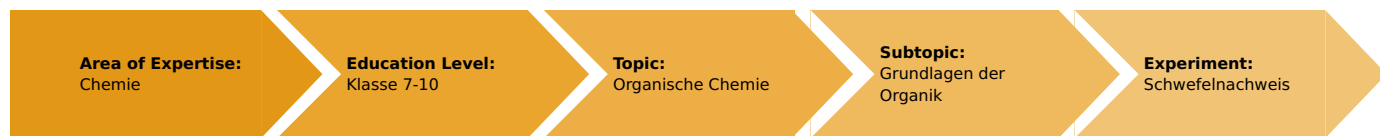


The detection of sulphur (Item No.: P7170500)

Curricular Relevance



Difficulty



Easy

Preparation Time



10 Minutes

Execution Time



10 Minutes

Recommended Group Size



2 Students

Additional Requirements:

Experiment Variations:

Keywords:

organic compounds, tests for sulphur

Task and equipment

Information for teachers

Learning objectives

- Many organic substances, proteins in particular, contain sulphur.
- Sulphur can be detected as silver sulphide (Hepar test).

Notes on setup and procedure

Preparation:

Cut out 4 x 4 cm pieces of silver foil for use in the experiment. Albumin (egg white) or the amino acid cysteine (31230-04) can be used in place of casein with good success.

Notes on the students experiments:

The protein must form a homogenous melt with the sodium carbonate and this must glow right through.



Hazard and Precautionary statements

Sodium carbonate:

H319: Causes serious eye irritation.

P260: Do not breathe dust.

P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P501: Dispose of contents/ containers to be collected by a licensed contractor in accordance with national and local regulations.

Hazards

- Gases with an unpleasant smell are evolved when the substances are heated. Do not inhale them!

- Wear protective glasses!

Notes

On melting, sodium carbonate decomposes and thereby reacts with the sulphur present in organic substances under the formation of brown coloured sodium polysulphides. The colour of these polysulphides is similar to that of liver, and this is the basis for the name "Hepar test", Hepar being Greek for liver. Soluble polysulphides form silver sulphide spontaneously with metallic silver. Proteins with a high content of cysteine or methionine are particularly rich in sulphur. These include the vegetable proteins in the fruits of leguminous plants.

Remarks on the method

It is very difficult to answer the questions without having further information. The experiment should therefore be evaluated in a teaching discussion so that the processes taking place in the Hepar test become intelligible.

Waste disposal

- Put the decomposition products into the container for solid organic waste.
- Clean the silver foil by rubbing it down with emery.

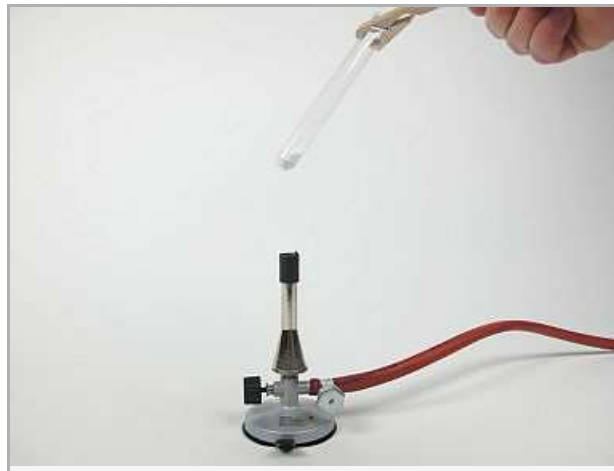
The detection of sulphur (Item No.: P7170500)

Task and equipment

Task

Which other elements can organic compounds contain? (3)

Examine the various organic compounds for sulphur content.



Equipment



Position No.	Material	Order No.	Quantity
1	Test tube rack for 12 tubes, holes d= 22 mm, wood	37686-10	1
2	Spoon, special steel	33398-00	1
3	Pipette with rubber bulb	64701-00	1
4	Protecting glasses, clear glass	39316-00	1
5	Glass rod, boro 3.3, l=200mm, d=6mm	40485-04	1
6	Test tube brush w. wool tip,d25mm	38762-00	1
7	Test tube,180x20 mm,DURAN, PN19	36293-00	1
8	Wash bottle, 250 ml, plastic	33930-00	1
9	Test tube holder, up to d 22mm	38823-00	1
	Butane burner f.cartridge 270+470	47536-00	1
	Butane cartridge CV 300 Plus, 240 g	47538-01	1
	Silver foil, 150 x150 x 0.1 mm, 25 g	31839-04	1
	Water, distilled 5 l	31246-81	1
	Casein, alkali-soluble 100 g	31188-10	1
	Sodium carbonate, anhyd. 1000 g	30154-70	1
Additional material			
	Water		

Set-up and procedure

Set-up

Hazards

- Gases with an unpleasant smell are evolved when the substances are heated. Do not inhale them!
- Wear protective glasses!



Procedure

Put a spatula tip of casein in the test tube (Fig. 1) and add the same amount of sodium carbonate. Mix the two substances well with each other by shaking the test tube.

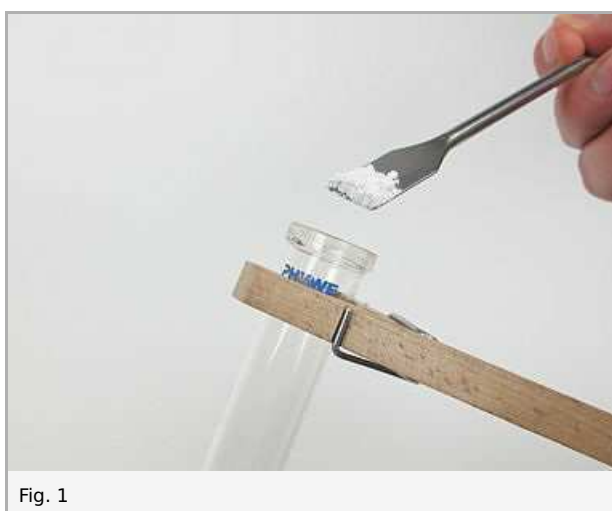


Fig. 1

Heat the mixture for about 5 minutes at red-heat (Fig. 2). Remove it with the spatula while red-hot and place it onto the silver foil (Fig. 3).

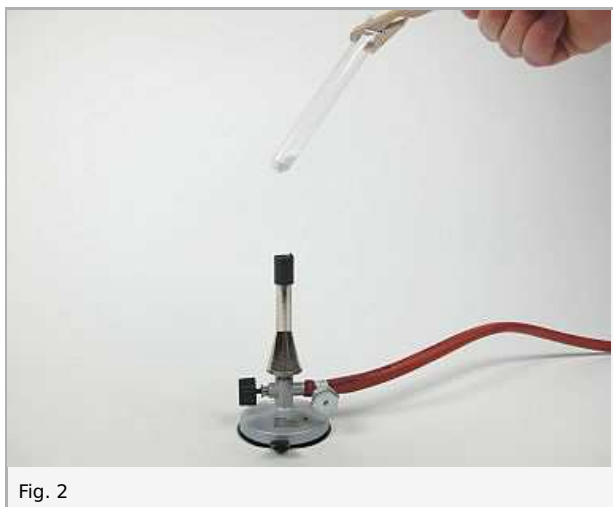


Fig. 2

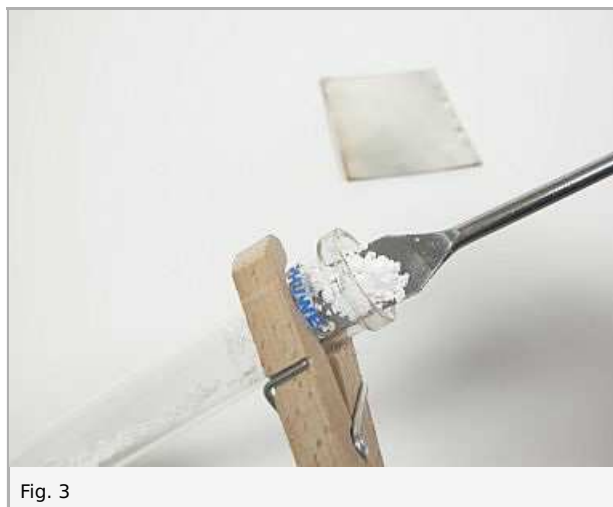


Fig. 3

Wet the hot mixture with two drops of water (Fig. 4) and, using the glass rod, press it firmly against the silver foil (Fig. 5).



Fig. 4

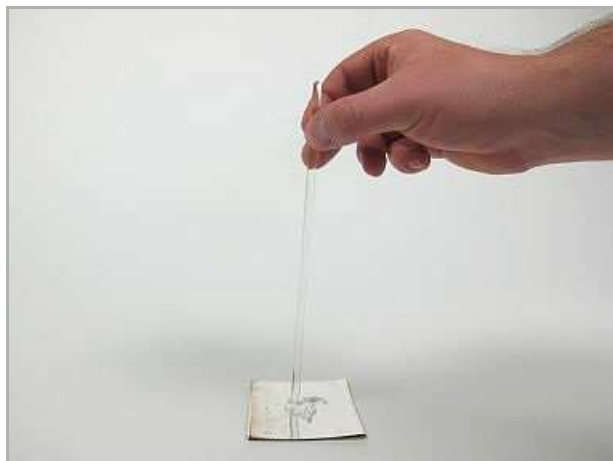


Fig. 5

Let the mixture work for about 10 seconds, then wash it off of the foil with plenty of water (Fig. 6).



Fig. 6

Waste disposal

- Put the decomposition products into the container for solid organic waste.
- Clean the silver foil by rubbing it down with emery.

Report: The detection of sulphur

Result - Observations 1

Note the observations you make when heating the substances.

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Result - Observations 2

Record the change in the silver foil.

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Evaluation - Question 1

Draw conclusions from your observations.

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Evaluation - Question 2

Give the reason why this experiment serves to detect sulphur, and state which substance could have been formed on the silver foil?

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Evaluation - Question 3

Name some foods which have an especially high sulphur content?

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