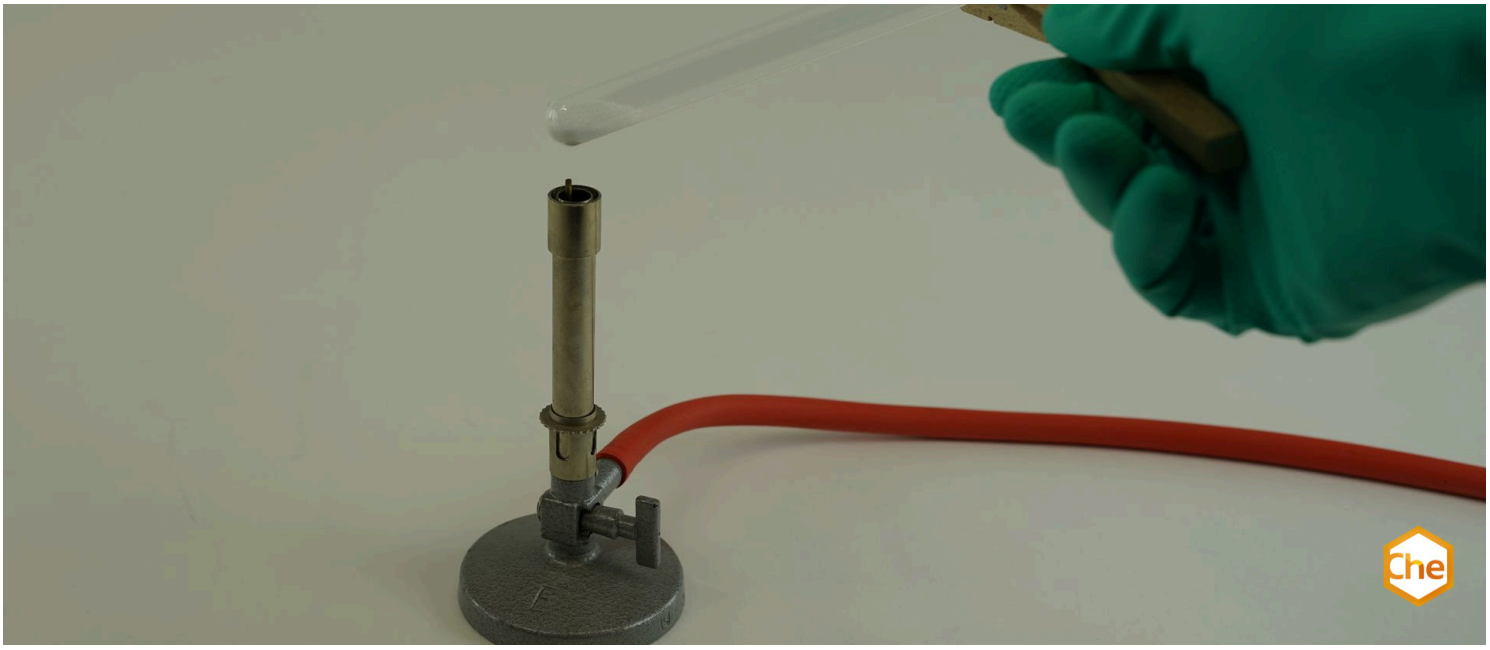
# The detection of oxygen



Chemistry > Organic chemistry > Basics: Organic chemistry

| Difficulty level | Group size | Preparation time | Execution time |
|---|---|---|---|
| easy | 2 | 10 minutes | 10 minutes |

This content can also be found online at:

http://localhost:1337/c/6341c864dddc3a0003017d04

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# Teacher information

## Application

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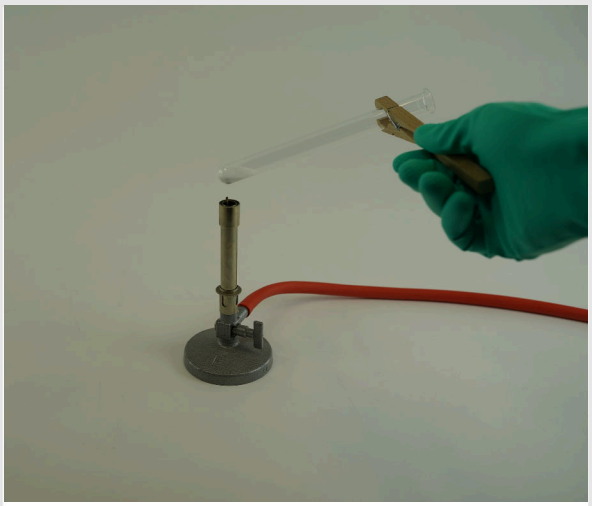

Test tube filled with chemicals over the butane burner

In addition to the large proportion of oxygen in our atmosphere, it is also found in the majority of all organic substances. When heated, oxygen is released in a bound state. In this case, it is released in the form of water, which can be detected.



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## Other teacher information (1/2)

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**Prior knowledge**

- The students should be familiar with the handling of the burner and the chemicals used.

**Principle**

- Combustion is promoted when oxygen is supplied to a flame.

## Other teacher information (2/2)

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**Learning objective**

- Very many organic compounds contain oxygen.
- This can be detected as water during the decomposition of such substances.

**Tasks**

- Various organic compounds are examined for their oxygen content.



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## Safety instructions

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- When heating the substances, unpleasant smelling substances are produced. Do not inhale! Ventilate the room well!
- Put on protective goggles!
- For H- and P-phrases please consult the safety data sheet of the respective chemical!

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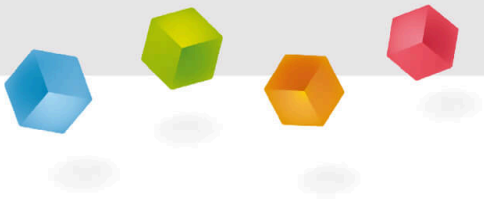

# Student information



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## Motivation

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The atmosphere consists largely of oxygen

The second most common gas in our atmosphere is oxygen. It is incorporated by many organic substances and released again when heated. However, since oxygen is not only needed by humans, animals and many other living creatures to breathe, but also poses a danger due to its combustion-promoting properties, today you will learn about this.

## Tasks

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- Examine different organic compounds for their oxygen content.



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# Equipment

| Position | Material | Item No. | Quantity |
|---|---|---|---|
| 1 | Spoon, special steel | 33398-00 | 1 |
| 2 | Test tube, 180x18 mm,100pcs | 37658-10 | 1 |
| 3 | Test tube brush w. wool tip,d20mm | 38762-00 | 1 |
| 4 | Test tube rack for 12 tubes, holes d= 22 mm, wood | 37686-10 | 1 |
| 5 | Test tube holder, up to d 22mm | 38823-00 | 1 |
| 6 | Laboratory pen, waterproof, black | 38711-00 | 1 |
| 7 | Protecting glasses, clear glass | 39316-00 | 1 |
| 8 | Citric acid 250 g | 30063-25 | 1 |
| 9 | D(+)-glucose 1000 g | 30237-70 | 1 |
| 10 | Casein, alkali-soluble 100 g | 31188-10 | 1 |
| 11 | Butane burner with cartridge, 220 g | 32180-00 | 1 |
| 12 | Copper-II sulphate, anhydr. 250 g | 31495-25 | 1 |



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## Set-up

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Fill the numbered test tubes

Number the test tubes from 1 to 3 and place them in the test tube rack.

Put half a spoonful of citric acid into test tube 1, the same amount of glucose into test test tube 2 and casein into test tube 3.

## Procedure

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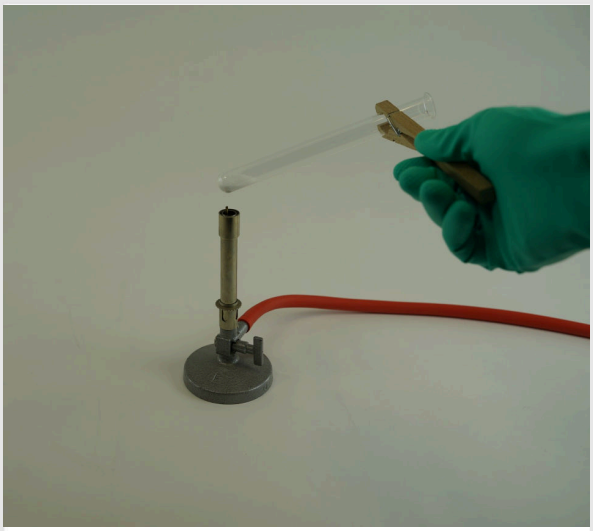
Heat test tube 1 in the burner flame, keeping it horizontal.

Add a few grains of anhydrous copper sulphate to the resulting droplets of liquid.

Repeat the experiment in the same way with the other substances.



Heating over the butane burner



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# Report

## Observation (1/2)

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Note down your observations when heating the substances.

| Substance | Observation |
|---|---|
| Citric acid | |
| Glucose | |
| Protein (casein) | |



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## Observation (2/2)

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Note down your observations when adding copper sulphate.

| Substance | Observation |
|---|---|
| Citric acid | |
| Glucose | |
| Protein (casein) | |

## Task 1

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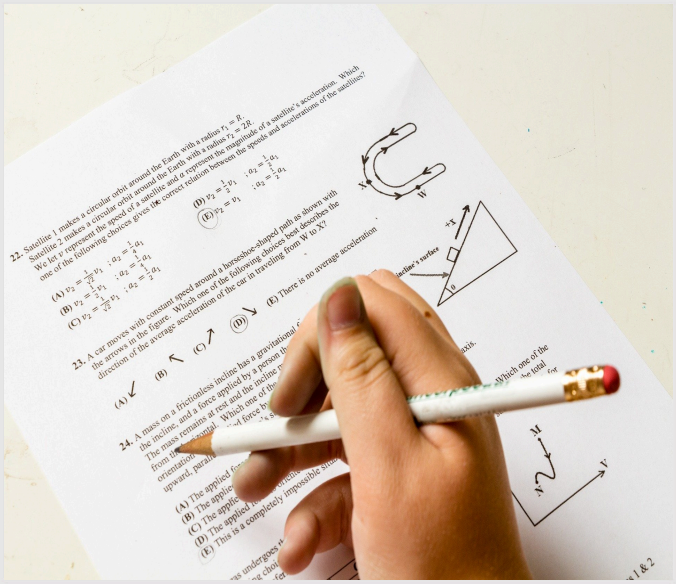
Complete the text with the help of your observations.

The organic substances used decompose to form [ ]. This releases [ ], which forms [ ] copper sulphate containing crystalline water with white copper sulphate.

Check





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## Task 2

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Which elements were detected in these experiments?

- [ ] Hydrogen
- [ ] Oxygen
- [ ] Carbon
- [ ] Sulphur

Check

## Task 3

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For which oxygen-containing organic compounds does this experiment fail?

With compounds that do not _____, no water _____ be formed. With these substances, the oxygen that may be present must be _____ in a different way.

detected | decompose | will

Check



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| Slide | Score / Total |
|---|---|
| Slide 15: Observations text | 0/3 |
| Slide 16: Detected elements | 0/2 |
| Slide 17: When does attempt fail? | 0/3 |

**Total** 0 / 8

Solutions | Repeat | Export text



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