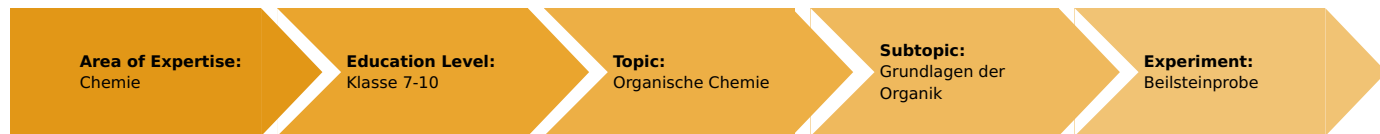


# The Beilstein test (Item No.: P7170600)

## Curricular Relevance



### Difficulty



Easy

### Preparation Time



10 Minutes

### Execution Time



10 Minutes

### Recommended Group Size



2 Students

### Additional Requirements:

### Experiment Variations:

### Keywords:

organic compounds, Beilstein test

## Task and equipment

## Information for teachers

## Learning objectives

- Halogens are further elements which are sometimes present in organic compounds.
- Halogens can be detected in the form of copper halides because of their characteristic flame colouration.

## Notes on setup and procedure

### Preparation:

To save time, you can provide ready-cut copper strips. Remains from other experiments can also be used.

### Remarks on the students experiments:

To keep the concentration of halogenated organic substances as low as possible, ensure that heating is stopped as soon as a colouration of the flame is to be seen.



## Hazard and precautionary statements

Petrol:	
H225:	Highly flammable liquid and vapour.
H304:	May be fatal if swallowed and enters airways.
H350:	May cause cancer.
H361:	Suspected of damaging fertility or the unborn child.
H373:	May cause damage to organs through prolonged or repeated exposure.
H412:	Harmful to aquatic life with long lasting effects.
P201:	Obtain special instructions before use.
P210:	Keep away from heat/sparks/open flames/hot surfaces – No smoking.
P273:	Avoid release to the environment.
P281:	Use personal protective equipment as required.
P301 + P310:	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P308 + P313:	IF exposed or concerned: Get medical advice/attention.
P501:	Dispose of contents/ containers to be collected by a licensed contractor in accordance with national and local regulations.
P403 + P235:	Store in a well ventilated place. Keep cool.

## Hazards

- Gases which are detrimental to health are evolved when the substances are heated. Do not inhale them! Carry out the experiment in a fume hood whenever possible!
- Wear protective glasses!

## Notes

Since the Beilstein test actually detects copper ions but not halogens the Beilstein test is only an indirect method for the detection of halogens. Therefore no differentiation between the different halogens is possible.

## Remarks on the method

This experiment is the last of the preliminary tests for the introduction to organic chemistry. A different introduction is naturally possible, but the detection tests should still be carried out.

## Waste disposal

- Pour contaminated remains of petrol into the container for combustible organic substances.
- Put remains of PVC into the container for solid organic waste.

# The Beilstein test (Item No.: P7170600)

## Task and equipment

### Task

### Which other elements can organic compounds contain? (4)

Examine various organic compounds for halogen content (Beilstein test).



## Equipment



Position No.	Material	Order No.	Quantity
1	Porcelain dish, 75ml, d = 80 mm	32516-00	2
2	Scissors, l = 110 mm, straight, point blunt	64616-00	1
3	Spoon, special steel	33398-00	1
4	Test tube holder, up to d 22mm	38823-00	1
5	Protecting glasses, clear glass	39316-00	1
	Butane burner f.cartridge 270+470	47536-00	1
	Butane cartridge CV 300 Plus, 240 g	47538-01	1
	Copper foil, 0.1 mm, 100 g	30117-10	1
	Stand.petrol b.p.65-95 C 1000 ml	31311-70	1
	Polyvinyl chloride,powder 250 g	31745-25	1

## Set-up and procedure

### Set-up

### Hazards

- Gases which are detrimental to health are evolved when the substances are heated. Do not inhale them! Carry out the experiment in a fume hood whenever possible!
- Wear protective glasses!



### Procedure

Cut out an approximately 10 cm long and 1 cm wide strip from the copper foil. Fold the edges up a little so that a sort of channel is formed (Fig. 1).



Fig. 1

Put 10 ml of petrol in of the porcelain dishes (Fig. 2). Grip one end of the copper strip with the test tube holder and hold the strip in the Bunsen burner flame to glow it out (Fig. 3).



Fig. 2

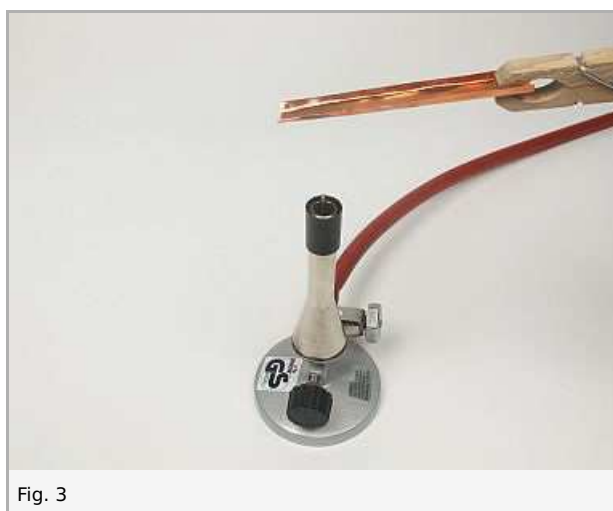


Fig. 3

Immerse the copper strip briefly in petrol (Fig. 4), let the liquid run off and hold the strip in the flame (Fig. 5). Subsequently glow

it out again.



Fig. 4

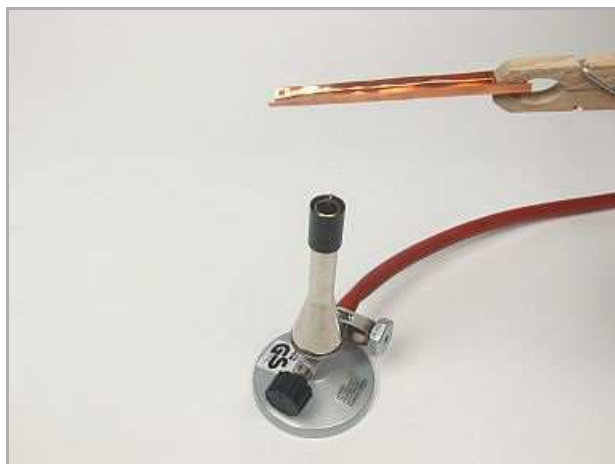


Fig. 5

Put half a spoonful of PVC powder in the other porcelain dish. Dip the glowing-out copper strip while it is still hot in the PVC powder (Fig. 7) and hold the strip in the flame (Fig. 8).



Fig. 6



Fig. 7

## Waste disposal

- Pour contaminated remains of petrol into the container for combustible organic substances.
- Put remains of PVC into the container for solid organic waste.

## Report: The Beilstein test

### Result - Observations

Note the observations you make when heating the substances.

a) Petrol

b) PVC

.....

.....

.....

.....

### Evaluation - Question 1

Draw conclusions from your observations.

.....

.....

.....

.....

### Evaluation - Question 2

Which of the substances cause a colouration of the flame?

.....

.....

.....

.....

### Evaluation - Question 3

Summarize all the performed tests in the following table.

Element to be detected	Detection	Name or type of the detection
Carbon	as carbon on decomposition	carbonization
	as carbon dioxide on oxidation with Cu	lime-water turbidity
Hydrogen	as water on decomposition	blue colouration of anhydrous copper su
Oxygen	as water on decomposition	blue colouration of anhydrous copper su
Nitrogen	as ammonia with soda lime	indicator / smell
Sulphur	as silver sulphide	Hepar test
Halogens	as copper halides (flame colouration)	Beilstein test