

Behaviour of salt with regard to solvents of different polarities

Task and equipment

Information for teachers

Learning objectives

- Salts dissolve better in polar solvents than in non-polar solvents.
- If there are two solvents of different polarities, salts can change from the non-polar phase to the polar one and dissolve there.

Notes on set-up and procedure

Preparation: In order to save time you can already get hot water ready (boiler). The temperature of water when the salt is added should be in the range of 80 °C.

Remarks on the students' experiments: The olive oil must be poured onto the water surface in such a way that several oil spots (diameter approx. 1 cm) result.



Hazard and Precautionary statements

Copper sulphate:

H302:	Harmful if swallowed.
H319:	Causes serious eye irritation.
H315:	Causes skin irritation.
H410:	Very toxic to aquatic life with long lasting effects.
P273:	Avoid release to the environment.
P302 + P352:	IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338:	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Hazards

- Water might splash when being heated!
- Wear protective glasses!
- Copper sulphate is hazardous to health. Do not swallow it!

Notes

Not only olive oil but also every other edible oil can be used for this experiment. The copper sulphate can be replaced by any other coloured and soluble salt.

Remarks on the method

The students can also be divided into several groups each of which can then work with a different salt.

Waste disposal

Put the solution into the collecting container for acids and alkalis.

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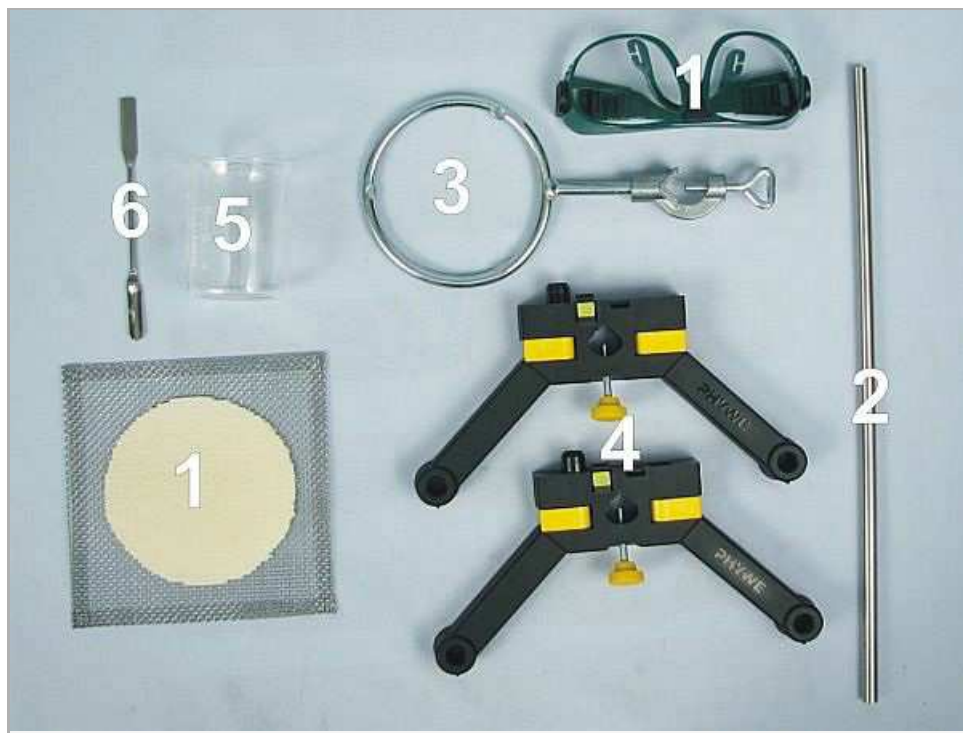
Task

How do salts react in solvents of different polarities?

Study the behaviour of soluble salts in a water-oil-mixture.



Equipment



Position No.	Material	Order No.	Quantity
1	Protecting glasses, clear glass	39316-00	1
1	Wire gauze with ceramic, 160 x 160 mm	33287-01	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	Support base, variable	02001-00	1
5	Glass beaker DURAN®, short, 150 ml	36012-00	1
6	Spatula, powder, steel, l=150mm	47560-00	1
	Butane burner f.cartridge 270+470	47536-00	1
	Butane catridge CV 300 Plus, 240 g	47538-01	1
	Copper-II sulphate,cryst. 250 g	30126-25	1
	Sodium chloride 250 g	30155-25	1
	Olive oil,pure 100 ml	30177-10	1
Additional material			
	Water (tap water)		

Set-up and procedure

Set-up

Hazards

- Water might splash when being heated!
- Wear protective glasses!
- Copper sulphate is hazardous to health. Do not swallow it!



Set-up

Set up a stand with the support base and the support rod as you can see in Fig. 1 and Fig. 2.

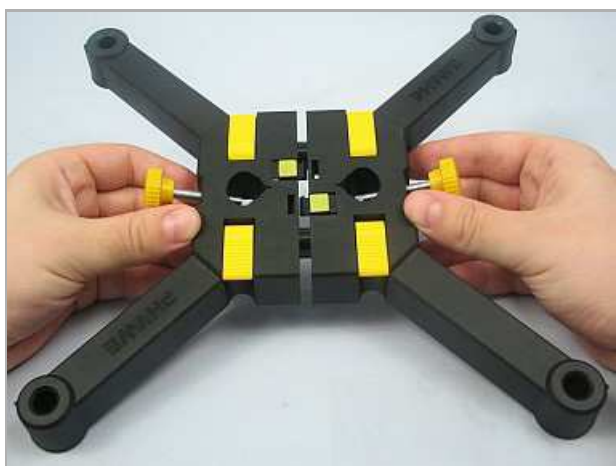


Fig. 1



Fig. 2

Attach the support ring to the support rod (Fig. 3) and place the wire gauze onto the support ring (Fig. 4).



Fig. 3



Fig. 4

Slide the support ring upwards or downwards so that the tip of the burner flame reaches the wire gauze. Then fill the glass beaker two thirds full with water (Fig. 5) and place it onto the wire gauze square (Fig. 6).



Fig. 5



Fig. 6

Procedure

Bring the water to boil, then extinguish the burner flame and remove the burner (Fig. 7).



Fig. 7

Pour some drops of olive oil onto the surface of the water (Fig. 8). Allow it to stand for a short time and then add a spatula-tipful of sodium chloride onto one of the oil spots (Fig. 9). Observe the reaction of the oil spot.



Fig. 8



Fig. 9

When the sodium chloride has dissolved, add another spatula-tipful of copper sulphate onto another oil spot (Fig. 10).



Fig. 10

Waste disposal

Put the solution into the collecting container for acids and alkalis.

Report: Behaviour of salt with regard to solvents of different polarities

Result - Observations 1

Write down your observations on

- the addition of olive oil
- the addition of sodium chloride
- the addition of copper sulphate

Evaluation - Question 1

Draw the conclusions from your observations.

Evaluation - Question 2

Explain the reaction of the olive oil with regard to the salt and water.

Evaluation - Question 3

Compare the processes that have taken place to the extraction method.
