Mixture separation - evaporation

Chemistry | General Chemistry | Substances mixtures & separation

Difficulty level	Group size	Preparation time	Execution time
easy	1	10 minutes	10 minutes

This content can also be found online at:

http://localhost:1337/c/5f51bc62739d0a0003ee40f6

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Teacher information

Application

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extraction of sea salt

With the help of the method of evaporation the dissolved substances can be recovered from solutions.

There are two forms of evaporation, one is boiling and the other is evaporation. In this experiment the students will apply and compare both methods.

Evaporation is used, for example, in the extraction of sea salt. In this process, the sea water is directed into large, very shallow basins, so that a large surface area is obtained. This accelerates the evaporation of the water and the sea salt remains in the basins.

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Other teacher information (1/2)

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Prior knowledge

In this experiment, terms developed in previous experiments are taken up again and treated in a different context. This experiment can thus be used simultaneously to repeat and deepen already known terms.

Scientific principle

The students first prepare a saline solution. Some of this solution is poured into two watch glasses. In both cases, the salt is separated from the water, in one watch glass where the water is brought to boiling point, in the other by evaporation. In addition, the economic and technical aspects of this process will be dealt with in order to demonstrate the importance of these processes on a larger scale.

Other teacher information (2/2)

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Learning objective

In liquids one can dissolve substances, so that one contains a solution. The dissolved substances can be recovered by evaporating the solvent.

Tasks

1. Run a saline.
2. Recovers the salt by evaporating water from this salt solution.
3. Observe exactly what happens and answer the questions in the minutes.

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Safety instructions

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- There is a risk of splashing if the unit is heated too much!
- Put on protective goggles!
- Make sure that the smallest burner flame is used. Watch glasses jump relatively easily!

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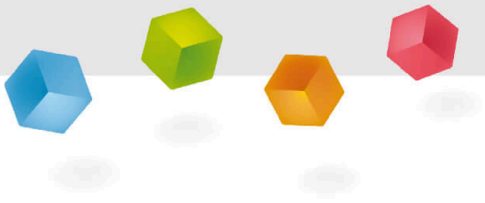

Student Information

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Motivation

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Sea salt production by evaporation

There are many substances that can be dissolved in liquids. For example, you can dissolve salt in water and get a saline solution. This occurs in nature for example in the sea.

The dissolved substances can be recovered by evaporating the solvent, for example sea salt is recovered from the sea by evaporating sea water.

In this experiment, you will learn about and perform the two ways in which vaporization can be performed.

Tasks

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Equipment

Position	Material	Item No.	Quantity
1	Protecting glasses, clear glass	39316-00	1
2	Rubber gloves, size M (8), one pair	39323-00	1
3	Test tube, 180x18 mm,100pcs	37658-10	1
4	Test tube brush w. wool tip,d20mm	38762-00	1
5	Rubber stopper, d=22/17 mm, without hole	39255-00	1
6	Pipette with rubber bulb, long	64821-00	1
7	Spatula, powder, steel, l=150mm	47560-00	1
8	Sodium chloride 250 g	30155-25	1
9	Support base, variable	02001-00	1
10	Support rod, stainless steel, l=370 mm, d=10 mm	02059-00	1
11	Wire gauze with ceramic, 160 x 160 mm	33287-01	1
12	Ring with boss head, i. d. = 10 cm	37701-01	1
13	Butane burner with cartridge, 220 g	32180-00	1
14	Watch glass, dia.60 mm	34570-00	2

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Set-up (1/2)

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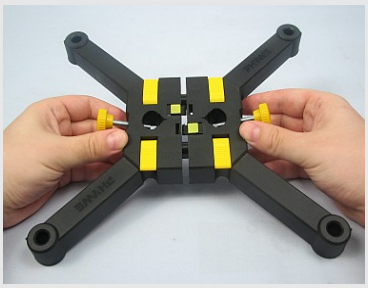
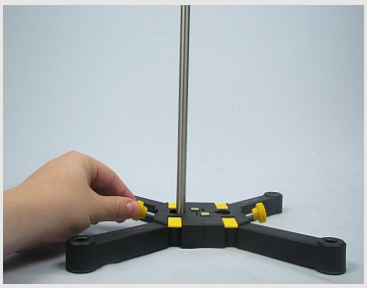
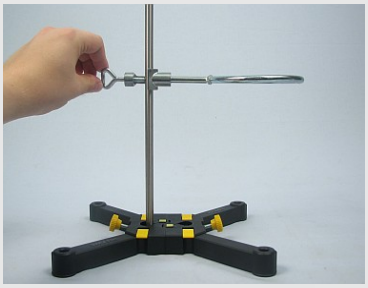
- Assemble the tripod from the tripod base and the tripod rod.
- Attach the tripod ring to the tripod rod and place the wire netting on the tripod ring
- Please note the illustrations on the right


Set-up (2/2)

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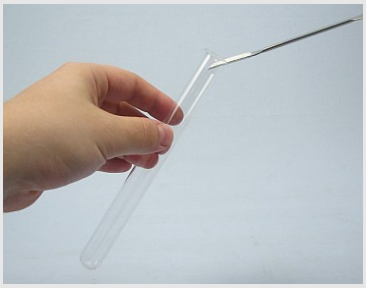
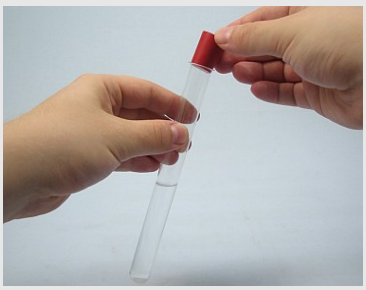
- Put a spatula tip of saline into the test tube.
- Fill up to half with water.
- Seal the test tube with a stopper
- Shake until the saline is dissolved.



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Procedure

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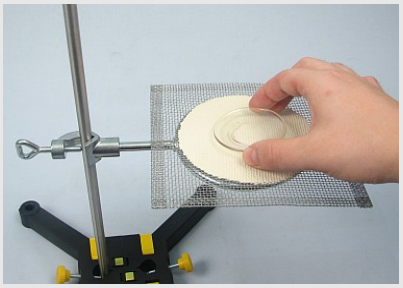
Using the pipette, pour about 10 drops of salt water from the test tube onto both watch glasses. Then place one watch glass carefully on the middle of the wire netting and then heat it carefully with the smallest burner flame.



Extinguish the burner flame as soon as the water has almost completely evaporated, let the watch glass cool down and look at it closely. Keep the second watch crystal in a cabinet for a few days, and rinse the watch crystal with water after the test.

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Report

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Task 1

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What happens when the watch glass heats up?

It rises _____ and the _____ becomes less. Margins of _____ form on the watch glass. After some time, the _____ has almost completely disappeared and there is a crust of _____ on the watch crystal.

salt | salt | steam | water | water

Check

Which of the material properties you know are used for this separation process?

- ○ Weight.
- ○ Magnetisability.
- ○ Boiling point.

Check

Task 2

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What happens to the watch crystal in the cabinet? How can sea salt be obtained with this process?

After a few days, the water in the watch glass _____ and the salt is _____ in the watch glass. Sea salt can be obtained by pouring sea water into shallow _____ and waiting until the _____ evaporates. This works especially well in very _____ areas, where the water _____ more quickly.

remained | water | warm | evaporates | basins | evaporates

Check

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Slide	Score / Total
Slide 14: Multiple tasks	0/6
Slide 15: Evaporation in the watch glass	0/6

Total amount 0 / 12

Solutions Repeat

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