Evaporation of water

Teacher Notes

CHEMISTRY
State of matter

Driving Question:
How does the temperature change during the evaporation of liquids?

Applied Technology: Data-logging

Student Level: Middle School Level (11-14)

Duration: 1 lesson period

Recommended Settings: Student Investigations

Learning Objectives

- To measure the change of temperature during an evaporation process.
- To understand the factors which influence the cooling effect of evaporation.

Didactical Approach

In this activity students investigate the process of evaporation and use a temperature sensor to record temperature changes during evaporation of water and alcohol.

Concepts learnt in this activity:

– Evaporation, rate of evaporation.

Materials

In your investigations you will use:

– Data-logger,
– Temperature sensors,
– Tissue paper or cotton wool,
– Pipette.
– Demineralized water
– Alcohol (for example in perfume)

Procedure

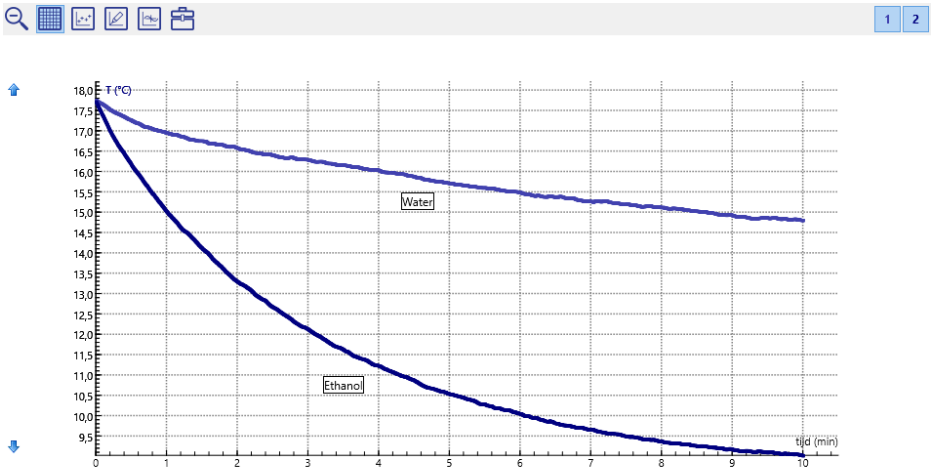
- Let the students setup the experiment.
- Open the Coach Activity ‘Evaporation of water’.
- Let the students perform the investigations.
- Discuss the results of their investigations.

Questions and Assignments

- How quickly does the temperature sensors cool?
- How long does the cooling last?
- What was the lowest temperature reached in the experiment?
- How many seconds did it take for the lowest temperature to be reached?
- Does the cooling depend on the amount of liquid?
- Does the cooling depend upon the temperature of the air?
- Does the cooling depend on a type of liquid?

Data Analysis

In the first part of the activity students observe the process of cooling by evaporation of water and an alcohol (a deodorant or perfume, or pure ethanol). The temperature sensor is set up with a small strip of cotton wool or tissue paper rolled around its tip. After moistening the cotton wool with several drops of, the cooling effect due to evaporation becomes evident on the temperature versus time graph, which develops while the experiment is in progress. The graph below shows an example of the data.



Discuss the measurement results with the students. Discuss/test what might happen to the temperature measured by the sensor of you blow air over the sensor.

Resources

Coach activity: Evaporation of water.cma7

Coach result: Evaporation of water.cmr7

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