General safety precautions to be taken when handling acids

Chemistry > Inorganic chemistry > Acids, bases, salts

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

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Teacher information

Application

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Acids are corrosive

Acids are an important part of inorganic chemistry. Many experiments and tests that take place in the laboratory include acids, namely concentrated acids. Concentrated acids decompose natural substances and are highly corrosive.

The reason for this is that they contain protons. Protons can decompose base metals (iron, magnesium), for example. Therefore, comprehensive safety measures must be taken when handling acids. The students practice these accident prevention measures and reduce any bias towards handling acids.

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Other teacher information (1/2)

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Prior knowledge

- The ratio of water to acid indicates whether an acid is weak (diluted) or concentrated.With a concentrated acid the proportion of water is lower than with a diluted acid.
- Such concentrated acids have a corrosive effect on various substances.

Scientific principle

The students study the effect of concentrated acids on meat, paper and fabrics.

Preparations:

White sheets of paper (paper towels) to cover the workplace are required to immediately detect splashes on the sheets of paper. The eye wash bottle must be kept ready! Fabric samples are selected so that they fit into the Petri dishes. The paper sample should be as woody as possible, because it decomposes faster. The specified filter paper is suitable for this purpose.

Other teacher information (2/2)

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Learning objective

In this experiment the students learn that concentrated acids can cause severe burns on natural substances.

Therefore, extensive safety conditions must be created when handling acids.

Tasks

The students investigate the effect of the concentrated acids used in the experiment and what protective measures result from working with them.

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Safety instructions

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- Use safety glasses/protective gloves!
- The general instructions for safe experimentation in science lessons apply to this experiment.
- 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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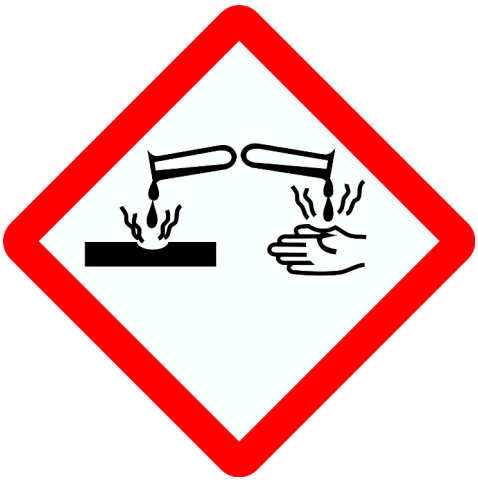
Motivation



Warning symbol for corrosive substances

We are in contact with acids every day because they are also useful in everyday life.

Our stomach can digest our food because it contains hydrochloric acid. The fruit we eat every day contains fruit acids. We can clean our drains in everyday life because the pipe cleaners contain acids that etch away organic waste.

However, household chemicals can be dangerous and it is therefore important to know the precautions to take when handling acids.

Tasks

What precautions must be taken when handling acids?

- Study the properties of concentrated acids.
- Examine the effect of concentrated acids on other substances.
- Write down your observations and answer the questions in the minutes.

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Equipment

Position	Material	Item No.	Quantity
1	Circular filter,d 110 mm,100 pcs	32977-04	1
2	Knife, stainless	33476-00	1
3	Dish, plastic, 150x150x65 mm	33928-00	1
4	Protecting glasses, clear glass	39316-00	1
5	Rubber gloves, size M (8), one pair	39323-00	1
6	Scissors, l = 110 mm, straight, point blunt	64616-00	1
7	Petri dish, d 100 mm	64705-00	1
8	Test tube brush w. wool tip,d20mm	38762-00	1
9	Laboratory pen, waterproof, black	38711-00	1
10	Test tube, 180x18 mm,100pcs	37658-10	1
11	Pipette with rubber bulb	64701-00	3
12	Hydrochloric acid 37 %, 1000 ml	30214-70	1
13	Sulphuric acid, 95-97%, 500 ml	30219-50	1
14	Ammonia solution, 25% 1000 ml	30933-70	1

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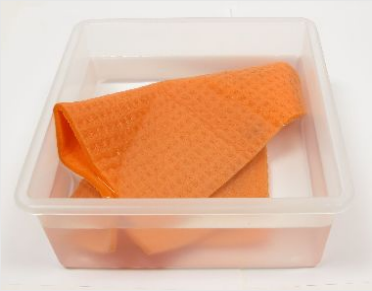
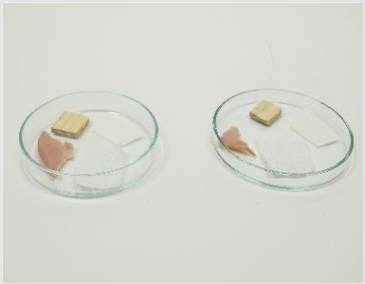
Structure



- Completely cover the workstation with a white sheet of paper and place the required tools and chemicals on top of it.
- Place the clean wipe cloth in the water-filled tub, ready to hand.
- Take 3 pipettes and number them from 1 to 3.

Procedure (1/2)



- Halve the substances to be examined (meat, wood, filter paper, fabric) with a knife or scissors. Place one half of the cut surface upwards in the petri dish and the other half in the corresponding lid.
- Take some sulfuric acid with pipette 1 and drop it on the samples.
- Take 2 hydrochloric acid with a pipette and proceed in parallel with the counter samples (samples in the lid of the Petri dish).
- Leave the acid to work for a few minutes.

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Procedure (2/2)

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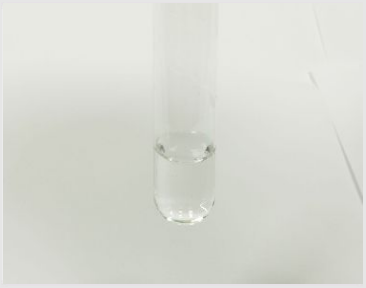

- Take 2 concentrated hydrochloric acid with a pipette and place it in a test tube (filling height approx. 1 cm).
- Fill a second test tube with ammonia solution (use pipette 3).
- Place the two test tubes next to each other in the test rack and wait a short time.

Disposal

- Dilute sulphuric acid and hydrochloric acid from test part 1 and place in the collecting vessel for acids and alkalis.
- Collect hydrochloric acid and ammonia from test part 2 in appropriately marked containers and reuse for similar tests.

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Report

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Table

Write down your observations in Table 1.

Substance	Reaction with conc. sulfuric acid	Reaction with conc. hydrochloric acid
Meat		
Wood		
Paper		
Substance		

Task 1

Complete the cloze !

Concentrated sulphuric and hydrochloric acids decompose organic substances such as [ ], but also [ ]. Sulfuric acid [ ], which largely [ ] these substances in the samples. From [ ] a hardly visible gas rises, which is also [ ].

Check

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Task 2

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When handling acids, you must...

... protective gloves and goggles must be worn.

... no special measures are taken.

Slide	Score / Total
Slide 15: Concentrated sulphuric acid	0/6
Slide 16: Dealing with acids	0/4

Total amount 0 / 10

Solutions | Repeat | Exporting text

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