Precautions when handling lyes

Chemistry > Inorganic chemistry > Acids, bases, salts

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

This content can also be found online at:

http://localhost:1337/c/5f56b7da742d0c00034be31e

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Teacher information

Application

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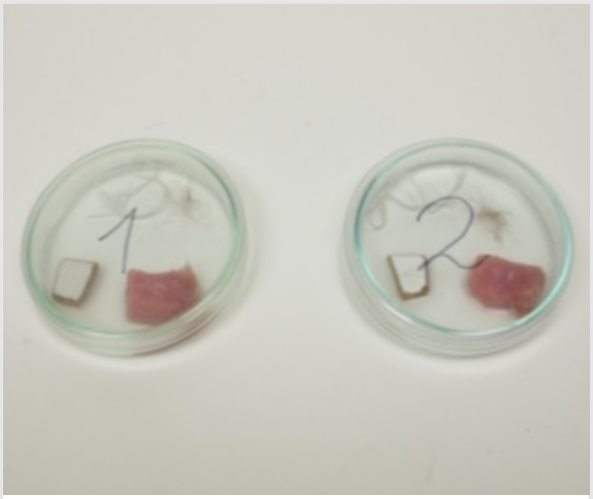

Test setup (fabric samples)

Concentrated bases decompose natural substances and have a highly corrosive effect. This and other (demonstration) experiments are highly recommended at the beginning of a lesson on "alkalis" to practice accident prevention measures, but also to reduce any bias against handling alkalis. Addressing the subject of alkalis in the home can build a bridge between chemistry lessons and the everyday life of the students and thus has a high application relevance.

PHYWE

Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
www.phywe.de

Other teacher information (1/2)

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Prior

- Leaches or alkaline solutions are aqueous solutions of metal hydroxides such as sodium hydroxide (caustic soda).
- Just like acids, lyes are able to attack many natural substances and have a corrosive effect. This is, for example, the reason for their good effect in drain cleaners against hair, grease or other deposits.

Scientific

- In this student experiment, the effect of concentrated bases (drain cleaner and caustic soda) on meat, paper and fabrics is investigated and it is derived which protective measures should be taken when handling concentrated bases.
- Provide dyed twine, hair and pieces of meat. The pieces of wood used should have a coat of paint on them so that the use of lyes as paint strippers can be demonstrated. Provide concentrated caustic soda lye.

Other teacher information (2/2)

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Learning

- Concentrated lyes are highly corrosive and decompose organic material in particular.
- When handling lyes, protective measures similar to those for handling acids must be observed.

Tasks

1. Investigation of the properties of a drain cleaner and of concentrated caustic soda lye on the basis of their effects on fabric samples of hair, meat, wood and threads.

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Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
www.phywe.de

Safety instructions

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- Drain cleaners and concentrated lyes are highly corrosive. Wear protective goggles! Wear protective gloves!
- Any splashes on skin and clothing must be washed off immediately with plenty of water! dilute spilled lye immediately with water and absorb with a damp cloth!
- Make sure that the students deal carefully with the concentrated solutions. Provide an eye wash bottle!
- Secure the petri dish against unauthorized use.
- 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

PHYWE

Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
www.phywe.de

Motivation

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Protective gloves for handling lyes

Lyes can react strongly with various substances and are able to attack or even completely decompose them. We make use of this chemical property of lyes in our everyday life, for example when using pipe cleaners to remove blockages in drains or pipes. Conventional pipe cleaners usually consist of a mixture of alkaline substances, mostly sodium hydroxide. Due to their strong chemical properties they are able to attack or even decompose deposits of organic material such as grease or hair. Special care is therefore required when handling such highly corrosive substances.

Tasks

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Outflow

What precautions should be taken when handling lyes?

1. Investigate the properties of a drain cleaner and of concentrated caustic soda lye on the basis of their effects on fabric samples of hair, meat, wood and twine.

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Robert-Bosch-Breite 10
37079 Göttingen

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info@phywe.de
www.phywe.de

Equipment

Position	Material	Item No.	Quantity
1	Spatula, powder, steel, l=150mm	47560-00	1
2	Knife, stainless	33476-00	1
3	Dish, plastic, 150x150x65 mm	33928-00	1
4	Wash bottle, 250 ml, plastic	33930-00	1
5	Beaker, Borosilicate, low form, 250 ml	46054-00	1
6	Protecting glasses, clear glass	39316-00	1
7	Rubber gloves, size M (8), one pair	39323-00	1
8	Glass rod, boro 3.3, l=200mm, d=5mm	40485-03	1
9	Scissors, l = 110 mm, straight, point blunt	64616-00	1
10	Pipette with rubber bulb	64701-00	1
11	Laboratory pen, waterproof, black	38711-00	1
12	Petri dish, d 100 mm	64705-00	2
13	Sodium hydroxide, pellets, 500 g	30157-50	1
14	Water, distilled 5 l	31246-81	1

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Robert-Bosch-Breite 10
37079 Göttingen
Tel.: 0551 604 - 0
Fax: 0551 604 - 107
info@phywe.de
www.phywe.de

Additional equipment

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Position	Equipment	Quantity
1	Wiping cloth	1
2	Drain cleaner	1
3	Paper sheet (white)	1
4	Material samples (string, meat, hair, wood (paint))	1

Set-up

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Experiment set-up

- Cover the entire workstation completely with a white sheet of paper.
- Place the required tools and chemicals on top of it.
- Place the clean wipe cloth in the tub filled with water, ready to hand.

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Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
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Procedure (1/4)

- Fill the beaker to about a quarter with distilled water and add drain cleaner in portions.
- Stir with the glass stick. Stop adding when no more drain cleaner dissolves.

Procedure (2/4)

- Place the beaker to the side to cool down.
- Number the lids of the petri dishes from 1 to 2.
- Crush the material samples and place a few pieces of each in the two Petri dishes.

Robert-Bosch-Breite 10
37079 Göttingen
Tel.: 0551 604 - 0
Fax: 0551 604 - 107
info@phywe.de
www.phywe.de

Procedure (3/4)

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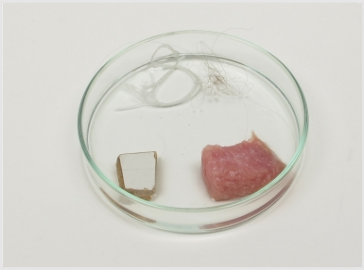

- Using the first pipette, add enough concentrated sodium hydroxide solution to the first Petri dish to cover the entire bottom of the Petri dish.
- Do the same with the solution of the drain cleaner in the second Petri dish.
- Examine the samples for changes after 10 min, note the result in the protocol.

Procedure (4/4)

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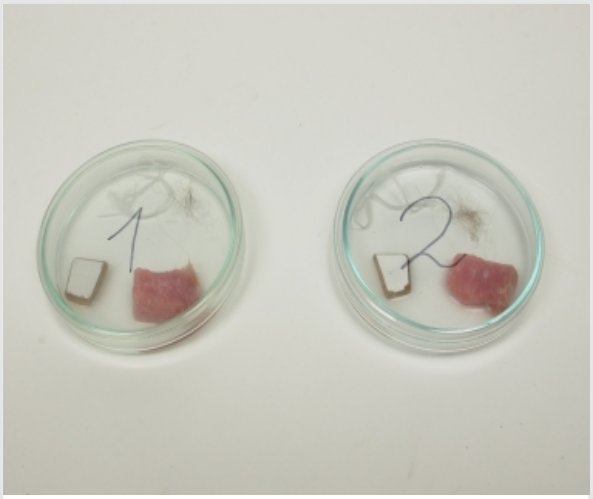

Numbered Petri dishes with fabric samples

- Then close the petri dishes (follow the order!) and keep them in a safe place until the next hour.
- At the place of storage bring the **Warning GHS05 for corrosive substances** on.
- **disposal:**
  - Dilute lyes in the Petri dishes with plenty of water, then place in the collection container for acids and lyes.
  - Sample residues can be disposed of in the conventional waste.

PHYWE
Robert-Bosch-Breite 10
37079 Göttingen
Tel.: 0551 604 - 0
Fax: 0551 604 - 107
info@phywe.de
www.phywe.de

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Report

Monitoring

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What observations should be made when preparing the solution?

Note the changes in the substances after a short exposure time.

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Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
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Table

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Enter the changes in the table after prolonged exposure.

Table 1: Effects of the alkalis

Stoffprobe	Einwirkung von	
	Natronlauge	Abflussreiniger
Bindfaden		
Fleisch		
Haar		
Holz(anstrich)		

Task 1

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Drain cleaner solution

When dissolving the drain cleaner granulate, the temperature of the solution...

- ○ ...the same.
- ○ ...increased.
- ○ ...sank.

Check

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Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
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Task 2

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Complete the cloze with the adjacent terms!

Caustic solutions are solutions that are _____ to, for example, various organic materials and contain _____. The concentration of _____ is greater than that of _____. Lyes are formed, for example, when metals, metal oxides or hydroxides react with water. Alkaline earth metals and _____ (as well as their oxides and hydroxides) such as sodium hydroxide react particularly readily with water to form _____.

hydronium ions
alkaline metals
hydroxide ions
hydroxide ions
hydroxide ions
corrosive

Check

Task 3

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Any splashes of lye on skin or clothing should be...

...first with your skin and clothing.

...should be washed off immediately with plenty of water.

PHYWE
Robert-Bosch-Breite 10
37079 Göttingen
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info@phywe.de
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Slide	Score / Total
Slide 19: Heat of solution	0/1
Slide 20: Lye	0/6
Slide 21: Safe handling	0/3

Total amount 0 / 10

Solutions | Repeat | Exporting text

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Robert-Bosch-Breite 10
37079 Göttingen
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Fax: 0551 604 - 107
info@phywe.de
www.phywe.de