Lyes - component of household cleaners

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/5f56b8d9742d0c00034be328

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Teacher information

Application

pH value check with litmus paper

Bases and lyes are essential components of our daily life. For example, many household cleaners contain alkalis. They are added there because of their decomposing and thus cleaning effect against organic pollutants, and they also have a germicidal effect. In this student experiment, everyday household cleaners are examined for their components and it is tested whether household cleaners really contain lyes. The experiment uses the changes in the indicator colours treated with the "acids". If they have not been treated, the tests for indicator production and reaction indicated there can also be used here with small modifications.

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Other teacher information (1/2)

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Prior knowledge

- 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 principle

- In this student experiment, everyday household cleaners are examined for their components and it is tested whether household cleaners really contain lyes.

Other teacher information (2/2)

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Learning objective

- Many household cleaners contain alkaline solutions.
- They are added there because of their decomposing and thus cleaning effect against organic pollutants, and they also have a germicidal effect.

Tasks

1. The students examine a household cleaner for its components.

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Safety Instructions (1/2)

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- Sodium hydroxide is caustic. Do not touch with your fingers! Put on goggles.
- When heating the household cleaner, harmful and unpleasant smelling gases are produced. Carry out a test under the fume cupboard!
- 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.

Safety instructions (2/2)

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- **Comments on the student experiments**
  - When heating the household cleaner, make sure that the process is stopped when the first odour of ammonia appears.
  - The test tubes must be shaken during heating, as there is a slight delay in boiling. Possibly add boiling pebbles.
- **Disposal**
  - Pour all solutions into the collection container for acids and alkalis.

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Student Information

Motivation

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Household cleaners

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 mainly 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.

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Tasks

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Which substances contain lyes, what are they used for?

- Examine a household cleaner for its components.

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Equipment

Position	Material	Item No.	Quantity
1	Spatula, powder, steel, l=150mm	47560-00	1
2	Wash bottle, 250 ml, plastic	33930-00	1
3	Beaker, 100 ml, plastic (PP)	36081-00	1
4	Test tube rack for 12 tubes, holes d= 22 mm, wood	37686-10	1
5	Test tube holder, up to d 22mm	38823-00	1
6	Protecting glasses, clear glass	39316-00	1
7	Litmus paper, red, 1 box	30678-02	1
8	Test tube brush w. wool tip,d20mm	38762-00	1
9	Test tube, 180x18 mm,100pcs	37658-10	1
10	Sodium hydroxide, pellets, 500 g	30157-50	1
11	Phenolphthalein, 0,5% soution in ethanol, 100 ml	31715-10	1
12	Butane burner with cartridge, 220 g	32180-00	1
13	Water, distilled 5 l	31246-81	1

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Additional equipment

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Position	Equipment	Quantity
1	Household cleaners	1

Structure

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- Fill the two test tubes a quarter full with household cleaner.
- Place them in the test tube rack.
- Pour distilled water into the beaker (filling height about 1 cm).
- Add a few drops of phenolphthalein solution.

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Procedure (1/2)

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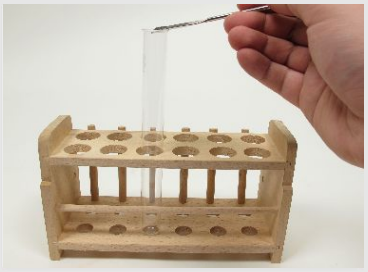

- From one of the test tubes, pour the household detergent into the distilled water with added phenolphthalein.
- Using the spatula, place two sodium hydroxide biscuits in the second test tube.

Procedure (2/2)

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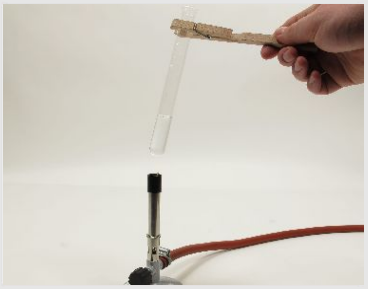

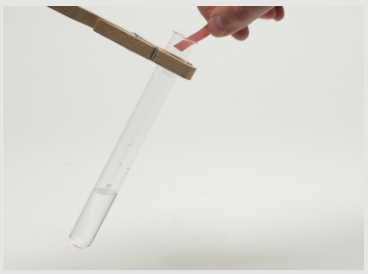

- Warm the household cleaner with the added sodium hydroxide very carefully.
- Carry out the odour samples at shorter intervals.
- Stop heating at the first occurrence of pungent smelling gases.
- Hold a strip of moistened red litmus paper over the test tube opening.

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Report

Monitoring

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Table

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Enter the changes of the indicator colors in the table!

Table 1: Changes in the indicator color

	Indikatorfarbe
Phenolphthalein in destilliertem Wasser	
Phenolphthalein nach Zugabe des Reinigers	
Lackmuspapier vor dem Erhitzen des Reinigers	
Lackmuspapier nach dem Erhitzen des Reinigers	

Task 1

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Complete the cloze with the adjacent terms!

Alkaline or base solutions are solutions that can have _____ effects on, for example, various organic contaminants and contain hydroxide ions. They also have a _____ effect, which is why they are often an essential component of _____. The concentration of _____ in these solutions is higher than that of _____, which is why alkaline solutions have a pH value greater than 7. This is shown, for example, by the color change of the indicator in our experiment.

household cleaners
hydronium ions
germicidal
hydroxide ions
corrosive

Check

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Task 2

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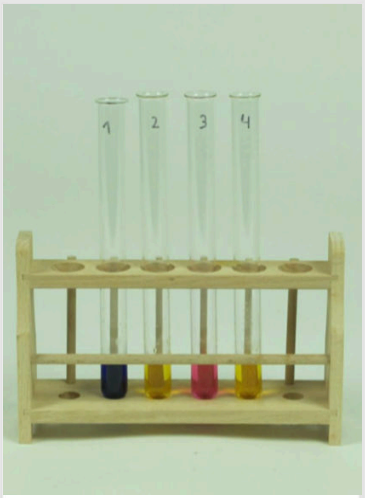

different indicators

Indicate which color change would be seen in the other three usable indicators in this experiment.

Indicator: Colour before Colour with household cleaner additive

Bromothymol blue: [ ] [ ]

Cresol red: [ ] [ ]

Alizarin yellow R: [ ] [ ]

Check

Slide	Score / Total
Slide 18: Leaches and bases	0/5
Slide 19: Colour change	0/6

Total amount 0 / 11

Solutions Repeat Exporting text

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