Test for chlorine

5.8.2.4 · Chemistry · revision notes

How to show that a gas is chlorine: damp litmus paper is bleached white. Questions ask for the test and result, often linked to the electrolysis of chloride solutions, to safety with this toxic gas, or to all four gas tests together.

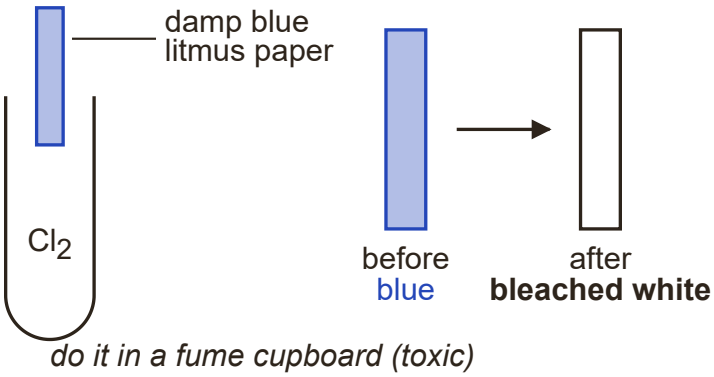
Key facts

- Test: put damp litmus paper into the gas
- The litmus paper must be damp
- Electrolysis of a chloride solution: chlorine at the positive electrode (anode)
- Result: the litmus paper is bleached (turns white)
- Chlorine is toxic: use a fume cupboard
- H_2: pop · O_2: relights · CO_2: limewater milky · Cl_2: litmus bleached

Notes

The test

- Put a piece of **damp** litmus paper into the gas.
- If the gas is chlorine, the litmus paper is **bleached** and turns white.



Chlorine bleaches damp litmus paper white.

- Blue litmus may turn red for a moment first, because chlorine forms an acidic solution in water. The result to give is 'bleached' or 'turns white'.
- The paper must be damp: chlorine has to dissolve in the water on the paper to bleach it.

About chlorine

- Chlorine is a pale yellow-green gas with a sharp smell.
- Chlorine is **toxic**: use only small amounts and do the test in a fume cupboard.
- Chlorine forms at the positive electrode (anode) when a solution containing chloride ions, such as sodium chloride solution, is electrolysed. For sodium chloride solution, hydrogen forms at the negative electrode.

The four gas tests together

- Hydrogen: burning splint at the open end of the tube → pop.
- Oxygen: glowing splint put into the tube → relights.
- Carbon dioxide: bubble through limewater → limewater turns milky.
- Chlorine: damp litmus paper → bleached white.

How to answer each type of question

Describe the test for chlorine and give the result 2 marks **Grade 3**

1. Test (1 mark): damp litmus paper put into the gas.
2. Result (1 mark): the paper is bleached / turns white.

Example. Sodium chloride solution is electrolysed. A gas forms at the positive electrode. Describe a test to show that this gas is chlorine. Give the result of the test.

Model answer. Put damp litmus paper into the gas (1). The litmus paper is bleached / turns white (1).

Give a hazard and a safety precaution 2 marks **Grade 4**

1. Hazard: chlorine is toxic.
2. Precaution: do the test in a fume cupboard / use only a small amount.

Example. Give **one** hazard of chlorine gas and **one** precaution a student should take when testing for it.

Model answer. Chlorine is toxic (1). Carry out the test in a fume cupboard / use only a small amount of the gas (1).

Identify gases from test results

3 to 4 marks | **Grade 5**

1. Learn the four tests as a table: test → result → gas.
2. For each gas, find the positive result: pop, relights, milky limewater or bleached litmus.
3. Ignore tests that gave no change; they only tell you what the gas is not.

Example. A student tested four gases, W, X, Y and Z. The table shows the results.

Gas	Result
W	Damp blue litmus paper turned white
X	Limewater stayed colourless; a glowing splint relit
Y	A burning splint gave a squeaky pop
Z	Limewater turned cloudy

Identify each gas.

Model answer.

W: chlorine (1)
X: oxygen (1)
Y: hydrogen (1)
Z: carbon dioxide (1)

Don’t lose marks

- Forgetting to say the litmus paper is damp, or using dry paper.
- Giving 'turns red' as the result. Blue litmus may go red first, but the result is bleached / white.
- Forgetting the safety point: chlorine is toxic, so use a fume cupboard.
- Mixing up the electrodes: in the electrolysis of sodium chloride solution, chlorine forms at the positive electrode and hydrogen at the negative electrode.

More tips

Memory tricks

- Chlorine bleaches: the colour goes out of damp litmus paper.
- Damp for chlorine: think of the chlorine smell of a (wet) swimming pool.
- The four results in order H_2, O_2, CO_2, Cl_2: 'Pop, Relight, Milky, Bleach'.

Exam technique

- Use the spec words: 'damp litmus paper' and 'bleached' or 'turns white'.
- In electrolysis questions, name the gas at each electrode and give a test for each.
- Learn all four gas tests together; a whole question often tests them side by side.

What each grade needs

What you need to be able to do, from the first marks up to the top grade.

Grade 3

Describe the test for chlorine

Put damp litmus paper into the gas.

Grade 3

State the positive result for chlorine

The litmus paper is bleached and turns white.

Grade 4

Give a safety precaution for chlorine

Chlorine is toxic, so use small amounts in a fume cupboard.

Grade 5

Name a reaction that produces chlorine

Electrolysis of a chloride solution, such as sodium chloride solution: chlorine forms at the positive electrode.

Grade 5

Identify gases using all four tests

Match each result to hydrogen, oxygen, carbon dioxide or chlorine.

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