Test for oxygen

5.8.2.2 · Chemistry · revision notes

How to show that a gas is oxygen: a glowing splint put into the gas relights. Usually a 2-mark 'describe a test and give the result' question, sometimes linked to reactions that make oxygen or to telling oxygen and hydrogen apart.

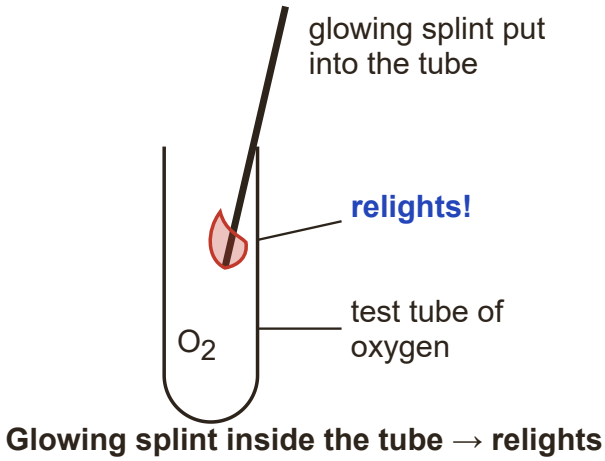
Key facts

- Test: glowing splint put into a test tube of the gas
- Result: the splint relights
- Air is only about 20% oxygen, so a glowing splint does not relight in air
- $2H_2O_2 \rightarrow 2H_2O + O_2$ (a catalyst speeds it up)
- Electrolysis of sulfate solutions: oxygen at the positive electrode (anode)
- Glowing splint = oxygen test; burning splint = hydrogen test

Notes

The test

- Collect the gas in a test tube.
- Light a splint, then blow it out so that it is just **glowing**.
- Put the glowing splint **into** the test tube of gas.
- If the gas is oxygen, the splint **relights** (bursts back into flame).



Oxygen: a glowing splint put into the gas relights.

- Why it works: burning needs oxygen. Air is only about 20% oxygen, so a glowing splint just smoulders in air. In a tube of oxygen the concentration is much higher, so it burns faster and bursts into flame. Grade 6+ only

Where oxygen comes from

- Hydrogen peroxide decomposes to water and oxygen. A catalyst such as manganese(IV) oxide speeds this up: $2H_2O_2 \rightarrow 2H_2O + O_2$.
- In the electrolysis of solutions such as dilute sulfuric acid or sodium sulfate solution, oxygen forms at the positive electrode (anode).
- Plants and algae give out oxygen in photosynthesis.

Don't mix it up

- Oxygen: **glowing** splint → **relights**. Hydrogen: **burning** splint → **pop**.
- A burning splint just burns more brightly in oxygen, which is not the test. Always use a glowing splint for oxygen.
- The result must be 'relights'. A splint that goes out shows the gas is not oxygen.

How to answer each type of question

Describe the test for oxygen and give the result — 2 marks — Grade 3

1. Test (1 mark): put a glowing splint into the gas.
2. Result (1 mark): the splint relights.

Example. When a catalyst is added to hydrogen peroxide solution, a colourless gas is given off. Describe a test to show that the gas is oxygen. Give the result of the test.

Model answer. Put a glowing splint into a test tube of the gas (1). The splint relights (1).

Tell two gases apart using gas tests — 2 to 4 marks — Grade 4

1. Choose the right test for each gas: glowing splint for oxygen, burning splint for hydrogen.
2. Give the test and the result for each gas.
3. Say which result identifies which gas.

Example. A student has two test tubes of colourless gas. One contains hydrogen and the other contains oxygen.
Describe how the student could find out which gas is in each tube. Give the results.

Model answer. Put a glowing splint into each tube (1). The gas that relights the splint is oxygen (1). Hold a burning splint at the open end of the other tube (1). The gas that burns with a squeaky pop is hydrogen (1).

Explain why the splint relights

2 marks | Grade 6

1. Say that burning needs oxygen, and air is only about 20% oxygen.
2. Say that the tube has a much higher concentration of oxygen, so the splint burns faster and bursts back into flame.

Example. A glowing splint relights in a test tube of oxygen but not in air.
Explain why.

Model answer. Air contains only about 20% oxygen, but the tube contains (nearly) pure oxygen / a much higher concentration of oxygen (1). So the splint burns faster and bursts back into flame (1).

Don’t lose marks

- Using a burning splint for oxygen. It only burns more brightly, which is not the test.
- Writing 'the splint burns' or 'the gas reacts'. Write 'the splint relights'.
- Mixing up 'relights' (oxygen) and 'pop' (hydrogen).
- Holding the splint at the mouth of the tube for oxygen. Put the glowing splint into the gas.

More tips

Memory tricks

- Oxygen helps things burn, so it brings a dying (glowing) splint back to life.
- Hydrogen burns, so it gets the burning splint; oxygen relights, so it gets the glowing splint.
- 'Glowing grows': in oxygen, a glowing splint grows back into a flame.

Exam technique

- Use the spec words: 'glowing splint' and 'relights'.
- When a question has two gases, give a test and a result for each one.
- In electrolysis questions, link each gas to its electrode, e.g. for sodium sulfate solution: hydrogen at the negative electrode, oxygen at the positive electrode.

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 oxygen**
Put a glowing splint into a test tube of the gas.

Grade 3 — **State the positive result for oxygen**
The glowing splint relights (bursts back into flame).

Grade 4 — **Tell the oxygen and hydrogen tests apart**
Oxygen: glowing splint relights. Hydrogen: burning splint gives a pop.

Grade 5 — **Name reactions that produce oxygen**
Decomposition of hydrogen peroxide, electrolysis (at the positive electrode) and photosynthesis.

Grade 6

Explain why the splint relights

The gas has a much higher concentration of oxygen than air (about 20%), so the splint burns fast enough to relight.

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