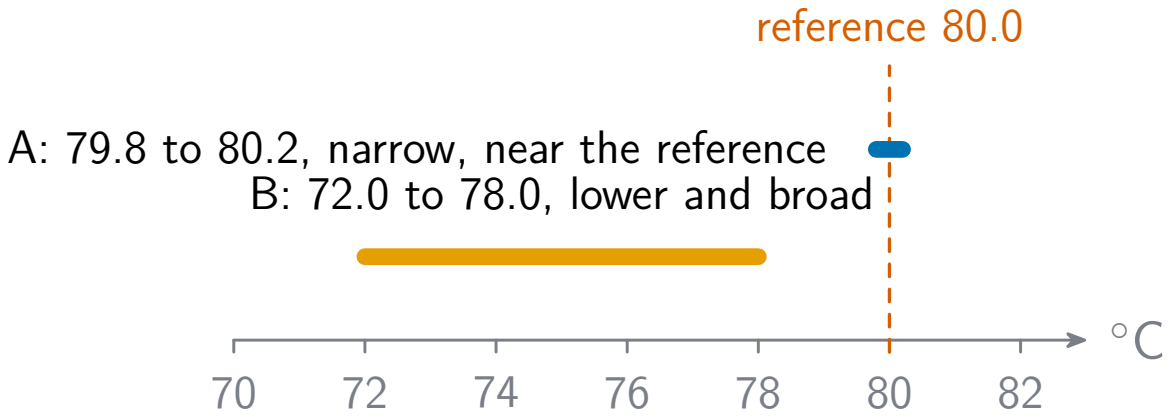
Exercise walk-through

8.2
Identification of common gases (4.8.2)

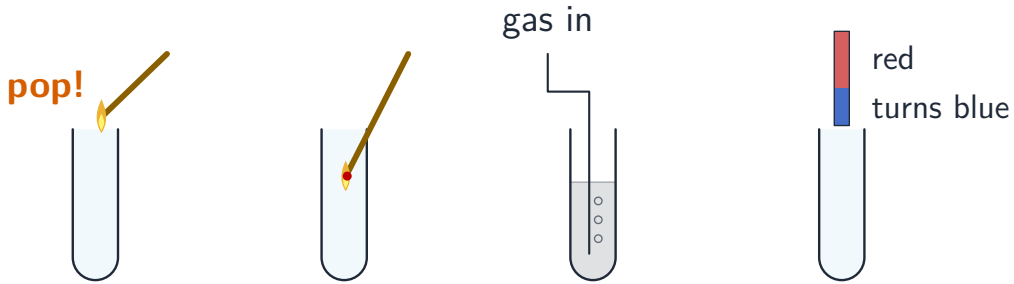
AQA · GCSE · Chemistry

Figure: Purity and formulations



- A **pure substance** melts at one fixed temperature.
- Impurities lower and broaden the range.

Figure: Tests for gases



- Pair each test with its **observation**.
- Say what you see, not what it means.

Identifying metal ions (chemistry only)

- **Flame tests.** For a **flame test** , dip a clean wire loop in the solid, hold it in a hot Bunsen flame, and observe the colour.
- Clean the loop between tests to avoid **contamination** .
- In a **mixture**, one colour can hide another: the strong yellow of sodium can mask the others.
- **Sodium hydroxide test.** Add a few drops of sodium hydroxide solution to a solution of the compound.

$$\mathrm{CuCl_2(aq) + 2NaOH(aq) \rightarrow Cu(OH)_2(s) + 2NaCl(aq)}$$

Exercise 2.1

2.1 State the action and positive result for hydrogen. [2]



Exercise 2.1

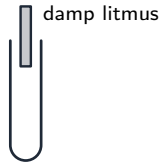
2.1 State the action and positive result for hydrogen. [2]



2.1 Hold a burning splint at the open end of the test tube of gas; a pop/squeaky pop is heard. Do not substitute a glowing splint.

Exercise 2.2

2.2 Which gas bleaches damp litmus white? [1]

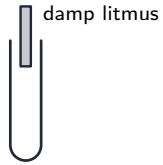


2.3 Correct this oxygen-test report: “I inserted a burning splint and it was still burning, so it relit.” [2]



Exercise 2.2

2.2 Which gas bleaches damp litmus white? [1]



2.3 Correct this oxygen-test report: “I inserted a burning splint and it was still burning, so it relit.” [2]

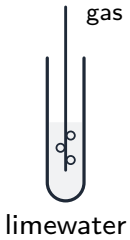


2.2 Chlorine.

2.3 Use a **glowing**, not already burning, splint; observe it **relight**, rather than merely continuing to burn. The original report did not perform the specified positive test.

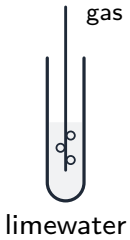
Exercise 3.1

3.1 Describe the positive test for carbon dioxide. Give the reagent, its chemical name and the observation; do not require a later clearing stage. [3]



Exercise 3.1

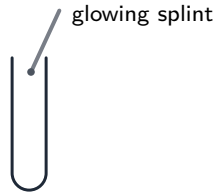
3.1 Describe the positive test for carbon dioxide. Give the reagent, its chemical name and the observation; do not require a later clearing stage. [3]



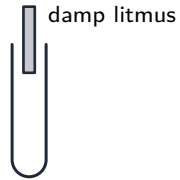
3.1 Bubble through/shake with limewater, aqueous calcium hydroxide, which turns milky/cloudy. Accept the paired chemical/reagent name in one sentence. The positive stage is the formation of cloudiness; clearing later is neither necessary nor an extra required mark.

Setup for exercise 3.2

3.2 A gas relights a glowing splint. Identify it among the four specified gases, state what the observation demonstrates, and explain why a failed hydrogen test alone would be weaker evidence. [3]

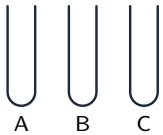


3.3 A student says, “My gas turned damp litmus red, so it must be chlorine.” Evaluate the conclusion and state the required chlorine observation. Explain how a chloride-ion result differs. [3]



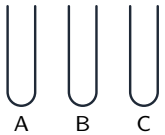
Exercise 3.2

3.4 Three separate gases A, B and C are each one of the four specified gases. A makes limewater cloudy, B produces a pop with a burning splint at the tube opening, and C relights a glowing splint. Identify all three and explain whether these data identify a fourth untested sample D. [4]



Exercise 3.2

3.4 Three separate gases A, B and C are each one of the four specified gases. A makes limewater cloudy, B produces a pop with a burning splint at the tube opening, and C relights a glowing splint. Identify all three and explain whether these data identify a fourth untested sample D. [4]



3.2 Oxygen; relighting is the specified positive oxygen observation among these four gases; no pop only fails to establish hydrogen and does not choose between oxygen, carbon dioxide and chlorine. Do not claim universal specificity beyond the stated possibilities.

3.3 Red alone is insufficient; chlorine's specified positive observation is **bleaching white**. Damp litmus becoming red can indicate acidity without that bleaching evidence. Chloride ions give a white precipitate with dilute nitric acid and silver nitrate, a solution test distinct from chlorine gas. Do not propose unsupervised gas generation.

3.4 A carbon dioxide, B hydrogen, C oxygen. D remains untested and cannot be identified from these observations alone unless an additional premise says the four samples contain four different gases. Do not silently assume all gases are different.