

GCSE Chemistry

Worksheet: Metal hydroxides

TIME 35 min	TOTAL 31 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Metal hydroxides

NAME _____

CLASS _____

DATE _____

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

A student adds sodium hydroxide solution to a solution containing calcium ions, Ca^{2+} .

0 1 . 1

Give the colour of the precipitate that forms.

.....

.....

.....

.....
[1 mark]

0 1 . 2

Name the precipitate.

.....

.....

.....

.....
[1 mark]

0 2

0 2 . 1

Which **two** hydroxide precipitates are white?

Tick (✓) **two** boxes.

Aluminium hydroxide

☐

Copper(II) hydroxide

☐

Iron(III) hydroxide

☐

Magnesium hydroxide

☐

[2 marks]

0 2 . 2

Describe how a student could use a further test to tell these two white precipitates apart.

.....

.....

.....

.....

[2 marks]

0 3

Sodium hydroxide solution is corrosive.

0 3 . 1

Give **one** safety precaution a student should take when using it to test for metal ions.

.....

.....

[1 mark]

0 3 . 2

State what should be done if sodium hydroxide solution splashes onto skin.

.....

.....

[1 mark]

0 4

0 4 . 1

Which colour precipitate forms when sodium hydroxide solution is added to a solution of iron(II) ions?

Tick (✓) **one** box.

Blue

☐

Brown

☐

Green

☐

White

☐

[1 mark]

0 4 . 2

Name the ion that forms a brown precipitate with sodium hydroxide solution.

.....

.....

.....

[1 mark]

0 5

Sodium hydroxide solution can be used to identify some metal ions.

0 5 . 1

What colour precipitate forms when sodium hydroxide solution is added to a solution containing iron(III) ions?

Tick (✓) **one** box.

Blue

☐

Brown

☐

Green

☐

White

☐

[1 mark]

0 5 . 2

A solution forms a blue precipitate with sodium hydroxide solution.
Name the metal ion in the solution.

.....

.....

.....

.....

[1 mark]

0 5 . 3

Give **two** metal ions that form a white precipitate with sodium hydroxide solution.

.....

.....

.....

.....

[2 marks]

0 6

A student adds a few drops of sodium hydroxide solution to a solution of an unknown metal compound, and then adds more sodium hydroxide solution until it is in excess.
Table 1 shows the observations.

Table 1

Test	Observation
Sodium hydroxide solution added, a few drops	a green precipitate forms
Sodium hydroxide solution added, in excess	the precipitate does not dissolve

0 6 . 1

Identify the metal ion in the solution.
Give a reason for your answer.

.....

.....

.....

.....

[2 marks]

0 6 . 2

Name the precipitate that formed.

.....

.....

.....

.....

[1 mark]

0 7

Copper(II) sulfate solution reacts with sodium hydroxide solution to form a precipitate.

0 7 . 1

Name the precipitate.

.....

.....

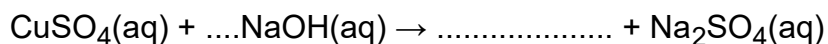
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[1 mark]

0 7 . 2

Complete the balanced equation for the reaction. Include the state symbol for the precipitate.



.....

.....

.....

.....

.....

.....

[3 marks]

0 7 . 3

Give the colour of the precipitate.

.....

.....

.....

[1 mark]

0 7 . 4

A solution of iron(II) sulfate was left in an open beaker for several days. When sodium hydroxide solution was then added, a brown precipitate formed instead of the expected green precipitate. Suggest why.

.....

.....

[1 mark]

0 8

A student adds a few drops of sodium hydroxide solution to a solution of an unknown metal compound, and then adds more sodium hydroxide solution until it is in excess. Table 2 shows the observations.

Table 2

Test	Observation
Sodium hydroxide solution added, a few drops	a white precipitate forms
Sodium hydroxide solution added, in excess	the precipitate does not dissolve

0 8 . 1

Name the **two** metal ions that could be in the solution.

.....

.....

.....

.....

[2 marks]

0 8 . 2

Explain why the solution cannot contain aluminium ions.

.....

.....

[1 mark]

0 9

A student adds sodium hydroxide solution, drop by drop and then in excess, to four solutions, J, K, L and M.

Table 3 shows the observations.

Table 3

Solution	Observations
J	blue precipitate; no change in excess
K	white precipitate; dissolves in excess to a colourless solution
L	brown precipitate; no change in excess
M	white precipitate; no change in excess

0 9 . 1

Identify the metal ion in J and the metal ion in K.

.....

.....

.....

.....

[2 marks]

0 9 . 2

Identify the metal ion in L.

.....

.....

.....

.....

[1 mark]

0 9 . 3

M could contain calcium ions or magnesium ions.

Describe a further test that would distinguish between them, and give the results.

.....

.....

.....

.....

[2 marks]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Chemistry · Worksheet: Metal hydroxides · 31 marks

Question 1 (2 marks)

01.1 [1 mark]

Answer: white

- white (1)
-

01.2 [1 mark]

Answer: calcium hydroxide

- calcium hydroxide / $\text{Ca}(\text{OH})_2$ (1)
-

Question 2 (4 marks)

02.1 [2 marks]

Correct: Aluminium hydroxide; Magnesium hydroxide

02.2 [2 marks]

- add excess sodium hydroxide solution to each precipitate (1)
 - the aluminium hydroxide precipitate dissolves (forming a colourless solution); the magnesium hydroxide precipitate does not dissolve (1)
-

Question 3 (2 marks)

03.1 [1 mark]

- wear eye protection / goggles (1)

Notes: Allow: wear gloves / use a dilute solution / wipe up spills straight away.

03.2 [1 mark]

- wash it off immediately with plenty of water (1)
-

Question 4 (2 marks)

04.1 [1 mark]

Correct: Green

04.2 [1 mark]

Answer: iron(III)

- iron(III) / Fe^{3+} (1)
-

Question 5 (4 marks)

05.1 [1 mark]

Correct: Brown

05.2 [1 mark]

Answer: copper(II)

- copper(II) / copper / Cu^{2+} (1)
-

05.3 [2 marks]

- aluminium / Al^{3+} (1)
- calcium / Ca^{2+} (1)
- magnesium / Mg^{2+} (1)

Any 2 of the points above.

Question 6 (3 marks)

06.1 [2 marks]

Answer: iron(II) (Fe^{2+})

- iron(II) / Fe^{2+} (1)
 - only iron(II) ions give a green precipitate with sodium hydroxide solution (1)
-

06.2 [1 mark]

Answer: iron(II) hydroxide

- iron(II) hydroxide / $\text{Fe}(\text{OH})_2$ (1)
-

Question 7 (6 marks)

07.1 [1 mark]

Answer: copper(II) hydroxide

- copper(II) hydroxide / copper hydroxide (1)

07.2 [3 marks]

Answer: $\text{CuSO}_4(\text{aq}) + 2\text{NaOH}(\text{aq}) \rightarrow \text{Cu}(\text{OH})_2(\text{s}) + \text{Na}_2\text{SO}_4(\text{aq})$

- $\text{Cu}(\text{OH})_2$ (1)
- (s) after the formula of the precipitate (1)
- 2 (in front of NaOH) (1)

Notes: The state symbol mark depends on a correct or nearly correct formula for the precipitate.

07.3 [1 mark]

Answer: blue

- blue (1)

07.4 [1 mark]

- (some of) the iron(II) ions had been oxidised to iron(III) ions (by oxygen from the air) (1)

Question 8 (3 marks)

08.1 [2 marks]

Answer: calcium and magnesium

- calcium / Ca^{2+} (1)
- magnesium / Mg^{2+} (1)

08.2 [1 mark]

- aluminium hydroxide dissolves in excess sodium hydroxide solution, but this precipitate did not dissolve (1)
-

Question 9 (5 marks)

09.1 [2 marks]

Answer: J: copper(II); K: aluminium

- J: copper(II) / Cu^{2+} (1)
 - K: aluminium / Al^{3+} (1)
-

09.2 [1 mark]

Answer: iron(III)

- iron(III) / Fe^{3+} (1)
-

09.3 [2 marks]

- carry out a flame test (1)
 - calcium ions give an orange-red flame; magnesium ions give no flame colour (1)
-