

A Level Chemistry B (Salters)

H433/03 Practical skills in chemistry

Insert

Practice paper – Set 1

Time allowed: 1 hour 30 minutes



INSTRUCTIONS

- Do not send this Insert for marking; it should be retained in the centre or recycled.
Please contact OCR Copyright should you wish to re-use this document.

INFORMATION

- This document consists of **4** pages. Any blank pages are indicated.

Finding the formula of a complex ion

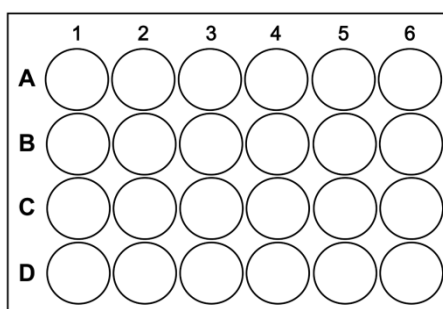
A student describes below an investigation to find the formula of a complex ion.

- Research told me it was possible to work out the formula of the complex ion formed from copper(II) ions and ammonia by mixing different proportions of them. The mixture with the most intense deep blue colour indicates the proportions of Cu^{2+} and NH_3 in the complex ion.
- After a preliminary experiment using well plates I then did a more accurate larger scale version, as my main experiment, using a colorimeter.

Preliminary experiment

Method

- Using a well plate (see diagram), place 4 drops of 0.1 M copper sulfate solution into each of wells A1 to A6.



well plate

- Add 1 drop of 0.1 M ammonia solution (ammonium hydroxide solution) to well A2, 2 drops to well A3, and so on until 5 drops are added to well A6. See table below.
- Add 6 drops of distilled water to well 1, 5 drops to well 2, and so on ending with 1 drop added to well 6. See table below.

Well	Drops of copper sulfate soln.	Drops of ammonia soln.	Drops of distilled water
A1	4	0	6
A2	4	1	5
A3	4	2	4
A4	4	3	3
A5	4	4	2
A6	4	5	1

- Stir each well.
- Note and record the observations for the reaction in each well.

Observations

Well	Observations
A1	blue solution
A2	slightly cloudy pale blue solution
A3	pale blue precipitate
A4	pale blue precipitate
A5	deep blue solution
A6	deep blue solution

Main experiment**Method****Chemical requirements**

2.0 mol dm⁻³ ammonium sulfate solution

0.1 mol dm⁻³ copper sulfate solution

0.1 mol dm⁻³ ammonia solution

1. Prepare a different mixture in 8 test-tubes by adding the volumes of the three solutions shown in the table below.
2. Cork each tube and shake to mix thoroughly.
3. Transfer the solution to the cuvettes fitting into the colorimeter.

Test-tube number	1	2	3	4	5	6	7	8
Volume of ammonium sulfate solution/cm ³	5	5	5	5	5	5	5	5
Volume of copper sulfate solution/cm ³	0.0	1.0	1.5	2.0	2.5	3.0	4.0	5.0
Volume of ammonia solution/cm ³	10.0	9.0	8.5	8.0	7.5	7.0	6.0	5.0
Colorimeter absorbance reading(arbitrary units)	0.0							

4. Choose a suitable filter for this experiment.
5. Zero the colorimeter using tube 1.
6. Immediately after setting the colorimeter to zero with tube 1, replace it with tube 2 and take a reading of the absorbance.
7. Repeat step 3 before taking further colorimeter readings for each of the remaining test-tubes in turn.

Results from main experiment

Test-tube number	1	2	3	4	5	6	7	8
Volume of ammonium sulfate solution/cm ³	5	5	5	5	5	5	5	5
Volume of copper sulfate solution/cm ³	0.0	1.0	1.5	2.0	2.5	3.0	4.0	5.0
Volume of ammonia solution/cm ³	10.0	9.0	8.5	8.0	7.5	7.0	6.0	5.0
Colorimeter absorbance reading(arbitrary units)	0.0	0.20	0.29	0.34	0.32	0.28	0.22	0.15

END OF PRACTICAL INSERT

OCR
Oxford Cambridge and RSA

Copyright Information:

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1GE.

OCR is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.