

GCSE Chemistry B (Twenty First Century Science)

J258/04 Depth in chemistry (Higher Tier)

Question Set 27

1. Eve investigates the reaction between magnesium and oxygen to make magnesium oxide.

This is part of her method:

- Weigh the empty crucible.
- Put some magnesium ribbon into the crucible and weigh it again.
- Heat the magnesium ribbon in the crucible.

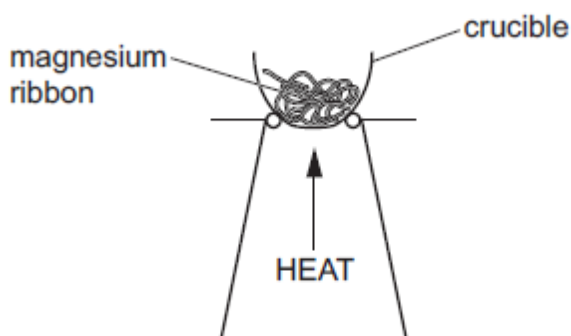


Table 6.1 shows Eve's results.

Mass of empty crucible (g)	20.0
Mass of crucible and magnesium ribbon before heating (g)	21.2
Mass of crucible and magnesium oxide after heating (g)	22.0

Table 6.1

- (a) Eve weighs the crucible after heating. She heats it again and reweighs it. She does this until the mass does **not** change.
Why does she do this? [1]
- (b) Eve writes a word equation for the reaction.
magnesium + oxygen → magnesium oxide
Which reactant limits the amount of magnesium oxide that can be formed?
Explain your answer. [1]
- (c) Use Eve's results in **Table 6.1** to calculate the mass of magnesium and oxygen used and the mass of magnesium oxide formed in the experiment.

Write your answers in **Table 6.2**.

Mass of magnesium used (g)
Mass of oxygen used (g)
Mass of magnesium oxide formed (g)

Table 6.2

[3]

(d) Eve thinks about her results.



When I look at my results (**Table 6.1**), the law of conservation of mass does not seem to work for this experiment.

Do you agree with Eve?

Yes

No

Explain your answer.

[3]

(e) Eve repeats her experiment with a different mass of magnesium.

She measures the mass of magnesium and oxygen used and the mass of magnesium oxide formed.

Table 6.3 shows her results.

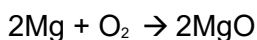
	Formula	Mass used or formed in experiment (g)	Mass of one mole (g)	Number of moles used or formed in experiment
magnesium	Mg	4.8	24	0.2
oxygen	O ₂	3.2
magnesium oxide	MgO	8.0	40

Table 6.3

(i) Complete **Table 6.3** by calculating the missing values.

[2]

(ii) Eve writes a balanced symbol equation for the reaction.



Explain how the results in **Table 6.3** show that the balanced symbol equation is correct.

Use ideas about moles in your answer.

[2]

Total Marks for Question Set 27: 12

Resource Materials

The Periodic Table of the Elements

(1)	(2)											(3)	(4)	(5)	(6)	(7)	(0)	
1	2											13	14	15	16	17	18	
1 H hydrogen 1.0																		2 He helium 4.0
3 Li lithium 6.9	4 Be beryllium 9.0											5 B boron 10.8	6 C carbon 12.0	7 N nitrogen 14.0	8 O oxygen 16.0	9 F fluorine 19.0	10 Ne neon 20.2	
11 Na sodium 23.0	12 Mg magnesium 24.3											13 Al aluminum 27.0	14 Si silicon 28.1	15 P phosphorus 31.0	16 S sulfur 32.1	17 Cl chlorine 35.5	18 Ar argon 39.9	
19 K potassium 39.1	20 Ca calcium 40.1	21 Sc scandium 45.0	22 Ti titanium 47.9	23 V vanadium 50.9	24 Cr chromium 52.0	25 Mn manganese 54.9	26 Fe iron 55.8	27 Co cobalt 58.9	28 Ni nickel 58.7	29 Cu copper 63.5	30 Zn zinc 65.4	31 Ga gallium 69.7	32 Ge germanium 72.6	33 As arsenic 74.9	34 Se selenium 79.0	35 Br bromine 79.9	36 Kr krypton 83.8	
37 Rb rubidium 85.5	38 Sr strontium 87.6	39 Y yttrium 88.9	40 Zr zirconium 91.2	41 Nb niobium 92.9	42 Mo molybdenum 95.9	43 Tc technetium	44 Ru ruthenium 101.1	45 Rh rhodium 102.9	46 Pd palladium 106.4	47 Ag silver 107.9	48 Cd cadmium 112.4	49 In indium 114.8	50 Sn tin 118.7	51 Sb antimony 121.8	52 Te tellurium 127.6	53 I iodine 126.9	54 Xe xenon 131.3	
55 Cs caesium 132.9	56 Ba barium 137.3	57-71 lanthanoids	72 Hf hafnium 178.5	73 Ta tantalum 180.9	74 W tungsten 183.8	75 Re rhenium 186.2	76 Os osmium 190.2	77 Ir iridium 192.2	78 Pt platinum 195.1	79 Au gold 197.0	80 Hg mercury 200.6	81 Tl thallium 204.4	82 Pb lead 207.2	83 Bi bismuth 209.0	84 Po polonium	85 At astatine	86 Rn radon	
87 Fr francium	88 Ra radium	89-103 actinoids	104 Rf rutherfordium	105 Db dubnium	106 Sg seaborgium	107 Bh bohrium	108 Hs hassium	109 Mt meitnerium	110 Ds darmstadtium	111 Rg roentgenium	112 Cn copernicium		114 Fl flerovium		116 Lv livermorium			

Key
 atomic number
Symbol
 name
 relative atomic mass

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 OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

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