

Chapter 10: Basic Chemical Calculation I

All the following "answers" are for your reference only!
The "best" answers are based on your actual experimental results!

Experiment 10.1 : Determining the empirical formula of magnesium oxide

10. Results: **[Sample results are given for reference.]**

Mass of crucible + lid	= 21.635 g
Mass of crucible + lid + magnesium	= 21.826 g
Mass of crucible + lid + magnesium oxide	= 21.952 g

$$\begin{aligned} \text{Mass of magnesium} \\ &= \mathbf{21.826\text{ g} - 21.635\text{ g}} \\ &= \mathbf{0.191\text{ g}} \end{aligned}$$

$$\begin{aligned} \text{Mass of magnesium oxide} \\ &= \mathbf{21.952\text{ g} - 21.635\text{ g}} \\ &= \mathbf{0.317\text{ g}} \end{aligned}$$

$$\begin{aligned} \text{Mass of oxygen present in the oxide} \\ &= \mathbf{0.317\text{ g} - 0.191\text{ g}} \\ &= \mathbf{0.126\text{ g}} \end{aligned}$$

11.

	Magnesium	Oxygen
Masses that combine	0.191 g	0.126 g
Relative atomic masses	24.3	16.0
Number of moles of atoms that combine	$0.191 / 24.3$ $= 7.86 \times 10^{-3}\text{ mole}$	$0.126 / 16.0$ $= 7.88 \times 10^{-3}\text{ mole}$
Mole ratio of atoms	1	1

12. The empirical formula of magnesium oxide is **MgO** .

13. (a) To remove any magnesium oxide.
- (b) To reduce the loss of magnesium oxide smoke particles.
- (c) To ensure there is enough oxygen to react with magnesium.
- (d) To ensure that the burning of magnesium is complete.
- (e) Weigh the crucible with its content after the 5-minute strong heating. Then reheat and weigh again. There is no increase in mass if the reaction is complete.
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