

Lab - The Law of Constant Composition

Purpose: To determine the percent composition by mass of a compound.

Materials: crucible and cover Bunsen burner magnesium ribbon
retort stand and ring balance
clay triangle sandpaper

- Procedure:**
1. Determine the mass of a clean, dry crucible and cover.
 2. Cut off approximately 10 cm of magnesium ribbon. Clean the ribbon by sanding it with a piece of sandpaper.
 3. Wind the piece of magnesium around a pencil to form a spiral. Place the spiral in the crucible and determine the mass of the crucible, lid and magnesium.
 4. Rest a clay triangle on the ring of a retort stand. Support the crucible on the triangle.
 5. Place the lid on the crucible. Leave a small opening for air enter.
 6. Adjust the Bunsen burner to produce a very hot, blue flame and heat the crucible for approximately ten minutes.
 7. **Cautiously** slide the lid open a bit. If the contents start to burn with a bright white flame, replace the lid and heat for another three to five minutes. Check again and, if necessary, continue heating. When the magnesium no longer “flares up,” carefully remove the lid and heat for one minute. Allow the crucible to cool.
 8. When the crucible, lid and contents are cool, determine their mass again.

Observations: Copy the following table in your lab notebook.

Table 1: Mass Data

1. Mass of crucible and cover:	_____ g
2. Mass of crucible, cover, and Mg:	_____ g
3. Mass of Mg:	_____ g
4. Mass of crucible, cover, and product:	_____ g
5. Mass of product:	_____ g
6. Difference between the mass of the Mg and product:	_____ g

- Discussion:**
- 1a. State the Law of Conservation of Mass
 - b. Do the results of this lab support this law? Explain.
 - 2a. Account for the apparent gain in mass during this experiment.
 - b. Write a balanced equation for the reaction.
 3. State the Law of Constant Composition.
 4. Use your experimental data to calculate the % Mg in the compound.

$$\% \text{ Mg} = \frac{\text{mass Mg}}{\text{mass product}} \times 100 \%$$

(over)

5. Compare your answer for the % Mg with two other groups. Theoretically, should the answers be the same? Explain.
6. Use your experimental data to calculate the % O in the compound. (Use line 6 from the Data Table.)
- 7a. Use molar mass to calculate the % composition by mass of magnesium oxide.
 - b. Compare these answers with the experimental values obtained in questions 4 and 6. Account for the similarity or difference.