

Oxidation of Magnesium

Introduction: Metal oxides are formed when a metal is reacted with oxygen. During this **oxidation** reaction, you will convert magnesium metal (an element) to magnesium oxide (a compound). If we know the mass of magnesium at the start, we can calculate the predicted mass of magnesium oxide produced at the end. This calculated mass will be compared to the actual product produced in the experiment.

Purpose: Use stoichiometry to determine the mass of magnesium oxide produced by the oxidation of a known mass of magnesium.

Materials:

Bunsen burner	Pipe-clay triangle	Crucible with lid
Ring and stand	Tong	Electronic scale
1-inch piece of magnesium ribbon		

Procedures:

Burning magnesium produces a very bright white flame. DO NOT look directly at the flame, it can damage your eyes.

1. Record the mass of the crucible and lid.
2. Place a clean, dry crucible and crucible cover on a clay triangle on a ring stand over a Bunsen burner. Adjust the height of the ring so the bottom of the crucible will be in the hot part of the flame. Place the cover so it is slightly ajar, allowing air to leave the crucible.
3. Obtain a piece of magnesium ribbon. If the metal is not shiny, rub it with steel wool to remove oxidized metal. Wipe the metal with a paper towel to remove the oxide dust. Weigh the clean metal to the nearest 0.01g and record the mass.
4. Fold the magnesium ribbon to fit into the bottom of the crucible and place in the crucible. Cover the crucible and reweigh it. Place the crucible on the clay triangle over the Bunsen burner.
5. Carefully lift the edge of the lid of the crucible so you can see the crucible's contents. Start heating the covered crucible. Do not open the lid too far; doing so will cause the magnesium to enflame, carrying some oxide product away as smoke. The metal should glow brightly without flames.
6. Continue heating until no metal remains and the sample no longer glows. Turn off the burner and allow the crucible and its contents to cool to room temperature.
7. Obtain the mass of the covered crucible.
8. Clean your crucible and dispose of the waste in the correctly labeled waste container.

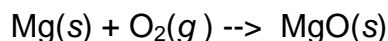
Data:

Materials	Mass (grams)
Empty Crucible with lid	
Magnesium ribbon	
Magnesium and crucible with lid	
Magnesium oxide and crucible with lid	
Magnesium oxide	

Results:

1. Describe the magnesium ribbon and then the magnesium oxide (product).
2. How do you know that magnesium metal reacts with certain components in the air?
3. Does the magnesium in your crucible gain or lose mass? Explain.

Calculations:



1. Balance the chemical equation above.
2. Using the initial mass of magnesium, calculate the moles of oxygen and then moles of magnesium oxide produced. What is the mole ratio of the reactants?
3. Calculate the mass of magnesium oxide from the initial mass of magnesium.
4. Calculate the percent error, using the calculated mass of magnesium oxide and the actual mass of magnesium oxide produced in the experiment.

$$\text{Percent error} = (\text{experimental mass} - \text{calculated mass}) / \text{calculated mass} \times 100$$

5. How would your % error change if not all of the magnesium reacted?

Conclusion:

Compare the calculated mass and actual mass of magnesium oxide. Is the percent error an acceptable value? What improvements can be made to your lab if it was repeated? (4-5 sentences)

