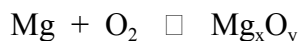


Empirical Formula of a Compound Lab

Chemical formulas indicate the composition of compounds. A formula that gives only the simplest ratio of the relative number of atoms in a compound is called the empirical formula. We call a formula that gives the actual numbers of each type of atom in a compound the molecular formula. The numbers in a molecular formula will be a whole number multiple of the numbers in an empirical formula. To determine the molecular formula of a compound, we need to know both the empirical formula and the molar mass of the compound.

In this experiment, you will determine the empirical formula of a magnesium-oxygen product. This compound is formed when magnesium metal reacts with the oxygen atoms contained in the air. This reaction can be represented in general as follows:



You will be attempting to determine the empirical formula for the Mg_xO_y compound represented in the equation above.

Materials:

Magnesium Ribbon – 0.30 g
Metal Crucible

Bunsen Burner
Crucible Tongs

Spatula

Procedure:

- 1) Obtain a clean, dry porcelain crucible and mass it to the nearest 0.01 g. Record this value on your data table.
- 2) Get a piece of magnesium ribbon and roll it in to a small circle so that it will fit in the bottom of the crucible. Make sure to not roll the ribbon too tightly or it will make it difficult to fully burn.
- 3) Place the magnesium ribbon into the crucible and record the mass in your data table. The mass of the magnesium ribbon should be close to 0.30 g.
- 4) Place the crucible over a Bunsen burner and heat in the hottest part of the flame.
- 5) Heat the magnesium until it lights and then continue to heat.
- 6) It is difficult to tell by appearance when the product is completely done reacting. Use a spatula to gently crumble the metal to expose it all to the air. Make sure to try and keep all of the powder in the crucible and not remove any that is stuck on your spatula.
- 7) When it appears that all of the metal has reacted, turn off the flame and let the crucible cool for a few minutes. Add a few drops of water to the crucible, reignite the burner and heat until all of the water has vaporized.
- 8) Take the crucible out of the heat and let cool. When the crucible is cool, place it on a scale and obtain the mass of the crucible and compound you formed.

Name: _____

Empirical Formula of a Compound Lab

Mass of Empty Crucible	
Mass of Crucible and Magnesium	
Mass of Crucible and Mg_xO_y compound after heating	

Calculations Required

Mass of magnesium	
Mass of Mg_xO_y compound	
Mass of oxygen	
Empirical formula	

Experimental Empirical Formula	
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Questions

1) What does the empirical formula of a compound tell you?

2) How is the molecular formula of a compound related to its empirical formula?

3) How would your experimental empirical formula of magnesium oxide " Mg_xO_y " have been affected if the magnesium did not completely react with oxygen in the air?

4) When 0.424 g of iron powder is burned in oxygen, 0.606 g of a reddish brown compound containing only iron and oxygen is obtained. Determine the empirical formula of the compound.

4) _____

5) A compound of nitrogen and oxygen is 30.46% by mass N and 69.54% by mass O. The molar mass of the compound was determined to be 92 g/mol. Determine the molecular formula of the compound.

5) _____