



Law of Definite Proportions

Lab #6

We have learned that atoms combine in whole number ratios to form chemical compounds. Every molecule of carbon dioxide contains one atom of carbon and two atoms of oxygen. Due to this fact, every molecule of carbon dioxide is approximately 27.3% carbon by mass and 72.75% oxygen by mass. We will use this concept to determine the mass percent of magnesium and oxygen in magnesium oxide.

Materials:

Crucible and cover	Magnesium strip about 30 cm in length	
Clay triangle	Bunsen burner	De-ionized water
Ring stand and ring	Steel wool	Crucible tongs

Procedure:

Obtain a piece of magnesium approximately 300 cm in length. Using a piece of steel wool, clean the magnesium. Fold the magnesium into a loose ball approximately 1-2 cm in diameter. Weigh the magnesium and record its mass.

Clean and dry the crucible and cover. Place the clay triangle on the ring and place the crucible in the triangle. Carefully place the cover on the crucible leaving a very small opening. Heat the crucible and cover for 2-3 minutes to remove any remaining impurities. Allow the crucible to cool. Weigh the crucible and cover and record the mass.

Place the crucible carefully into the clay triangle again and place the magnesium into the crucible. Place the cover on the crucible so that there is no opening. Adjust the ring so that the bottom of the crucible is about 2-3 cm above the Bunsen burner. Turn on the burner and begin heating the crucible and magnesium. The crucible should become orange due to its extremely high temperature. If this does not occur, adjust the flame to increase the heat.

After about 2 minutes, carefully lift the cover off the crucible with the crucible tongs. This will allow you to observe the reaction occurring in the crucible and will also allow additional oxygen to react with the remaining magnesium. After approximately 10 seconds, replace the cover on the crucible. Repeat this procedure four times. Each time you remove the cover, you will notice that the magnesium will re-ignite with the introduction of additional oxygen. You must remove and replace the cover of the crucible until the magnesium no longer re-ignites.

Allow the crucible and product to cool. Mass the crucible, cover and product and record this value.

Place the crucible, cover and product back in the clay triangle and re-heat intensely for 5 minutes. Allow the crucible to cool and re-mass the crucible, cover and product. If the two values are within 0.03 g of each other, you are finished with the lab procedure. If not, heat the crucible again until you get two consecutive masses within 0.03 g of each other.

Clean up.

Calculations:

Determine the mass of product formed

Determine the mass of oxygen that reacted with the magnesium

Determine the percent magnesium in the magnesium oxide