

Production of Magnesium Oxide Lab

Background:

In this experiment, you will examine the reaction when magnesium burns/oxidizes in air. The magnesium will be heated strongly in an open crucible for several minutes. You will measure the mass of the Mg that reacts, and predict the mass of product that will be produced, based on a balance chemical equation. You will then proceed with the experiment and calculate your % yield of actual product produced. Your goal is to determine the accuracy of this lab using stoichiometric calculations.

Materials:

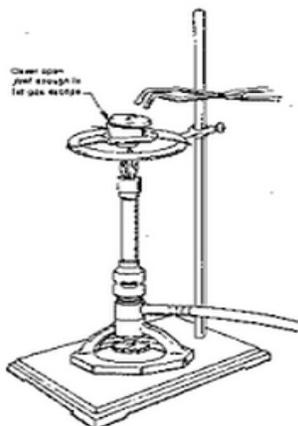
Ring stand with ring	Crucible tongs	Magnesium filings
Bunsen burner	Ceramic plate	water
Crucible with cover	Dropper	
Clay triangle	Balance	

Safety:

- *Crucibles, when heated, are very hot! Do not touch the crucible directly after heating – you could burn yourself badly.
- *Never smell chemicals directly. Waft the odor toward your nose.
- *Crucibles are fragile. Be sure to hold them tightly with crucible tongs when moving them from one place to another. They will break if dropped.

Procedure

- 1) Put on your safety goggles and tie long hair back.
- 2) Clean and dry your crucible and cover.
- 3) Set up the ring stand, ring, Bunsen burner, and triangle as shown in the diagram. Place the crucible on the triangle.



- 4) Heat the crucible on the clay triangle over a Bunsen burner for three minutes. This is to ensure that all the water from the last class has been evaporated. Using the crucible tongs, remove the crucible from the clay triangle and place carefully on the ceramic plate. Turn off the Bunsen burner. **Allow the crucible to cool for 5 minutes.**
- 5) Put the empty, cooled crucible and cover on the balance. **Record this mass on the data table.**
- 6) Put one small scoop of magnesium filings, the size of a dime, into the crucible. Find the mass of the crucible, cover, and magnesium. **Record this mass on the data table.**
- 7) Place the crucible carefully on the clay triangle. Put the cover on.

- 8) Begin heating the crucible gradually with the *lid completely on*. Heat slowly by moving the flame around underneath the crucible. Remove the heat temporarily if a large amount of smoke comes out of the crucible. After about 3 minutes of direct heating with no smoke, remove the lid slightly (tilt it on the crucible so you can barely see into the crucible). Heat the crucible to redness, **for 5 minutes**. Turn off the Bunsen burner.
- 9) Cool the crucible and contents completely!! You should be able to touch the crucible before you put it on the balance.
- 10) **Record the mass of the crucible, lid, and product on the data table.**
- 11) Drop 3 drops of water into the product, waft the odor toward your nose and sniff. Record your observation on your data sheet.
- 12) Return the crucible to the triangle and heat for three minutes.
- 13) Cool the crucible completely for the last time.
- 14) Determine the mass of the crucible, contents and cover and **record this mass on the data table.**
- 15) Clean up your lab station – discarding the contents of the crucible, any paper towels, and cooled matches in the trash can.

Names _____ Period _____

Magnesium Oxide Lab

Data table:

Mass of crucible and cover (empty)	
Mass of crucible, cover, and magnesium	
Mass of crucible, cover, and product (before water)	
Mass of crucible, cover, and product (after final heating)	

Calculations: (show all work and include significant figures, units and formulas in your answers – circle the answers!!)

Write the balanced equation for this reaction.

- 1) Calculate the mass of magnesium that you put in the crucible. (data table)

- 2) Using the balanced equation, calculate the mass of magnesium that should have been produced assuming all of the magnesium reacted. (theoretical)

3) Calculate the mass of product (MgO) actually produced in this experiment.
(Use values from your data table.)

4) Determine your % yield, using the following formula:

$$\frac{\text{Actual yield}}{\text{theoretical yield}} \times 100 = \% \text{ yield}$$

5) What are possible sources of error in this lab?