

## AP Chemistry Lab Formula of a Compound

### Prelab Questions

- 1) What two gases are the primary components of air?
- 2) What are the formulas for a nitride of magnesium and an oxide of magnesium?
- 3) What is the mass percentage of oxygen in MgO?
- 4) Write the chemical equation for the formation of magnesium oxide.
- 5) Write the chemical equation for the reaction of magnesium nitride with water to form magnesium oxide and ammonia gas.

### Procedure

- 1) Set up a Bunsen burner on a ring stand beneath a ring clamp holding a clay pipestem triangle. Place the crucible in the clay triangle (See Figure 1).
- 2) Adjust the height of the ring clamp so that the bottom of a crucible sitting in the clay triangle is about 1 cm above the burner. This will ensure that the crucible will be in the hottest part of the flame when the Bunsen burner is lit.
- 3) Light the Bunsen burner and brush the bottom of the crucible with the burner flame for about one minute. Turn off the Bunsen burner and allow the crucible to cool.
- 4) Measure the mass of the clean, empty crucible and its lid to the nearest 0.001 g. You may wear gloves to prevent finger oils from getting on the crucible.
- 5) Add approximately one teaspoonful of magnesium to the crucible. Measure the combined mass of the crucible, crucible lid, and magnesium to the nearest 0.001 g.
- 6) Place the crucible with its lid on the clay triangle as shown in Figure 2. Light the Bunsen burner again and slowly heat the crucible by brushing the bottom of the crucible with the Bunsen burner flame for 2-3 minutes.
- 7) Place the burner on the ring stand and heat the crucible for an additional 10 minutes.
- 8) If at any time you see the crucible begin to smoke, cover it and remove from the heat for a minute or two. The smoke is the product and cannot be lost.
- 9) Look inside the crucible. If you see a black product it is magnesium nitride. Slowly add a few drops of water to convert it to magnesium oxide.
- 10) Heat again to drive off the water and ammonia gas. You can place some red litmus paper over the crucible to test to see if ammonia gas is still being driven off.
- 11) Turn off the gas source and remove the burner.
- 12) Using tongs, remove the crucible lid and place it on a wire gauze on the bench top. With the tongs, remove the crucible from the clay triangle and place it on the wire gauze as well.
- 13) Allow the crucible and its contents to cool completely.
- 14) Measure the combined mass of the crucible, crucible lid, and product. Record the mass in the Data Table.
- 15) Repeat until you have three good trials.

### Sample Data Table

	Trial #1	Trial #2	Trial #3
Mass of crucible and lid, g			
Mass of crucible, lid, and magnesium, g			
Mass of crucible, lid, and magnesium oxide, g			

### Post Lab Questions

The following questions should be addressed in the format of a table.

- 1) Calculate the mass of the magnesium alone.
- 2) Calculate the mass of the magnesium oxide after reaction.
- 3) Calculate the mass of the oxygen that was added.
- 4) Calculate the moles of magnesium used.
- 5) Calculate the moles of oxygen added.
- 6) Calculate the mole ratio of magnesium to oxygen in your compound.
- 7) Express this ratio as an average for the three trials.
- 8) Write the formula of the magnesium oxide for all three trials.
- 9) Calculate the percentage of oxygen in your three samples.
- 10) If you had not added the water to the sample to drive off the magnesium nitride how would your formula for magnesium oxide be different? Support your answer with some calculations. You may show this as a fourth trial

### Conclusion

Your conclusion should state the formula you determined for the oxide.

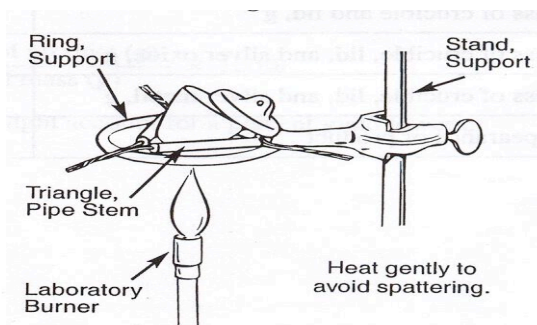
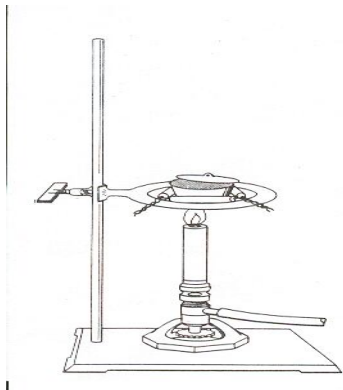


Figure 2.