

Determining the Empirical Formula of Magnesium Oxide

OBJECTIVES

- *Measure* the mass of magnesium oxide.
- *Perform* a synthesis reaction by using gravimetric techniques.
- *Determine* the empirical formula of magnesium oxide.
- *Calculate* the class average and standard deviation for moles of oxygen used.

MATERIALS

- 15 cm magnesium ribbon, 2
- crucible and lid, metal or ceramic
- 25 mL beaker
- crucible tongs
- Bunsen burner assembly
- distilled water
- clay triangle
- eyedropper or micropipet
- ring stand



FIGURE A

BACKGROUND

This gravimetric analysis involves the combustion of magnesium metal in air to synthesize magnesium oxide. The mass of the product is greater than the mass of magnesium used because oxygen reacts with the magnesium metal. As in all gravimetric analyses, success depends on attaining a product yield near 100%. Therefore, the product will be heated and cooled and have its mass measured until two of these mass measurements are within 0.02% of one another. When the masses of the reactant and product have been carefully measured, the amount of oxygen used in the reaction can be calculated. The ratio of oxygen to magnesium can then be established, and the empirical formula of magnesium oxide can be determined.

SAFETY



For review of safety, please see **Safety in the Chemistry Laboratory** in the front of your book.

PREPARATION

1. Copy the following data table in your lab notebook.

DATA TABLE

	Trial 1	Trial 2
1. Mass of crucible, lid, and metal (g)		
2. Mass of crucible, lid, and product (g)		
3. Mass of crucible and lid (g)		