Examples of Reactions

Introduction

What are some clues that accompany chemical changes? Chemical changes are accompanied by signals, many of which are visual. We can represent chemical reactions by writing chemical equations. Because atoms are neither created nor destroyed we must balance these equations.

Target:

In this lab you will carry out four chemical reactions and make careful observations to determine which clues accompany chemical changes.

Pre-laboratory Assignment

Read the entire experiment before you begin and answer the Pre-laboratory Questions.

- 1. Write and balance chemical equations for the following reactions. Include the state for each substance in the equation.
 - **a**. Solid magnesium reacts with aqueous hydrochloric acid to produce aqueous magnesium chloride and hydrogen gas.
 - **b.** Aqueous sodium chloride reacts with aqueous silver nitrate to produce solid silver chloride and aqueous sodium nitrate.
 - c. Solid magnesium burns in the air to form solid magnesium oxide.

Materials

Safety goggles Lab apron Bunsen burner Matches Tongs Wooden splint Well plate (6 wells) 13 x 100 mm test tubes (2) 100 mL beakers (2) Spatula Magnesium ribbon Silver nitrate Hydrochloric acid (3.0 *M*) Iron (III) nitrate (0.1 *M*) Potassium thiocyanate (0.1 *M*) Sodium chloride

<u>Safety</u>

- 1. The 3.0 *M* HCl is corrosive. Handle it with extreme care.
- 2. Safety goggles and a lab apron must be worn at all times in the laboratory.
- 3. Silver nitrate solution stains skin and clothing. Avoid contact with the solution.
- 4. If you come in contact with any solution, wash the contacted area thoroughly.
- 5. You will work with a flame in this lab. Tie back hair and loose clothing.
- 6. Do not drop matches into the sink. Dispose of burned matches in the trashcan after they are cool.

Procedure

Part 1 Reacting magnesium and hydrochloric acid

- 1. Place about 5 mL of 3.0 *M* aqueous hydrochloric acid in a test tube.
- 2. Add a 2-3 cm piece of magnesium ribbon to the acid. Make and record careful observations.
- 3. Place another test tube over the mouth of the test tube containing the acid and magnesium (the mouths should be the same size).
- 4. After the reaction is finished, light a wooden splint. Quickly turn over the top test tube (so the mouth in pointing up) and place the burning wood splint near the mouth. Do not point the test tube toward anyone. Make and record careful observations.

Part 2 Reacting sodium chloride and silver nitrate

- 1. Dissolve a spatula tip amount of each of the solids in a small amount of water (about 10 mL) in separate 100 mL beakers.
- 2. Place a few drops of aqueous sodium chloride into one of the reaction wells.
- 3. Slowly add a few drops of aqueous silver nitrate to the aqueous sodium chloride. Make and record careful observations.

Part 3 Reacting magnesium and oxygen

- 1. Light the Bunsen burner.
- 2. Use tongs to hold a 1-2 cm piece of magnesium ribbon in the flame. Do not look directly at the magnesium as it burns. Make and record careful observations.

Part 4 Fe3+ + SCN- \rightarrow FeSCN2+

- 1. Place a few drops of aqueous iron (III) nitrate into a clean reaction well.
- 2. Slowly add a few a few drops of aqueous potassium thiocyanate to the aqueous iron (III) nitrate. Make and record careful observations.

Data: Make a section in your lab for Observations from each part...

Part 1 Observations

Part 2 Observations

Part 3 Observations

Part 4 Observations

Analysis and Questions:

1. For each of the reactions, which observations indicate that a chemical reaction was taking place?

2. What are some clues that accompany chemical changes?