

Name \_\_\_\_\_

date \_\_\_\_\_

## **Synthesis: Two Become One**

### **Introduction**

A synthesis reaction is when two elements (or compounds) react to produce a single compound.

General form:  $A + B \rightarrow AB$

### **Procedure**

#### Experiment #1

A mixture of iron and sulfur can easily be separated. This is because there are no chemical bonds between the sulfur and the iron. The iron is magnetic and is therefore easily removed from the sulfur. In this experiment, a mixture of iron and sulfur are heated to make a new compound.

1. Examine the plastic bag of sulfur, the bag of iron and the bag containing a mixture of the two.
2. Run a magnet over each of the bags.
3. Set up your bunsen burner
4. Place a mixture of the iron and sulfur in a test tube.
5. Heat the very end of the tube strongly. When the mixture starts to glow, move the Bunsen burner to one side.
6. Watch the mixture in the tube. (If the glow just goes out, heat the tube again.)
7. Let the tube cool down completely.
8. Test the iron sulfide with a magnet. Does the magnet pick it up? *record your answer to this question in your data table.*

### **Questions**

1. Think about classification of matter. The stuff in the baggie is a(n) (*circle one*)

**element**

**compound**

**mixture**

Why?

2. The stuff in the test tube after the reaction is a(n) (*circle one*)

**element**

**compound**

**mixture**

Why?

3. List the **names and formulas** for the reactants in this reaction. (*HINT: Yellow sulfur is S<sub>8</sub>*)
4. Write the formula for iron II sulfide (the product of this reaction).
5. Write a balanced equation for this reaction.
6. List three pieces of evidence for the formation of a new product.
  - a)
  - b)
  - c)

#### Experiment #2

1. Obtain a piece of magnesium ribbon. In your data table record what it looks like.
2. Hold one end of the magnesium with crucible tongs. Ignite the other end in a Bunsen burner flame.
3. DO NOT LOOK DIRECTLY AT THE REACTION.
4. Record what happened during the reaction.
5. Record what the product looks like after the reaction.

#### **Questions**

1. What element did Mg react with in the flame? Write its **name and formula**.
2. What is the product in this reaction? Write the **name and formula**.

3. Write the balanced equation for this synthesis reaction.
  
  
  
  
  
  
  
  
  
  
4. List two pieces of evidence for the formation of a new product in this experiment.
  - a)
  
  
  
  
  
  - b)

### Experiment #3

1. Obtain 1.00 g of calcium oxide.
2. Place a piece of pH paper in the powder. Do you get a pH reading? *Record observations in the data table.*
3. Place the calcium oxide in a small test tube.
4. Measure 10 mL of deionized water and pour it into the flask.
5. Shake the test tube slightly. **DO NOT SPILL THE CONTENTS and do not cover the test tube with your finger to shake.**
6. Use pH paper to test the pH of the product and record the data.

### **Questions**

1. What are the reactants in this experiment?
  
  
  
  
  
  
  
  
  
  
2. Write the balanced equation for this synthesis reaction.
  
  
  
  
  
  
  
  
  
  
3. What is the **name** for the product?
  
  
  
  
  
  
  
  
  
  
4. Is this a true chemical reaction? \_\_\_\_\_  
Why or why not?

**DATA TABLE**

*Record ALL observations about your experiments here.  
Include magnetic properties for experiment #1 and pH for experiment #3.*

	<b>Before</b>	<b>During</b>	<b>After</b>
<b>Experiment #1</b>			
<b>Experiment #2</b>			
<b>Experiment #3</b>			