

Name \_\_\_\_\_

Date \_\_\_\_\_

Due Date \_\_\_\_\_

Mark \_\_\_\_\_ / 10

*Correct and Hand in Again by* \_\_\_\_\_

## Chemistry 11

### Experiment 5-C—Types of Reactions

#### Purpose

To carry out 7 different chemical reactions, use observations to help determine what the products are and to write a balanced equation for each reaction.

#### Procedure

After an introduction concerning safety in this lab, and procedure changes, carry out the procedure on page 72 of the Heath Lab Manual. Record your observations on the data tables below. You may start at any reaction except Reaction 4.

#### Observations

##### Reaction 1

After heating in the hot flame for a few minutes, describe any changes in the appearance of the copper wire.

##### Reaction 2

After the nail has been in the  $\text{CuSO}_4$  solution for 15 minutes or so, describe the appearance of the nail.

Describe any changes in the appearance of the solution.

##### Reaction 3

Describe what is happening to the colour of the copper (II) sulphate pentahydrate as you heat it. \_\_\_\_\_

Does there appear to be any new products? \_\_\_\_\_

When blue cobalt chloride paper is rubbed on the top of the test tube while heating, it turns \_\_\_\_\_

Is this reaction endothermic or exothermic? \_\_\_\_\_

**Reaction 4**

When a few drops of water are added to the “whiteish” product from Reaction 3, the colour turns \_\_\_\_\_  
Is this reaction endothermic or exothermic? \_\_\_\_\_

**Reaction 5**

Describe what happens when calcium chloride solution is mixed with the sodium carbonate solution.

**Reaction 6**

When the hydrochloric acid (HCl) is added to the zinc, describe what you see  
When the gas is tested with a burning splint, it \_\_\_\_\_

**Reaction 7**

Describe what you observe when the manganese (IV) oxide is added to the hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) solution.

Is this reaction endothermic or exothermic? \_\_\_\_\_  
When a glowing splint is placed in the gas, it \_\_\_\_\_

**Questions****Reaction 1**

1. When heated, the copper reacts with the most reactive gas in the air which is \_\_\_\_\_. One product forms. In this product, assume that copper has a combining capacity of “2+”. What is the formula for the product? \_\_\_\_\_
2. Write a **balanced chemical equation** for Reaction 1  
\_\_\_\_\_
3. What **type** of reaction is Reaction 1? \_\_\_\_\_

**Reaction 2**

1. The steel nail is composed mostly of iron. The solution is  $\text{CuSO}_4$ . The reddish substance on the nail is an element. What element is it? \_\_\_\_\_. The new compound that forms in solution contains iron with a combining capacity of “2+”. Give the formula for the new compound. \_\_\_\_\_
2. Write a **balanced chemical equation** for Reaction 2  
\_\_\_\_\_
3. What **type** of reaction is Reaction 2? \_\_\_\_\_

**Reaction 3**

1. There is only one reactant in this reaction. It is copper (II) sulphate pentahydrate. This reaction has 2 products. One is the gas (or liquid) which turns cobalt chloride paper pink. The gas coming off of the copper (II) sulphate pentahydrate during heating is \_\_\_\_\_.  
The other product (the “whiteish” substance) is copper (II) sulphate. Write the correct formula for this \_\_\_\_\_.
2. Write a **balanced chemical equation** for Reaction 3. Include the word “heat” on the correct side of the equation.  
\_\_\_\_\_
3. What **type** of reaction is Reaction 3? \_\_\_\_\_

**Reaction 4**

1. Reaction 4 has two reactants. One is the “whiteish” substance formed in reaction 3. Write it’s formula \_\_\_\_\_. The other reactant is water.  
Reaction 4 has only one product. The product in reaction 4 is very much like the reactant in Reaction \_\_\_\_\_. Give the formula for this compound \_\_\_\_\_
2. Write a **balanced chemical equation** for Reaction 4. Include the word “heat” on the correct side of the equation.  
\_\_\_\_\_
3. What **type** of reaction is Reaction 4? \_\_\_\_\_
4. How are Reaction 3 and Reaction 4 related? \_\_\_\_\_

**Reaction 5**

1. Reaction 5 has two reactants, calcium chloride and sodium carbonate. Write the correct formulas for these \_\_\_\_\_ and \_\_\_\_\_.  
(Don't forget to look up charges on ions to get the correct formulas.)
2. Reaction 5 forms two new compounds for products. Write the correct formulas for these. \_\_\_\_\_ and \_\_\_\_\_.
3. Write a **balanced chemical equation** for Reaction 5.  
\_\_\_\_\_
4. What **type** of reaction is Reaction 5? \_\_\_\_\_

**Reaction 6**

1. Give the chemical formulas for the 2 reactants in reaction 6. (See the data table). They are \_\_\_\_\_ and \_\_\_\_\_.
2. Reaction 6 has 2 products. One is an element which is a gas that goes "PIK". The formula for this gas is \_\_\_\_\_. The other product is a compound which goes into solution. The formula for this compound is \_\_\_\_\_.
3. Write a **balanced chemical equation** for Reaction 6.  
\_\_\_\_\_
4. What **type** of reaction is Reaction 6? \_\_\_\_\_

**Reaction 7**

1. Reaction 7 has only **one reactant**. It is hydrogen peroxide ( $\text{H}_2\text{O}_2$ ). The black manganese (IV) oxide that you put in acts as a *catalyst*, **not** a reactant, so it is **not** included in the equation for the reaction. Instead, it's formula is written *above the arrow* in the equation. There are 2 products in Reaction 7. One product is a gas which relights a glowing splint. This gas is the element \_\_\_\_\_. Give the formula for this gas. \_\_\_\_\_. The other product is a very common, colourless, tasteless and cheap liquid compound. Give it's formula \_\_\_\_\_.
2. Write a **balanced chemical equation** for Reaction 7. (Include the catalyst above the arrow.)  
\_\_\_\_\_
3. What **type** of reaction is Reaction 7? \_\_\_\_\_