

## EXPERIMENT 10

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Partner: \_\_\_\_\_

### I. COMBINATION REACTIONS

1. The combination of **aluminum** with **iodine** (The answers are provided so you will know how to answer the remaining questions. The answers are **highlighted** below.)

- a. Evidence of reaction:

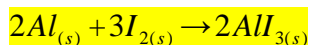
**A flash of light and blue smoke was produced.**

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- b. Write a word equation for this reaction and briefly describe both the reactants and the products:

**aluminum** + **iodine** → **aluminum iodide**  
**silver powder**      **dark purple crystals**      **purple smoke**

- c. Write a balanced chemical equation for the combination of aluminum and iodine (*show the state designations*):



2. The combination of **zinc** with **sulfur**

- a. Evidence of reaction:
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- b. Write a word equation for this reaction and briefly describe both the reactants and the products:

\_\_\_\_\_ + \_\_\_\_\_ → \_\_\_\_\_  
\_\_\_\_\_

- c. Write a balanced chemical equation for the combination of zinc with sulfur (*show state designations*):

3. The reaction of red phosphorus with oxygen

a. Evidence of reaction:

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b. Write a word equation for this reaction and briefly describe both the reactants and the products:

\_\_\_\_\_ + \_\_\_\_\_ → \_\_\_\_\_  
\_\_\_\_\_

c. Write a balanced chemical equation for the combination of red phosphorus with oxygen (*show state designations*):

4. The reaction of copper with oxygen

a. Evidence of reaction:

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b. Write a word equation for this reaction and briefly describe both the reactants and the products:

\_\_\_\_\_ + \_\_\_\_\_ → \_\_\_\_\_  
\_\_\_\_\_

c. Write a balanced chemical equation for the combination of copper with oxygen (*show state designations*):

5. The reaction of magnesium with air

a. Evidence of reaction:

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b. Write a balanced chemical equation for the combination of magnesium with **oxygen**:  
(show state designations)

c. Write a balanced chemical equation for the combination of magnesium with **nitrogen**:  
(show state designations)

## II. DECOMPOSITION REACTIONS

1. Electrolysis of water

a. Write a balanced chemical equation which represents the reaction for the decomposition of water:  
(show state designations)

b. Describe the test used to identify the presence of oxygen:

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b. Describe the test used to identify the presence of hydrogen:

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2. Decomposition of mercury (II) oxide (2 steps). Step one, the decomposition of mercury (II) oxide to form mercury (I) oxide:

Step 1: decomposition of mercury (II) oxide:

- a. Evidence of reaction:

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- b. Write a word equation for this reaction and briefly describe both the reactants and the products:

\_\_\_\_\_ → \_\_\_\_\_ + \_\_\_\_\_  
\_\_\_\_\_

- c. Write a balanced chemical equation for the decomposition of mercury (II) oxide (*show state designations*):

Step 2: decomposition of mercury (I) oxide:

- d. Evidence of reaction:

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- e. Write a word equation for this reaction and briefly describe both the reactants and the products:

\_\_\_\_\_ → \_\_\_\_\_ + \_\_\_\_\_  
\_\_\_\_\_

- f. Write a balanced chemical equation for the decomposition of mercury (I) oxide (*show state designations*):

3. Decomposition of sugar

- a. Evidence of reaction:

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- b. Write a word equation for this reaction and briefly describe both the reactants and the products:

\_\_\_\_\_ → \_\_\_\_\_ + \_\_\_\_\_  
\_\_\_\_\_

- c. Write a balanced chemical equation for the decomposition of sugar:  
(*show state designations*):

4. Dehydration of bluestone algicide (copper (II) sulfate pentahydrate)

a. Evidence of reaction:

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b. Write a word equation for this reaction and briefly describe both the reactants and the products:

\_\_\_\_\_ → \_\_\_\_\_ + \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

c. Write a balanced chemical equation for the decomposition of copper (II) sulfate pentahydrate:  
(show state designations):

5. Decomposition malachite (basic copper (II) carbonate or  $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$ )

a. Evidence of reaction:

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b. What happened to the burning splint when it was inserted into the test tube?

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c. What does this suggest about the gaseous product formed?

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d. Write a word equation for this reaction and briefly describe both the reactants and the products:

\_\_\_\_\_ → \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

e. Write a balanced chemical equation for the decomposition of  $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$  (show state designations):

6. Decomposition of hydrated (III) iron (III) nitrate ( $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$ )

a. Evidence of reaction:

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b. Write a word equation for this reaction and briefly describe both the reactants and the products:

\_\_\_\_\_ → \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

c. Write a balanced chemical equation for the decomposition of  $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$  (*show the state designations*):

7. Decomposition of ammonium dichromate ( $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$ )

a. Evidence of reaction:

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b. Write a word equation for this reaction and briefly describe both the reactants and the products:

\_\_\_\_\_ → \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

c. Write a balanced chemical equation for the decomposition of  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$  (*show the state designations*):