

## Investigate - Types of Chemical Reactions

### I. Introduction

In this lab, you will complete 5 different laboratory experiments in which you will observe each of the 5 different types of chemical reactions that we discussed in class. For each experiment, record your observations in the data table listed in the Results section of this lab, determine the type of reaction that you are observing and write a balanced chemical equation (including states of matter) for each reaction.

### II. Procedure

Reaction 1:

1. Gently crumple a small square of aluminum foil so that it will fit inside of the graduated cylinder (do not ball of the aluminum too much!)
2. Pour 40 ml of 0.5 M  $\text{CuCl}_2$  solution into the 50 ml graduated cylinder.
3. Slowly place the aluminum foil into the graduated cylinder and use the glass stirring rod to push the aluminum foil down until it is submerged in the  $\text{CuCl}_2$  solution.
4. Dispose of the contents of the graduated cylinder in the designated Waste beaker and rinse out the cylinder in the sink.

Reaction 2:

1. Measure 5 ml of Lead (II) Nitrate solution in the graduated cylinder.
2. Add the Lead (II) Nitrate solution to the test tube.
3. Add 2-3 small drops of Potassium Iodide solution to the test tube.
4. Make sure to rinse the graduated cylinder before proceeding!
5. Dispose of the contents of the test tube in the designated Waste beaker and rinse the cylinder and test tube in the sink.

Reaction 3:

1. Add approximately 20 ml of water to the aluminum tin.
2. Measure out approximately 10 g of Calcium Chloride and very carefully add it to the water in the aluminum tin.
3. **Caution:** This reaction is extremely exothermic. Be very careful when performing this reaction! Do not directly touch the bottom of the tin or its contents!
4. Dispose of the contents of the aluminum tin in the designated Waste beaker and rinse the aluminum tin in the sink.

Reaction 4:

1. Place a small scoop of Sodium Hydrogen Carbonate carefully into a dry test tube. (Dry test tubes should be turned upright.)
2. Using the test tube clamps, grasp the test tube carefully and heat it over the alcohol burner for 2 minutes. (**Caution:** Do not hold the test tube directly over the flame, pass it slowly back and forth over the flame cautiously.)
3. Make sure to record careful observations during this experiment!
4. After you are done heating the Sodium Hydrogen Carbonate, place a flaming splint into the test tube and record your observations.
5. Dispose of the contents of the test tube in the designated Waste beaker and rinse the test tube in the sink.
6. Place the test tube back into the test tube rack upside down.

Reaction 5: (Observation only)

1. Record your observations for the reaction between isopropyl alcohol ( $C_3H_8O$ ) and oxygen gas.

**III. Results and Observations**

Reaction	Evidence of a Chemical Reaction	Reactants / Observations	Products / Observations	Type of Reaction
1				
2				
3				
4				
5				

#### IV. Conclusions

1. Write a balanced chemical equation for each reaction above (include states of matter for each reactant and product):

Reaction 1 –

Reaction 2 –

Reaction 3 –

Reaction 4 –

Reaction 5 –

2. What are the 5 main indicators of chemical change (Note - you should have observed all of them in this lab).
  
  
  
  
  
  
  
  
  
  
3. List and describe at least 2 examples of physical changes in which you can observe at least 1 of the indicators that you listed as an indicator of chemical change in question 2.
  
  
  
  
  
  
  
  
  
  
4. Based on your answer to question #3, which indicators of chemical change seem to be the most reliable? Which are the least reliable?