

Chem Honors LAB [25 pts]

Evidence of an Interaction

CuCl_2 + Aluminum

Name _____

Lab Partner(s) _____

Period _____ Date _____

Introduction: This experiment provides you with an opportunity to carefully observe a simple reaction. Try to think of conditions that matter. Be alert to questions that come to mind as you observe. Afterwards, we will try to answer some of your “why” questions. *It is important that you make your observations as specific and complete as you can.*

Purpose: To observe blue crystals (CuCl_2) added into water and observe what happens when aluminum foil is added to the solution.

Write-up: Observations [10 pts] (*Complete sentences are **not** needed*)

Post-lab questions [15 pts] (*Complete sentences **are** needed*)

Procedure:

1. Fill two 100 mL beakers about half full with water. Ask me to add about one teaspoon of blue crystals (CuCl_2) to each 100 ml beaker. Allow the water/crystal mixtures to stand undisturbed for a short time. Compare the similarities and differences between the beakers.

[2 pts] **Observations when added blue-green crystals** (no stirring):

2. Stir the water until one of the components of the mixture disappears.

[2 pts] **Observations after stirring blue-green crystals:**

3. After I have checked your observations, place a piece of aluminum foil, rolled into a loose ball, into the liquid. Record observations until the reaction is completed. Write down any questions that have occurred to you during this experiment.

[3 pts] **Observations after adding aluminum foil:**

[3 pts] **Questions that have occurred to you while watching this reaction:**

4. When your reaction is complete, pour the contents of your beaker into the *waste beaker*. (Do not throw mixture down the sink). Clean your beaker and stirring rod (use a drop of soap on the end of a scrub brush), and place them back in your lab cabinet. Make sure your lab area is clean and lab drawer is in proper order.

Post Lab questions: [15 pts] *Answer in complete sentences on a separate sheet of paper and staple behind this sheet. Remember to use the Claim-Evidence-Reasoning model to explain your answers.*

- 1) a) [2 pts] Originally, you had solid blue-green crystals. However, when you added and stirred the crystals into the water, the solid blue crystals disappeared. Based on your observations and logic, what do you think happened to the solid blue crystals? (Give observational support.)
b) [2 pts] Did a physical change or a chemical reaction take place when you stirred the crystals? How did you make this decision? (*Note: New substances must be formed in a chemical reaction*)
- 2) [2 pt] When the aluminum foil was added to the solution, a chemical reaction did take place. Describe at least three observations support that a chemical reaction took place after adding aluminum.
- 3) [2 pt] Many people think that the red solid is rust. Why is it impossible for the red solid to be rust? (*Hint: What elements are in rust? What kinds of objects rust?*)
- 4) [2 pt] Now, think about what substances you began with— CuCl_2 and aluminum. What is the most likely identity of the red solid? Explain how you came to your decision.
- 5) [1 pt] In class, we will complete the overall chemical reaction. Write the entire reaction, and below each component include the physical description.
- 6) [2 pts] When the reaction was complete, everyone's reaction mixture did not look the same. There were two different versions of the ending reaction mixtures:
 - i. *Case 1—the liquid was green, red solid formed and no aluminum remained.*
 - ii. *Case 2—the liquid was colorless, red solid formed and aluminum was still there.*
 - Explain why the reaction stopped in each case and why you observed the substances in each reaction mixture (i.e. What was used up? What was left over?). Use your answer to #5 and evidence to support your reasoning.
- 7) [2 pts] Water is not necessary for this reaction to take place. What did your teacher do to prove that water is not necessary to do this reaction? Describe the experimental results of that experiment. Though water is not necessary, it is helpful. Why?