**Observations of Cupric Chloride**

**Introduction**

All of science is based upon observations. Chemistry is no exception. While you may not understand exactly understand why things happen in this experiment, the purpose is for you to practice observing what does take place. It is important to report facts, and not opinions. For example, if you say a "clear, colorless, odorless liquid" was in the beaker, you are reporting facts. If you say "the beaker was full of water", you are stating your opinion. Other clear, colorless, and odorless liquids do exist. As a matter of safety, you should never assume that a liquid in a container is water unless you are absolutely sure.

The observations that you record in this lab may be quantitative or qualitative. Quantitative, derived from the word quantity, data is an observation that includes a measurement. It is usually a number of some kind. Qualitative, derived from the word quality, data is a general description. For example, a quantitative observation would be "the water was 10 degrees Celsius". A qualitative observation would be "the water was cold."

Be specific and accurate in your observations. Be creative with your terminology. For example, don't just say "the solution was red." Say, "the solution was brick red" or "the solution was blood red." Be specific! Be sure to observe everything that happens, which may include: light, heat, color, shape, size, dissolving, crystallizing, fume production, color changes, and odor. (When checking for odor, be sure to waft the fumes toward your nose! Do not place your nose directly into the container!)

**Procedure**

1. Put on your safety glasses or goggles.

2. Obtain a 100 mL beaker, a stir rod, and a spoon or spatula from your A or B lab drawer. (Do not ever use equipment from drawer C or D.)

3. Fill the beaker about one-third full with tap water.

4. Cut an 8 cm by 8 cm square of aluminum foil.

5. Put a level teaspoon full of copper (II) chloride dihydrate in a weighing boat, and take it back to your desk. (If using a scoop type spatula, get enough crystals to fill the bottom 2- 3 cm of the scoop, and level.) Wash the spoon.

6. Describe the appearance of the copper (II) chloride dihydrate crystals. Record on your data table

7. Put the crystals into the water in the beaker, but DO NOT STIR. Record the appearance on your data table

8. Stir the crystals with your glass stir rod until the crystals have completely dissolved.

 Record the appearance on your data table

9. Obtain the temperature of this solution, and record. Do NOT use the thermometer as a stir rod! It could break! Record this on your data table.

10. Wad the piece of aluminum foil into a ball, and drop it into the solution. (CAUTION: Do not look down directly into a beaker! Watch from the side.) As soon as the foil touches the solution start taking temperature data, record the temperature every ten seconds for three minutes, record this in your data table.

11. Describe your observations from step 10. Record on your data table

12. Wash the thermometer, and return it to the thermometer drawer. Do NOT put thermometers in your own lab drawer. (prevents breakage)

13. Clean up all equipment and your area, as described on your cleaning checklist on the back of the equipment list in your drawer. If any aluminum foil remains, pick it up with your forceps, wash it off, and throw it away in the trash can. Pour the blue green liquid down the drain, put the brown sludge in a waste bucket in the fume hood, and rinse the beaker. Wash your hands, and return your safety glasses to the storage cabinet. Return to the classroom.

**Analysis questions**

1. Graph your data. Put your temperature data on the Y axis (vertical) and time on the X axis (horizontal). The graph should have a descriptive title, labeled axes, and take up a whole page.

2. List five qualitative observations from the lab

 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. List three quantitative observations from the lab

 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. How do you know a chemical reaction occurred? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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5. When was the chemical reaction over? How did you known the reactions was over? \_\_\_\_\_\_\_

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6. Place a star (٭) on the graph when the reaction ended.Observations data table

|  |  |
| --- | --- |
|  | **Observations** |
| Dry copper (II) Chloride |  |
| Copper chloride and water |  |
| Copper chloride in solution |  |
| Copper chloride solution and aluminum foil |  |

Temperature data table

|  |  |
| --- | --- |
| **Time (Seconds)** | **Temperature (Degrees C)** |
| 0 (initial temp) |  |
| 10 |  |
| 20 |  |
| 30 |  |
| 40 |  |
| 50 |  |
| 60 |  |
| 70 |  |
| 80 |  |
| 90 |  |
| 100 |  |
| 110 |  |
| 120 |  |
| 130 |  |
| 140 |  |
| 150 |  |
| 160 |  |
| 170 |  |
| 180 |  |