LAB: Copper Sulfate Crystals Preparation

Last Name: _____, First_____ Date_____

Crystals are special kinds of solids (crystalline solids) that are made up of molecules arranged in a regular repeating pattern. In some solids (amorphous solids), the arrangements of the molecules are random throughout the material. In crystalline solids, however, the molecules are repeated in exactly the same pattern over and over again throughout the entire material.

Compounds that form crystals are ionic. When ionic compounds are dissolved in water, the ions separate. One ion takes an electron from the other and it becomes negatively charged. The ion that loses the electron becomes positively charged. When the liquid is allowed to evaporate, the ppositely charged ions come back together and reform the ionic compound with a crystal structure.

PROBLEM: Does the evaporation rate or cooling rate affect the size, shape, or amount of copper (II) sulfate crystals formed?

HYPOTHESIS: _____

MATERIALS:
100 mL beakers
graduated cylinder
glass stirrer
hot plate
cold distilled water
copper sulfate solid
Petri dish

PROCEDURE:
1. Place about 50 mL of distilled water in a 100 mL beaker on a hot plate,(more than one student may use a hot plate).
2. Turn on the hot plate and gently warm the solution, when a single bubble is seen in the solution stop heating the water.
3. To the warm water add small quantities of copper(II)sulfate pent hydrate crystals with constant stirring using a glass rod until all of the copper sulfate.
4. When a small crystal remains un dissolved in the solution the solution is saturated. Stop heating the solution.
5. Pour the clear solution into a Petri dish while hot and leave it to cool over night.
6. Pour a small quantity of the saturated solution into a clean 10 mL beaker and cool it rapidly by placing it in cold water from the tap.

ANALYSIS:

1. What are crystalline solids?

2. What are amorphous solids?

3. What kind of compound is copper (II) sulfate penta hydrate?

4. What is the chemical formula for copper(II) sulfate penta hydrate?

5. How many atoms of copper, sulfur, and oxygen does copper(II) sulfate have?
    a. Copper (Cu) _____ atoms
    b. Sulfur S _____ atoms
    c. Oxygen _____ atoms

5. How may molecules of water of hydration does the compound have?

6. Was there a difference in the size of the crystals formed based on the rate of cooling of the crystals

CONCLUSION:

Did you find the answer to your problem? Is your hypothesis correct or incorrect? Explain why your hypothesis is correct or incorrect? Describe your results and observations.

SAFETY

1. Even a small increase in the temperature of the water will greatly affect the amount of copper sulfate that will dissolve in water.

2. Copper sulfate is harmful if swallowed and can irritate skin and mucous membranes. In case of contact, rinse skin with water. If swallowed, give water and call a physician.

3. Copper sulfate pentahydrate crystals contain water, so if you want to store your finished crystal, keep it in a sealed container. Otherwise water will evaporate from the crystals, leaving them dull and powdery. The gray or greenish powder is the anhydrous form of copper sulfate.

4. Copper sulfate is used in copper plating, blood tests for anemia, in algicides and fungicides, in textile manufacturing, and as a dessicant.