

Name _____

Date _____

Hour _____

LAB - Making a supersaturated solution

BACKGROUND INFORMATION - A solution is **unsaturated** if more solute can be dissolved at the existing temperature. If the solution is “holding” the maximum amount of solute, it is said to be **saturated**. If a hot saturated solution is prepared and allowed to cool without any solute undissolving, the solution is **supersaturated**. Most solutes will undissolve out of a solution as the temperature is lowered, but a few substances remain in solution during the cooling process. One such solid is sodium thiosulfate. This solid is used extensively by photographers for developing film. They often call it “hypo.”

PURPOSE: To prepare a supersaturated solution and observe its characteristics.

SAFETY: Wear safety glasses at all times. Hair tied back, sleeves up. Do not touch the sodium thiosulfate with your fingers and wash hands after completing lab. Be careful not to point the test tube at anyone while heating and wear heat resistant gloves.

PROCEDURE:

1. Weigh out 15 g. of sodium thiosulfate crystals into a small container.
2. Put 3 mL of water into a test tube.
3. Add sodium thiosulfate crystals a scoop full at a time to the water and shake 1-2 minutes after each addition. Note any change in temperature during the dissolving process by touching the outside of the test tube to the inside of your wrist.
4. When your solution is saturated (no more will dissolve) at room temperature, hold the test tube in a test tube holder while wearing gloves and heat it **very gently** by passing it through the flame every few seconds (**do not hold the test tube in the flame**). Continue to add the remaining sodium thiosulfate one scoop full at a time until all 15 g. are dissolved.
5. Place the test tube of hot, supersaturated solution in a beaker of tap water. Let the test tube and its contents stand in the water **UNDISTURBED** (THIS MEANS **DON'T** BUMP OR SHAKE IT!) for 8 –10 minutes.
6. Now carefully pick up the tube and examine the contents closely. The solution should be clear with no solid visible. Feel the temperature of the test tube.
7. Drop 1 small sodium thiosulfate crystal into the supersaturated solution and observe what happens. Touch the test tube to note any temperature change.
8. To clean up bring all equipment back to where you got it. Put the test tube and its contents in the dish pan of warm soapy water at the teacher’s desk.

QUESTIONS:

1. What must you do to a solution in order to supersaturate it?
2. How is a supersaturated solution different from a saturated solution?
3. Did the dissolving process at room temperature raise or lower the temperature of the solution?
4. When the sodium thiosulfate undissolved at the end of the lab, was heat absorbed or released?
NOTE: When heat is absorbed, the process is called **endothermic**. When heat is released, the process is called **exothermic**. Was this ending process endothermic or exothermic?