

Name: _____ Pd: _____ Date: _____

Lab # _____ Solubility Curve

Aim: To identify an unknown crystal by comparing its solubility to the solutes displayed on Table G.

Pre Lab questions:

(2 pts) What is the boiling point of a substance?

(3 pts) What is the Saturation Point of a crystal?

(2 pts) Hypothesis: If the point of saturation of can be determined then

Materials: (2 pts)

Diagram (Labeled) (3 pts)

Method:

1. Measure out exactly 10.00g of distilled water.
2. Mass out _____g of the unknown crystal.
3. Combine the crystal and distilled water in a test tube.
4. Use a hot water bath to heat the test tube gently in a water bath until all the crystal is dissolved. DO NOT BOIL!!!
5. Insert a thermometer into the test tube and allow the test tube to cool, stirring occasionally.
6. Watch the test tube continuously looking for the unknown substance to re-crystallize.
7. Record the temperature once at the first sign of re-crystallization.
8. Using the data recorded by each group (you and that of your fellow researchers) construct a solubility curve of the Mass of the Unknown Crystal (g) per 100g of water vs. temperature (°C).

Data:

Observations: To score well in this section you must show your knowledge of solutions by use as many of the following terms **correctly** as you can when describing what you see. saturated, unsaturated, solute, solvent, Crystallize, Precipitate, soluble/solubility, dilute, concentrated, aqueous, mass, temperature, saturation point.

(5 pts) **Observation 1** Describe the contents of the test tube immediately following step 3.

(5 pts) **Observation 2** Describe the contents of the test tube immediately following step 4.

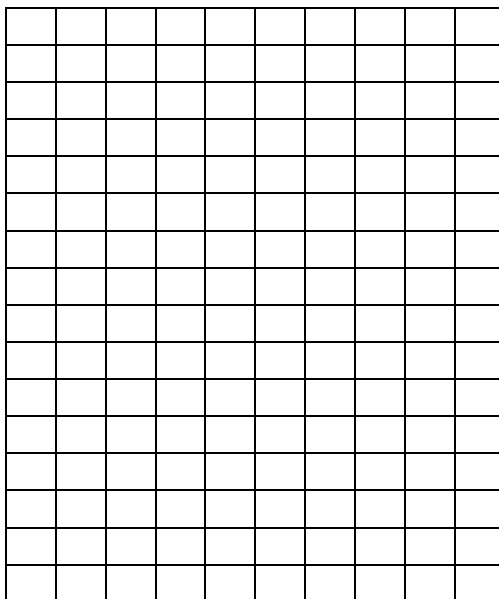
(5 pts) **Observation 3** Describe the contents of the test tube immediately following step 7.

(10 pts)

Group #	Mass Crystal (g)	Mass x 10 (g)	Experimental Crystallization Temperature (°C)	Accepted Crystallization Temperature (°C)	Percent Error
1					
2					
3					
4					
5					
6					

Graph:

- 1) (5 pts) Construct a solubility graph with Temperature in ($^{\circ}\text{C}$) on the x-axis and grams of solute/100g of H_2O on the y-axis. It should resemble Table G: Solubility Curves in your reference table.
- 2) (5 pts) Plot the experimental temperature vs. the mass of the unknown crystal on the graph below. Draw a smooth, Best Fit curve through your points.



Questions:

1. (2 pts) Compare your curve to the curves on Table G. What is the identity of the unknown crystal (Which curve is closest to the curve you made)? _____
2. (3 pts) On the data table (page 2), fill in the accepted re-crystallization temperatures using the mass and temperature for the solute you identified on Table G.
3. (5 pts) On the above graph, plot the accepted crystallization temperature vs. the mass of the crystal from Table G.

Calculations.

1. (5 pts) Calculate the percent error (showing all work here) for your group's mass re-crystallization temperature:

2. (3 pts) Record the percent error for all the other groups in your data table (you need not show the work for these).

