

## ASSIGNMENT: SOLUBILITY GRAPH

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The solubility of solids in liquids is affected by temperature, by solute particle size and by agitation (i.e. shaking or stirring). A solution is said to be saturated if there is as much solute as can possibly be dissolved in a given amount of solvent at a given temperature.

Solubility of gases decreases with temperature but increases with pressure.

- Using a graph paper, plot the solubility of copper (II) sulphate (y-axis) versus the temperature (x-axis) using the following data, and then answer the questions using the graph:

Solubility (g /100 g water)	Temperature ( $^{\circ}\text{C}$ )
14.3	0.00
17.4	10.0
20.7	20.0
25.0	30.0
28.5	40.0
33.3	50.0
40.0	60.0
55.0	80.0
75.4	100.0

- What is the solubility of copper (II) sulphate at  $55.0^{\circ}\text{C}$  ?
- If the above solution were cooled to  $5.00^{\circ}\text{C}$ , what would happen ?
- What mass of copper (II) sulphate would precipitate out at  $5.00^{\circ}\text{C}$  ?
- What is the temperature when the solubility of copper (II) sulphate is  $25.0\text{ g /100 g water}$ ?
- Would  $35.0\text{ g}$  of copper (II) sulphate dissolve completely at  $65.0^{\circ}\text{C}$  ? If so, what type of solution would be obtained?
- Would  $100.0\text{ g}$  of copper (II) sulphate completely dissolve at  $95.0^{\circ}\text{C}$  ? What type of solution would be obtained?
- How many grams of copper (II) sulphate are present in  $50.0\text{ g}$  of water at  $25.0^{\circ}\text{C}$  ?
- A solution of copper (II) sulphate in  $100\text{ g}$  of water is saturated at  $15.0^{\circ}\text{C}$ . How much additional copper (II) sulphate must be added to saturate the solution at  $45.0^{\circ}\text{C}$  ?
- A saturated solution of copper (II) sulphate is cooled from  $65.0^{\circ}\text{C}$  to  $22.0^{\circ}\text{C}$ . How many grams of copper (II) sulphate will precipitate out of  $100.0\text{ g}$  of solution ?
- $50.0\text{ g}$  of copper (II) sulphate are added to  $100.0\text{ g}$  of water at  $22.0^{\circ}\text{C}$ .
  - How much will remain as residue?
  - To what temperature must the solution be heated for all the copper (II) sulphate to dissolve?