

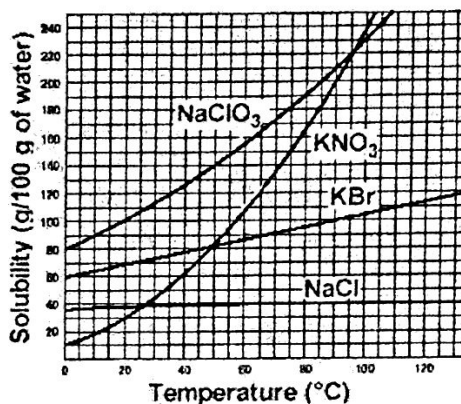
## SOLUBILITY CURVES

### Solubility

- is the amount of solute that dissolves in a given quantity of solvent at a certain temperature.
- When stating solubility of a substance, the temperature, mass of solute and quantity of solvent must be stated

### Solubility Curve

- a curve showing the solubility of a substance over a range of temperatures
- temperature is shown on the x-axis and the solubility on the y-axis
- the y-axis must be labelled with the units, showing the number of grams of solute dissolved in a certain amount (usually 100 g) of water



### Saturated Solution

- *the maximum amount of a particular solute is dissolved at a specific temperature*
- if more of the same solute is added, it will not dissolve
- other solutes may still be dissolved
- if the solution is cooled, solute particles will crystallize out of the solution
- all points on the curve represent a saturated solution

### Unsaturated Solution

- *a solution in which more of a particular solute can be dissolved at a specific temperature*
- it has the ability to dissolve more solute
- an unsaturated solution will become saturated when it is cooled down
- all points under the curve represent an unsaturated solution

### Supersaturated Solution

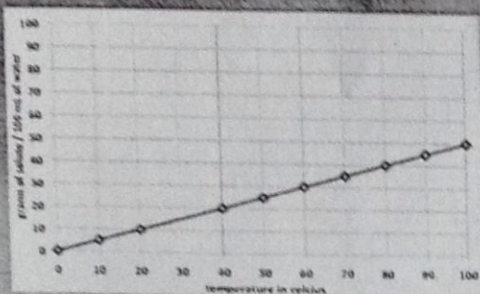
- *a solution in which there is more solute dissolved than can normally be dissolved at that temperature*
- some substances have the ability to make supersaturated solutions if a saturated solution is cooled very slowly and none of the excess solute crystallizes
- "seeding" a supersaturated solution, means that adding a crystal will cause all of the excess solute to come out of solution
- all point above the curve represent a saturated solution

### Solubility Curve Problems

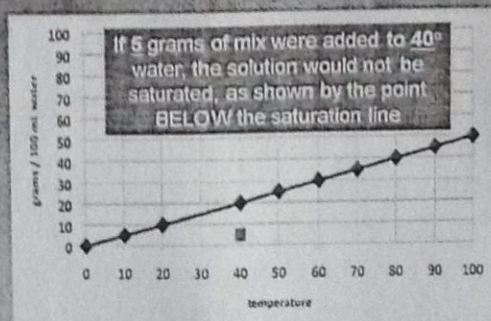
- most problems involve interpolating on the curve to find the required values
- if the amount of solvent is changed, the new amount of solute can be determined by doing a simple ratio
- e.g. The solubility of KBr is 24.5 g KBr/100g H<sub>2</sub>O at a certain temperature. How much KBr would be dissolved in 50 g of water at this temperature?

$$\frac{x \text{ g of KBr}}{50 \text{ g H}_2\text{O}} = \frac{24.5 \text{ g KBr}}{100 \text{ g H}_2\text{O}} \rightarrow \text{now solve for } x$$

- The **LINE ITSELF** also represents a "perfect" **SOLUTION**; that is, a solution with the **EXACT** amount of solute that will saturate 100 mL of water:



- At any temperature, any **LESS** solute than the value on the line would produce an **UNSATURATED** solution
- (points **below** the line)



- At any temperature, any **MORE** solute than the value on the line would produce an **OVERSATURATED** solution
- (points **above** the line)

