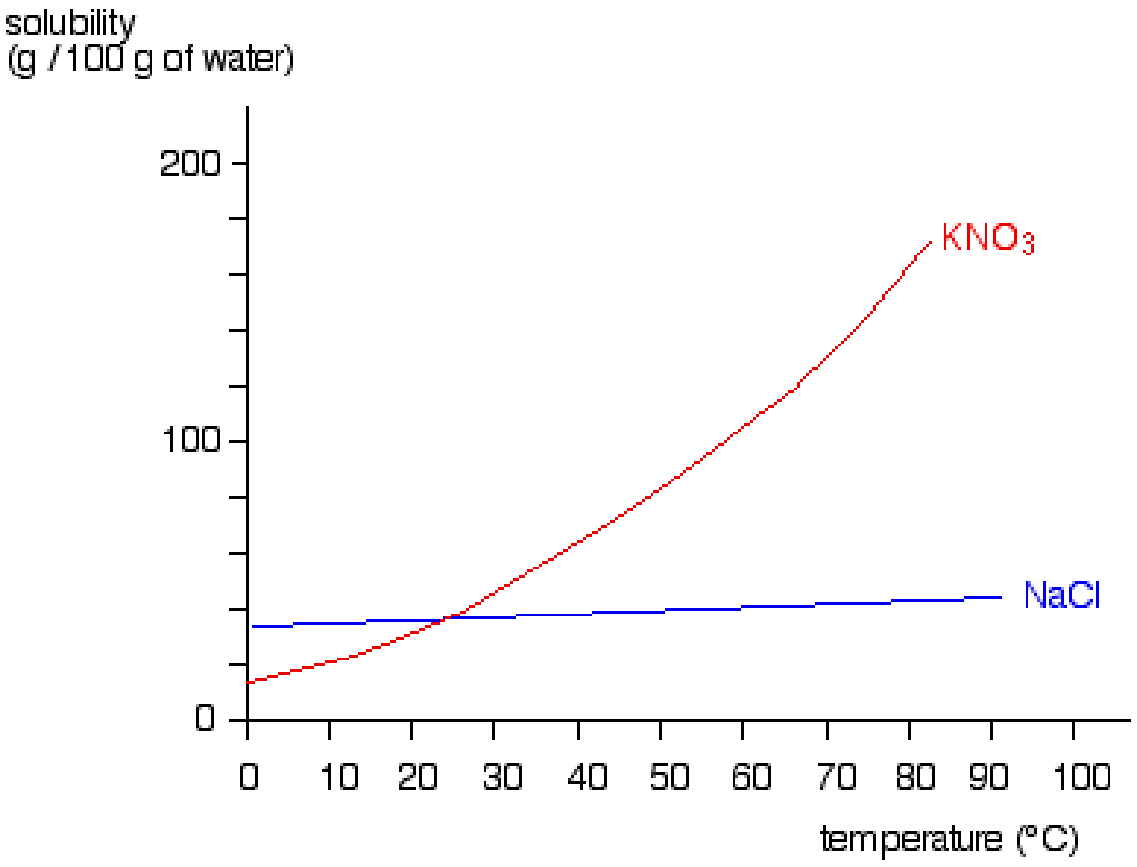
Chapter 13: Solutions, Colloids

AP Chemistry CQ

1. *Definitions.* Explain or define the following.
    1. Saturated
    2. Miscibility
    3. Supersaturated
    4. Standard solution
2. *Effect of temperature on solubility.* The following diagram shows the effect of temperature on the solubility of two substances.



Use the diagram to answer the following questions.

1. How many grams (if any) of potassium nitrate will precipitate from a solution containing 85g of KNO3 and 100g of water at 50 degrees celsius if the solution is cooled to 20 degrees?

2. Which is more soluble at 20 degrees, KNO3 or NaCl?

3. *Rate of solution.* Give three factors that influence the rate of solution.
4. *Solutions of electrolytes.*
    1. Most common acids are good electrical conductors in aqueous solutions.
    2. Write chemical formulas for five substances that would for aqueous solutions that conduct electricity.
5. *Solubility generalizations.* Which of each of the following pairs is the most soluble in water?
    1. Copper sulfide or copper nitrate
    2. Cadmium chloride or silver chloride
    3. Magnesium sulfate or barium sulfate
    4. Zinc carbonate or barium sulfate
    5. Strontium hydroxide or cadmium hydroxide
6. *Percent composition of solutions.* Tell exactly how you would prepare 100g of a 5% NaOH solution by mass.
7. *Molar solutions.* Suppose you wanted to prepare 0.500 L of a 0.100 M solution of NaOH by diluting a 2.00 M NaOH solution with an appropriate quantity of distilled water. What volume of the 2.00 solution would be required?
8. *Molar solutions.* How many moles of nonelectrolyte are contained in a 3.00 m solution containing 500g of water?
9. The S of nitrogen in blood at 37 degrees C is 5.6×10^{-4} M. If a deep sea diver breathes compressed air from a tank at partial pressure of 3 atm, which would the S of nitrogen be in blood at 37 degrees C?
10. *Applications of concentration calculations.* For a laboratory experiment, 20.0 L of 0.0250 M NaOH (mol. Wt = 40.0) must be prepared by dissolving solid NaOH. How many grams of NaOH are required?
11. *Colligative properties of solvents*. Exactly 1.00 g of a nonelectrolyte (mol. Wt = 200) is dissolved in exactly 15.0 g of solvent whose freezing point is 50.0 degrees C. The solution freezes at 42.0 degrees C. Calculate the Kf of the solvent.
12. *Determination of molecular weights*. Exactly 7.90 g of sugar is dissolved in 100 mL of water (Kf=1.86) causes the solution to have a freezing point of -0.817 degrees C at an atmospheric pressure of 760 torr. Calculate the molecular weight of the sugar.
13. *Definitions*. Define or describe each of the following.
    1. Polar molecule
    2. Electrolyte
    3. Peptization
    4. Absorption
    5. Brownian movement
    6. detergents