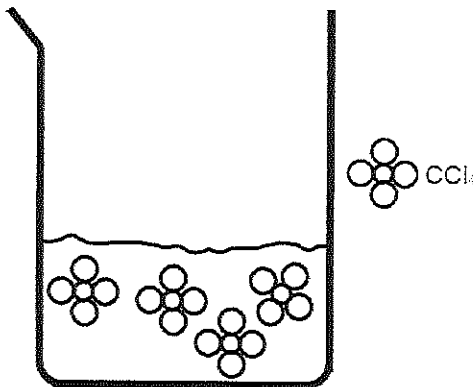


PQ4: Liquids #4



Liquids (states of matter)



Displayed here is a beaker of liquid CCl_4 at STP. The boiling point of $\text{CCl}_4 = 76.5^\circ\text{C}$.

1. (#4-2a) Which of the following statements is true.
- I. The vapor pressure of this solution is less than 1 atm. γ $VP = \frac{760}{760}$ at Boiling Same as ATM
- II. The vapor pressure will increase if the temperature is increased. $\uparrow \gamma$
- III. The predominant intermolecular force maintaining the liquid state is hydrogen bonding. NO
- a. I only
 b. I and II only
 c. II and III only
 d. I, II, and III
2. (#4-2b) Which of the following is correct relative to the properties of liquid carbon tetrachloride.
- I. It is a good conductor of electricity. N
- II. I would expect CCl_4 to dissolve nicely in water. N
- III. It can evaporate breaking covalent bonds. N
- a. I only
 b. II only
 c. I and II only
 d. none listed is correct
3. (#4-2c) CCl_4 (153g/mol) dissolves nicely in hexane (C_6H_{12} 84g/mol). If 15.3g of CCl_4 dissolves in 0.5L of hexane, the molarity of the solution is
- a. 5 M
 b. 0.2M
 c. 50 M
 d. 15M
- $\frac{.1\text{mol}}{.5\text{L}} = .2\text{M}$

1. (#4-2b) 0.5 moles of Aluminum Chloride is dissolved in 100mL of water.

a) Write the dissolving equation for Aluminum chloride (balanced)



(#4-2c) Determine the concentration [M] of the solution?

b) Al^{3+} 0.5M 5M

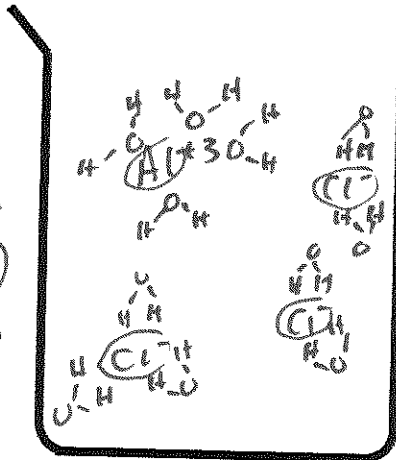
c) Cl^- 1.5M 15M

$$\frac{0.5}{0.1L} = 5M \quad \left| \begin{array}{l} \text{Al}^{3+} = 3.3 \\ \text{Cl}^- = 10M \end{array} \right.$$

2. (#4-2c) An additional 50 mL of water is added to the beaker in #1. EXPLAIN how this will affect all of the concentration of the chloride ion?

$$M_1 V_1 = M_2 V_2 \quad \text{or} \quad M = \frac{\text{mol}}{L} = \frac{0.5 \text{ mol}}{0.150 L} = 3.3$$

3. (#4-2b) Draw the solution provided, including relative concentrations of cations and anions and at least 10 water molecule showing correct orientation.



4. 10mL of 0.5M NaCl is mixed with 10mL of 1M AgNO₃ producing solid AgCl.

a. Write the net ionic reaction taking place.



b. Determine the concentration of each ion

Before

After

$$[\text{Na}^+] \quad 0.5 \rightarrow \times 2 \text{ vol} = 0.25M$$

$$[\text{Cl}^-] \quad 0.5 \rightarrow \text{L.R} = 0$$

$$[\text{Ag}^+] \quad 1M \rightarrow \times 2 \text{ vol} \rightarrow 0.5M$$

$$[\text{NO}_3^-] \quad 1M \rightarrow \times 2 \text{ vol} \rightarrow 0.5M \rightarrow \frac{1}{2} \text{ precipitated} \rightarrow \text{Volum} \times 2 \rightarrow 1M \rightarrow 0.5M \rightarrow 0.25M$$

c. Draw a set of proportional picture of before and after.

