

Colligative Properties Review

1) A 10.5 gram sample of Jamesonnum is dissolved in 125 mL of water. The resulting solution boils 103.5 deg C. What is the molar mass of Jamesonnum?

2) Consider a sample of Jamesonnum at 0.0 °C.

Sketch the temperature curve for Jamesonnum based on the following heating treatment:

Jamesonnum is solid at 0.0 deg C

Jamesonnum is heated to 5.0 deg C and melted

Jamesonnum is heated to 60.0 deg C

3) Calculate the heat added to 4.44 g of Jamesonnum from 0.0°C to 85.0 °C. Some of the info may not be needed.

$$C_{(s)} = 32.6 \text{ J/g } ^\circ\text{C}$$

$$\Delta H_{\text{fus}} = 99.0 \text{ J/g}$$

$$\text{melting point} = 5.0 \text{ deg } ^\circ\text{C}$$

$$C_{(l)} = 134.8 \text{ J/g } ^\circ\text{C}$$

$$\Delta H_{\text{vap}} = 339 \text{ J/g}$$

$$\text{boiling point} = 80.1 \text{ deg } ^\circ\text{C}$$

4) What is the freezing point of a solution comprised of 47.4 g CaCl_2 dissolved in 359.5 g water? $K_f = 1.86 \text{ } ^\circ\text{C/m}$

5) What is the molality of a solution formed by dissolving 62.2 g of $\text{CH}_4\text{N}_2\text{O}$ in 842.2 mL of water?

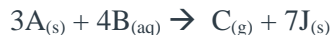
6) The osmotic pressure of a solution containing 6.69 mg of Jamesonite per 50.0 ml of solution is 4.55 torr and 45 deg C. What is this Jamesonite's molar mass?

7) Calculate the vapor pressure of a solution at 25 deg C containing 99.5 g of sucrose (molar mass = 342.30) and 300 ml of water. The vapor pressure of pure water at 25 deg C is 23.8 torr. Assume 1.00 g/ml for density of water.

Chemistry 232 Quiz 4 Review

Chemical Kinetics

1) James is trying to form Jamesonium (J) via the following reaction:



- Write a generic Rate Law expression for this reaction.
- What are four ways you can speed up this reaction and explain each.
- Calculate the average rate of change for [A] assuming from 600 seconds to 1200 seconds, the concentration of [A] changed from $1.24 \times 10^{-2} \text{M}$ to $0.93 \times 10^{-2} \text{M}$.
- Assume Product $C_{(g)}$ is shown to be forming at a rate of .0072 M/s. What are the rates of change for A, B and J?
- Assume the rate of appearance for J is 1.2M/min, what is the rate of disappearance of B?
- James wants to experimentally determine the order and rate constant for each. What is the rate law? Determine the rate constant and the overall order. Remember units and to assume constant temperature.

Trial	[A]	[B]	Initial Rate M/min
1	0.064	0.82	0.082
2	0.18	0.82	0.0656
3	0.78	0.60	0.478

- Using your rate from part e, how would the ratio of rate change if:
 - A is tripled
 - A and B are both halved
 - In experiment one, the concentrations for A and B are 0.20M and in experiment 2, the concentration of A is 0.40M and B is 0.60M.
- Mark said that the concentration of Jamesonium forming remains constant overtime. Mark got smacked across the face as a result. Explain why this was necessary.