

$$\Delta T = (K \times M) i$$

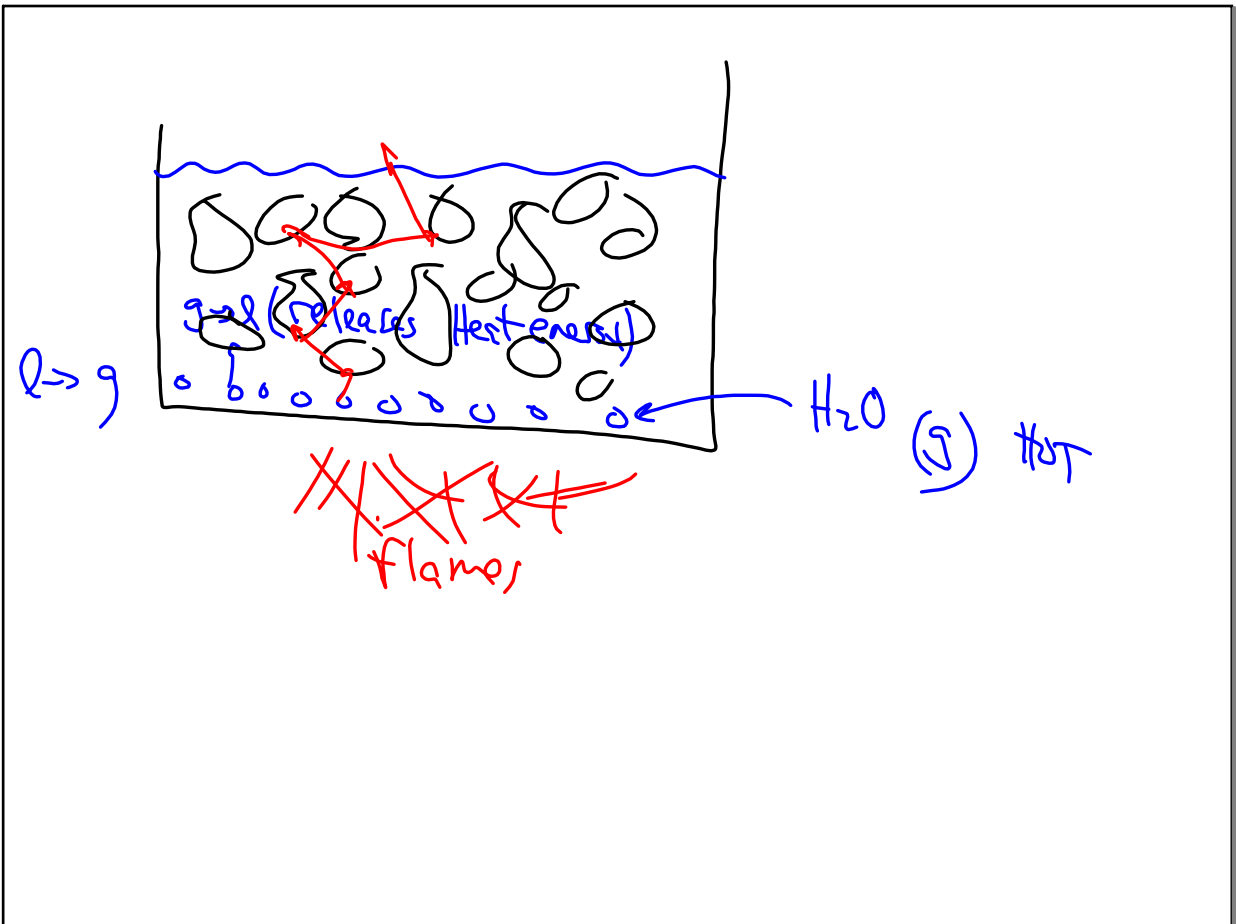
$K \approx 0.2$

Molality  $\rightarrow \frac{\text{moles solute}}{\text{kg solvent}} \rightarrow \frac{\text{g solute}}{\text{MW solute}}$

$LAP + \Delta T$

$AFP - \Delta T$

Jan 8-7:59 AM



Jan 8-8:18 AM

$$\frac{V_P}{SOLN} = \frac{X}{SOLVENT} P^0$$

Universal solvent  
 UP H<sub>2</sub>O at temp is on p ||||

Jan 8-8:26 AM

$$P \cdot V = nRT$$

$$P = \frac{n}{V} RT$$

$$P = MRT$$

$$\pi = MRT$$

$R = 0.08206 \frac{\text{L} \cdot \text{Atm}}{\text{mole} \cdot \text{K}}$

H<sub>2</sub>O ← Filtration P → RA → ← cancel sum

Jan 8-8:28 AM

PS 13

454g  $\text{CaCl}_2$  in water 500ml soln

②  $M = \frac{\text{Moles solute}}{\text{l Soln}}$

$\frac{454\text{g CaCl}_2}{0.5\text{ l soln}} = 8.25\text{ mole CaCl}_2$

$\frac{8.25\text{ mole CaCl}_2}{1\text{ l}} = 8.25\text{M CaCl}_2$

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$\text{CaCl}_2 \rightarrow \text{Ca}^{+2} + 2\text{Cl}^-$

8.25  $\rightarrow$  8.25  $\quad 2(8.25) = 16.5$

Jan 8-8:32 AM

~~X~~ Solute =  $\frac{\text{Mole solute}}{\text{Moles solute} + \text{Mole solvent}}$

Jan 8-8:45 AM

⑤

$$X_{\text{methanol}} = \frac{\text{moles meth}}{\text{moles meth} + \text{moles H}_2\text{O}}$$

$\downarrow$  (32)                       $\downarrow$  (18)  
 $\text{H} - \text{C} - \text{OH}$   
 $\quad |$   
 $\quad \text{H}$

Moles =  $\frac{g}{\text{MW}}$

32g meth  
32g H<sub>2</sub>O

$$= \frac{\frac{32}{32}}{\frac{32}{32} + \frac{32}{18}} = \frac{1}{1 + 1.78}$$

$$= 0.36$$

Jan 8-8:57 AM

⑫

$$VP_{\text{soln}} = X_{\text{solvent}} P_{\text{pure solvent}}$$

$$VP_{\text{soln}} = \frac{\text{moles H}_2\text{O}}{\text{moles H}_2\text{O} + \text{moles glucose}} (355)$$

0.03 mole glucose  
100g H<sub>2</sub>O  
P<sub>pure</sub>: 355 torr

$$\frac{\frac{100}{18}}{\frac{100}{18} + 0.03} (355)$$

Jan 8-9:02 AM

⑬  $\Delta T_b = (K_b \times m)$

glucose  $0.51 = (K_b \times 1)$   $K_b = 0.51$

$(C_6H_{12}O_6)$   
 $(100.51 - 100)$

$Al_2(SO_4)_3$   
 $2 + 3 = 5 \text{ ions}$

$\Delta T = (K_b \times m)$   
 $\Delta T = (0.51 \times 5)$   
 $\Delta T = 2.55^\circ C$

new bp  $102.55$

Jan 8-9:09 AM

⑭ 125mg caffeine, 100g cyclohexane solvent.  
 Find MW caffeine  $K_f = 20.1$

$\Delta T = 0.13$

$\Delta T_f = (K_f \times m)$   
 $0.13 = (20.1 \times m)$

$0.0065 \text{ m}$   
 $(6.5 \times 10^{-3} \text{ m})$

$m = \frac{\text{Moles solute}}{\text{Kg solvent}}$

$m = \frac{\text{Moles solute}}{\text{Kg solvent}} = \frac{\frac{g}{\text{MW}}}{\text{Kg solvent}} = \frac{0.125g}{\text{MW}} \div 0.1 \text{ Kg} = 6.5 \times 10^{-3}$

$\frac{0.125}{\text{MW}} = 6.5 \times 10^{-4}$

$\frac{0.125}{6.5 \times 10^{-4}} = \text{MW}$   
 $192.3 \text{ g/mole}$

Jan 8-9:15 AM

(16) 0.25g ctc, 50ml soln  
 $\pi = 1.52 \text{ kPa}$ ,  $25^\circ\text{C}$ , Find mw ctc

$$PV = nRT$$

$$\frac{1.52 \text{ kPa}}{101.3 \text{ kPa}} = \frac{1 \text{ atm}}{101.3 \text{ kPa}} = 0.015 \text{ atm}$$

$$\frac{PV}{i} = \frac{gRT}{\text{MW}}$$

$$\frac{816993}{g/mol}$$

$$\frac{\text{MW}}{i} = \frac{gRT}{PV} = \frac{(0.25)(0.08206)(298)}{(0.015)(50 \times 10^{-3})}$$

Jan 8-9:25 AM

(17)  $m = \frac{\text{moles}}{\text{Kg}} = \frac{\frac{g}{\text{MW}}}{0.125} = \frac{50}{58}$

Jan 8-9:30 AM