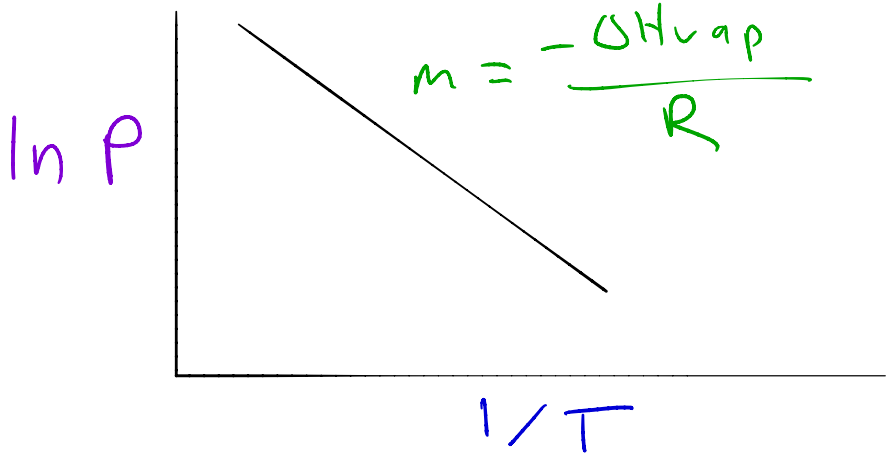
4/27/20

Lab Exercise 1:

Be sure to calculate the molar volume for each trial separately, then average the two results. The % error should be based on the average.

Lab Exercise 2: ΔH_{vap} of ethanol

$$\underbrace{\ln P}_{Y} = \underbrace{-\frac{\Delta H_{vap}}{R}}_{m}\underbrace{\left(\frac{1}{T}\right)}_{X} + \underbrace{C}_{b}$$



From a set of temperatures and vapor pressures of ethanol, the graph above can be constructed. The slope of this graph has physical meaning.

	Init	1	2	3	4	5
Total (kPa)						
Temperature °C						

Initial set of conditions before ethanol was added to the chamber.

Pressure/temperature measurements after ethanol is added.

$P_T = P_{air} + P_{ethanol}$

goal

$P_{ethanol} = P_T - P_{air}$

$P_{ethanol} = 0$ for P_{init}

P_{air} adjusted for T

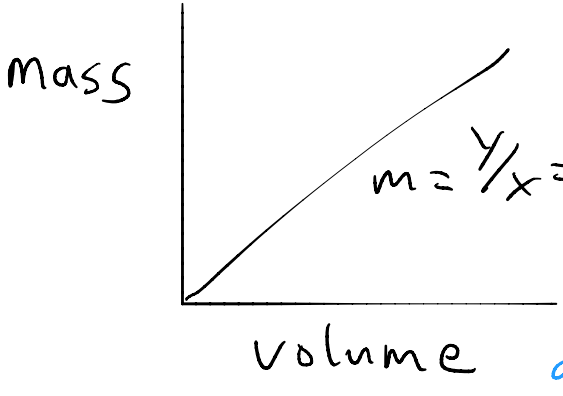
$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$

In this experiment, $V_1 = V_2$ (fixed-volume container)

air alone (initial): $\frac{P_{init}}{T_{init}} = \frac{P_{air}}{T_{air}}$

adjusted values based on T for trials 1-5

Once the set of vapor pressures and corresponding temperatures has been generated, a graph of $\ln P$ versus $1/T$ will yield a line that has a slope that can be used to calculate ΔH_{vap}.



$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

$$m = y/x = \frac{\text{mass}}{\text{volume}} = \text{density}$$

If the masses and volumes of several samples of the same substance are plotted against each other, the slope of the line generated will have a physical meaning: the density of that substance.