CHEM 450/450G HW #3

Reading: Chapter 5.1-5.13

Hand in:

Q 5.5, 5.11, 5.13 (each 3 points)

P 5.4, 5.17 (each 3 points)

Extra Credit: 5.16

Notes:

Q5.5: This question's wording could use some work. I interpreted it to mean there are three experiments performed using the same gas (i.e., Ar is used for all three). In the first, which is done with mass of gas m, the temperature change ΔT is attained. The second is done with the mass of gas $2m$, but restricted to the same temperature change. The final experiment uses mass m (as in the first), but allows the temperature change to be $2\Delta T$. Which of the three processes has the largest value of ΔS?

Additional:

Q 5.1, 5.2, 5.7

P 5.1, 5.5, 5.19, 5.21, 5.27, 5.36, 5.43

Caution about fusion and vaporization! Vaporization is the process of going from liquid to gas. It always sounds to me like fusion should be going from liquid to solid ("fusing"), but the heat of fusion is actually ΔH for the process of melting (going from solid to liquid).

Q5.2 is really asking for a *molecular explanation* of why ΔS is always positive.
P5.1: To interpret the somewhat mysterious statement, "assume $\kappa = 0$", you may consider looking at the definition of κ. How does that help you assess the volume of the system, and whether or not it changes as a function of pressure?
P5.19(b): You will note that you are not told whether the process is adiabatic or isothermal. That is because expansion against $P_{ext} = 0$ is a special case. To understand this, try approaching it from adiabatic ($q=0$) perspective, and then from ($\Delta U=0$) perspective, and see what happens.