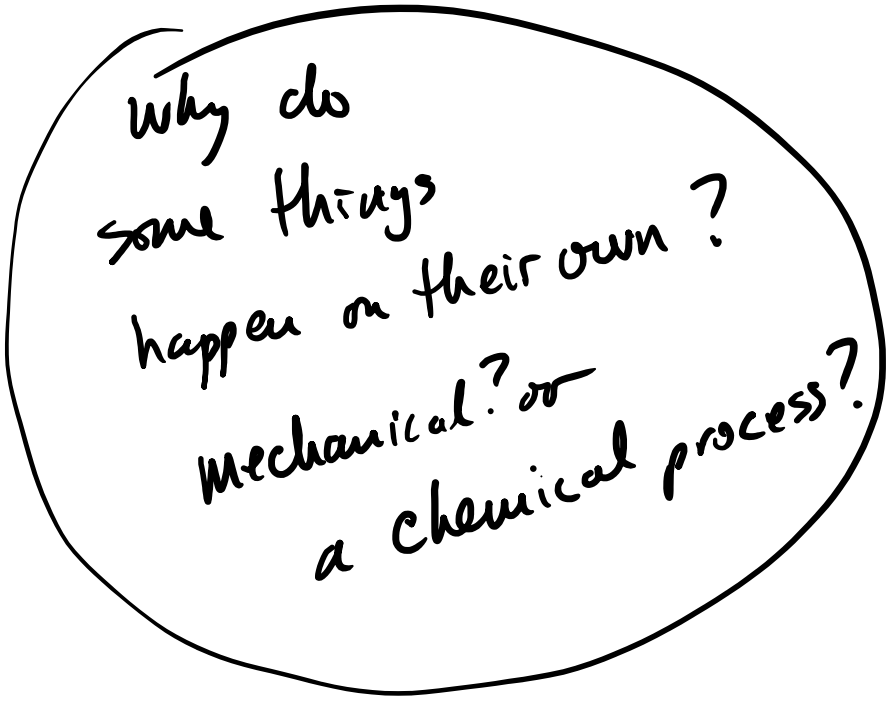
Thermodynamics

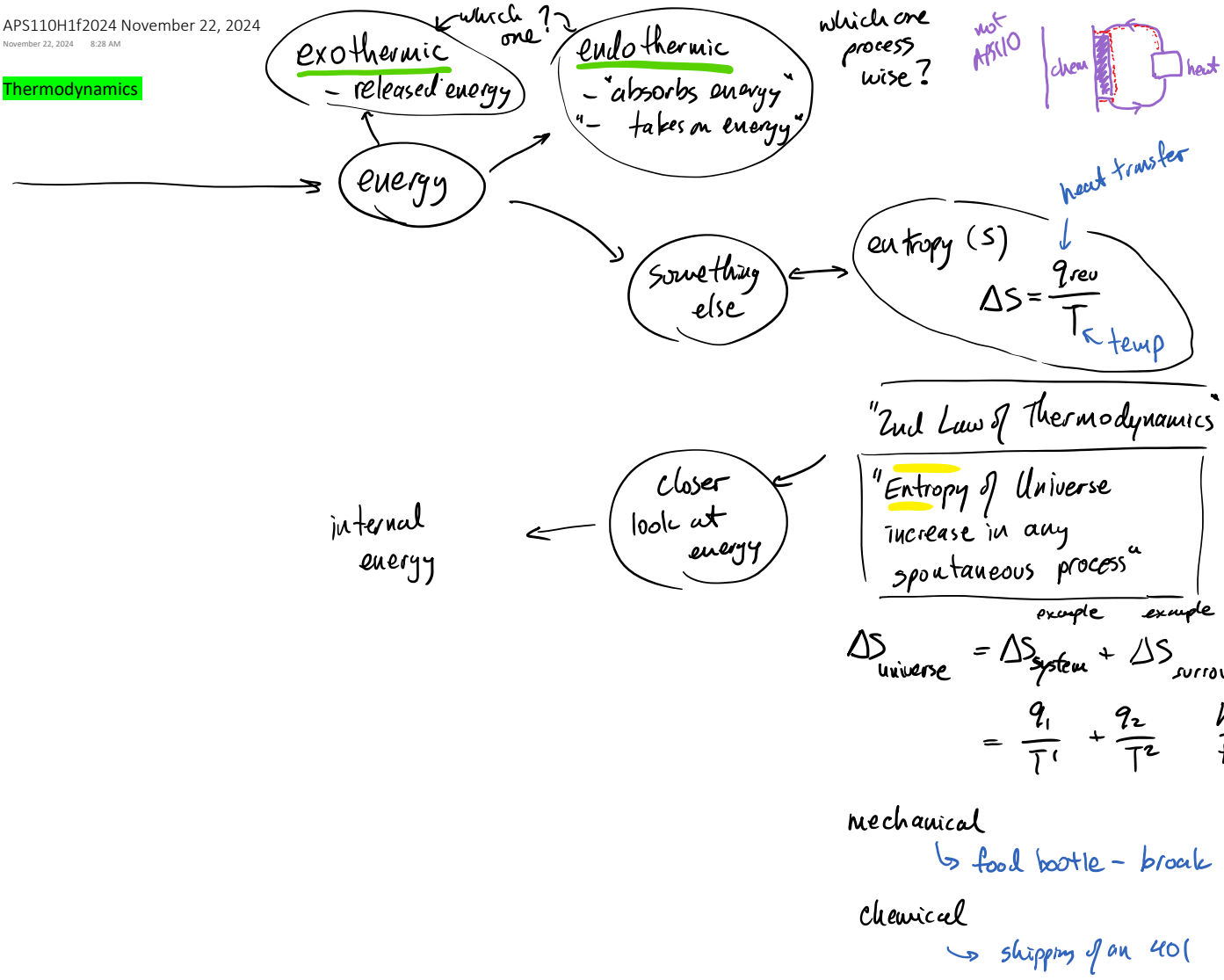
November 20, 2024 7:52 AM



APS110H1f2024 November 22, 2024

November 22, 2024 8:28 AM

Thermodynamics



mechanical

↳ food bottle - break my table

chemical

↳ shipping of an iPod

November 22, 2024 2:39 PM

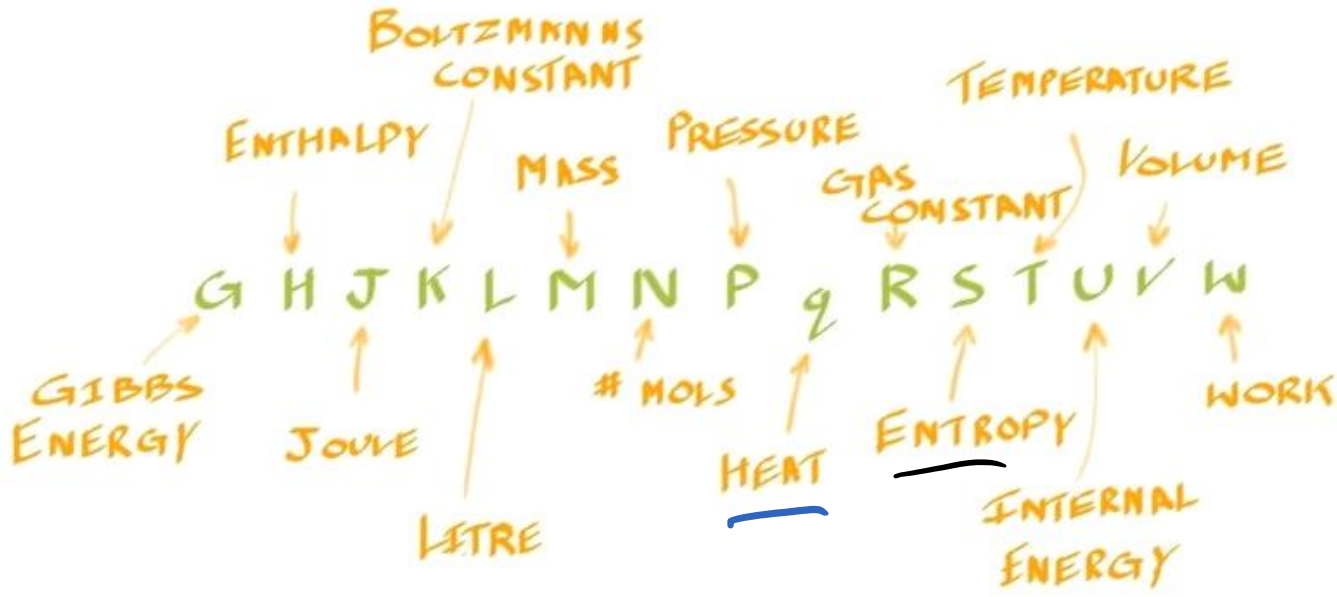


Figure 1. The thermodynamic alphabet.

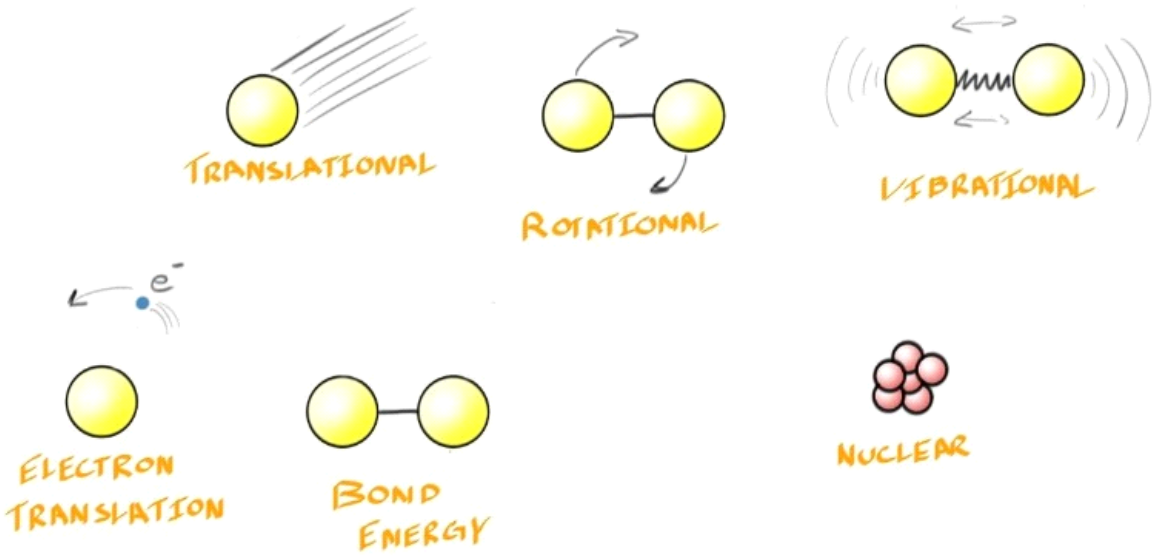
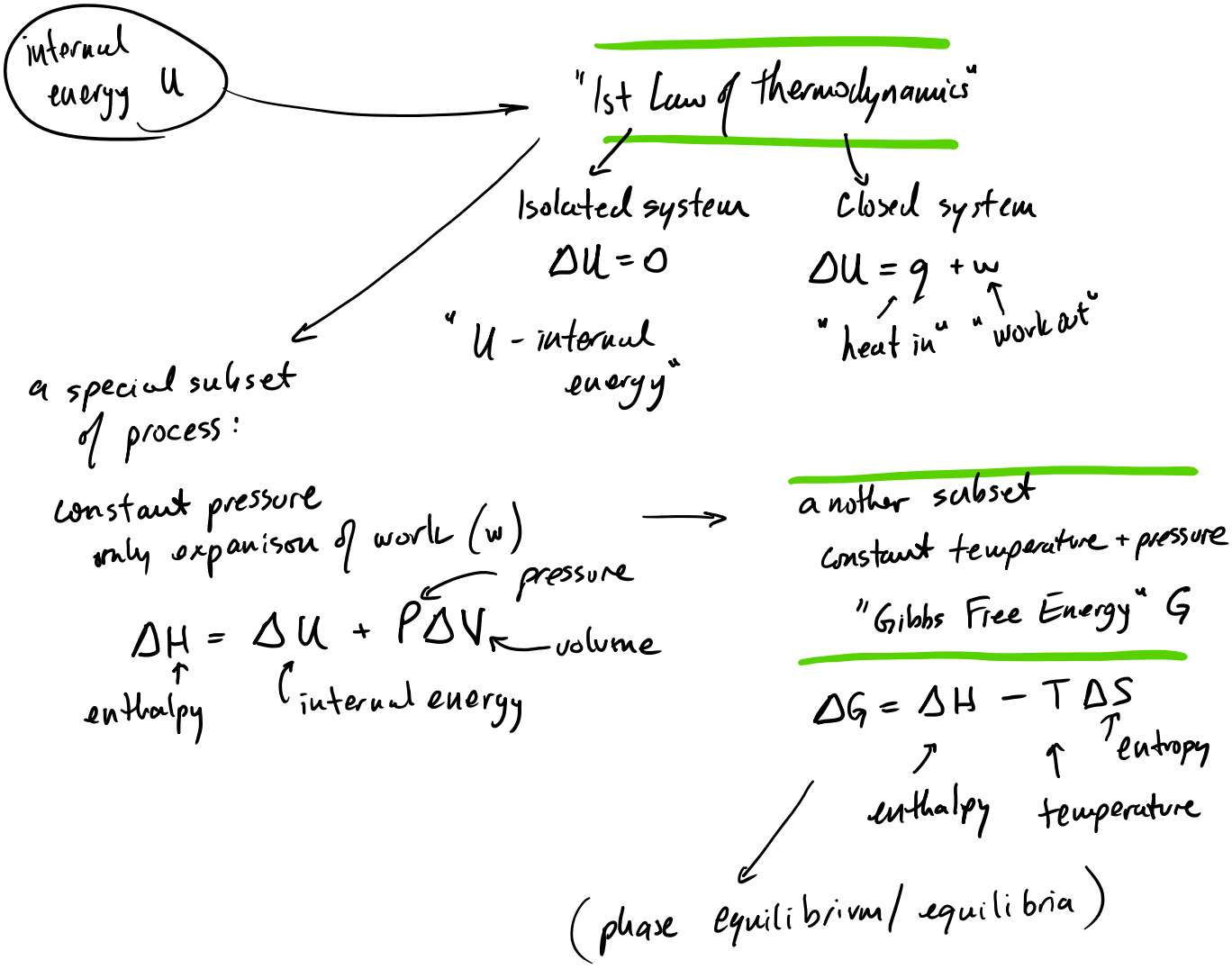


Figure 3. Some of the potential forms of energy contributing to the internal energy. Don't let this intimidate you; we don't need to calculate each of these, and we don't really care especially about the specific nature of the internal energy. We only concern ourselves with changes to the internal energy.

APS110H1f2024 November 25, 2024

November 25, 2024 9:01 AM

Thermodynamics



November 22, 2024 2:39 PM

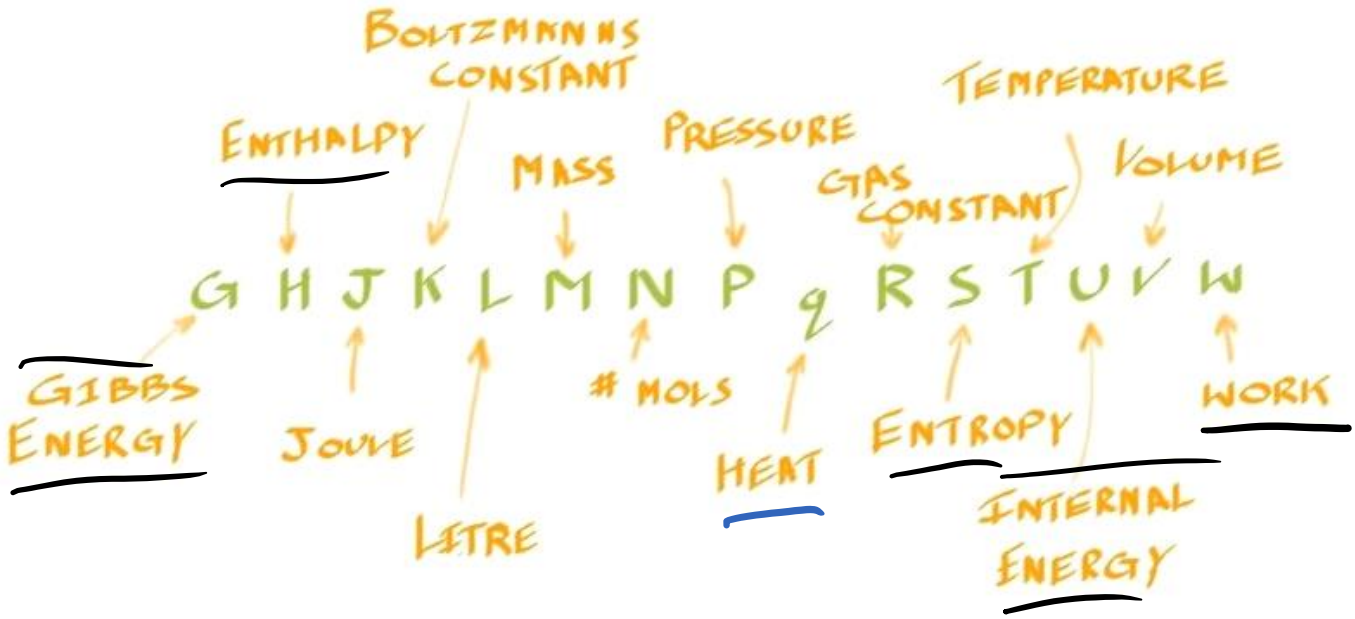
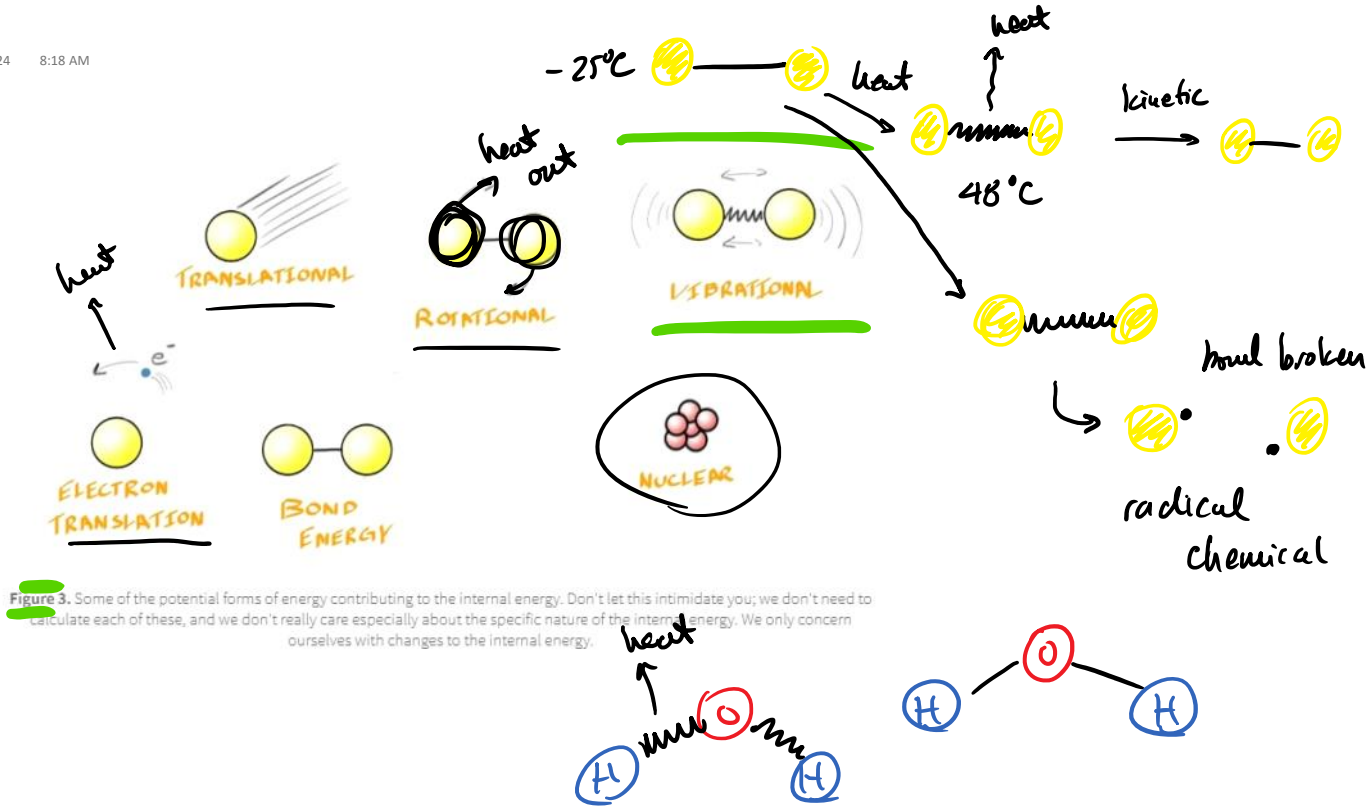


Figure 1. The thermodynamic alphabet.

November 20, 2024 8:18 AM



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November 25, 2024 9:13 AM

Note: 53 C shall be/should have been at the midpoint of 0-100 C - but was just to outline the difference of different chemicals - Figure 5 is of water...

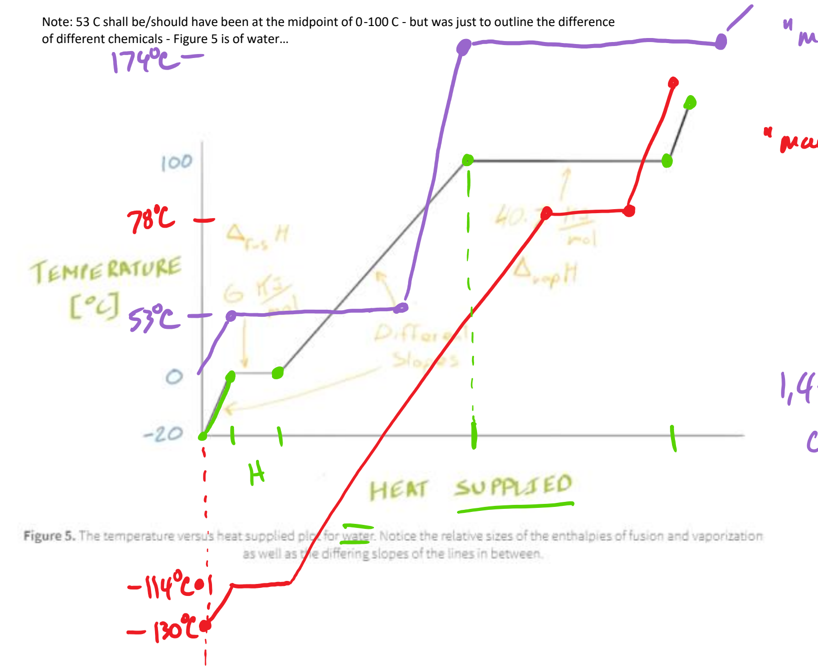
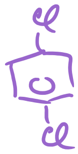


Figure 5. The temperature versus heat supplied plot for water. Notice the relative sizes of the enthalpies of fusion and vaporization as well as the differing slopes of the lines in between.



1,4-dichlorobenzene
chemical solvent

$$\text{slope} = \frac{\Delta T}{q} \quad \begin{matrix}\text{temperature} \\ \text{heat}\end{matrix}$$

$$q = \frac{1}{\text{slope}} \Delta T$$

$$q = n\, C_p\, \Delta T$$

- ΔT ← temperature
- n ← #mol
- C_p ← molar heat capacity - constant pressure

$$q = m\, c\, \Delta T$$

- ΔT ← temp.
- m ← mass
- c ← specific heat

APS110H1f2024 November 27, 2024

November 25, 2024 9:36 AM

Thermodynamics

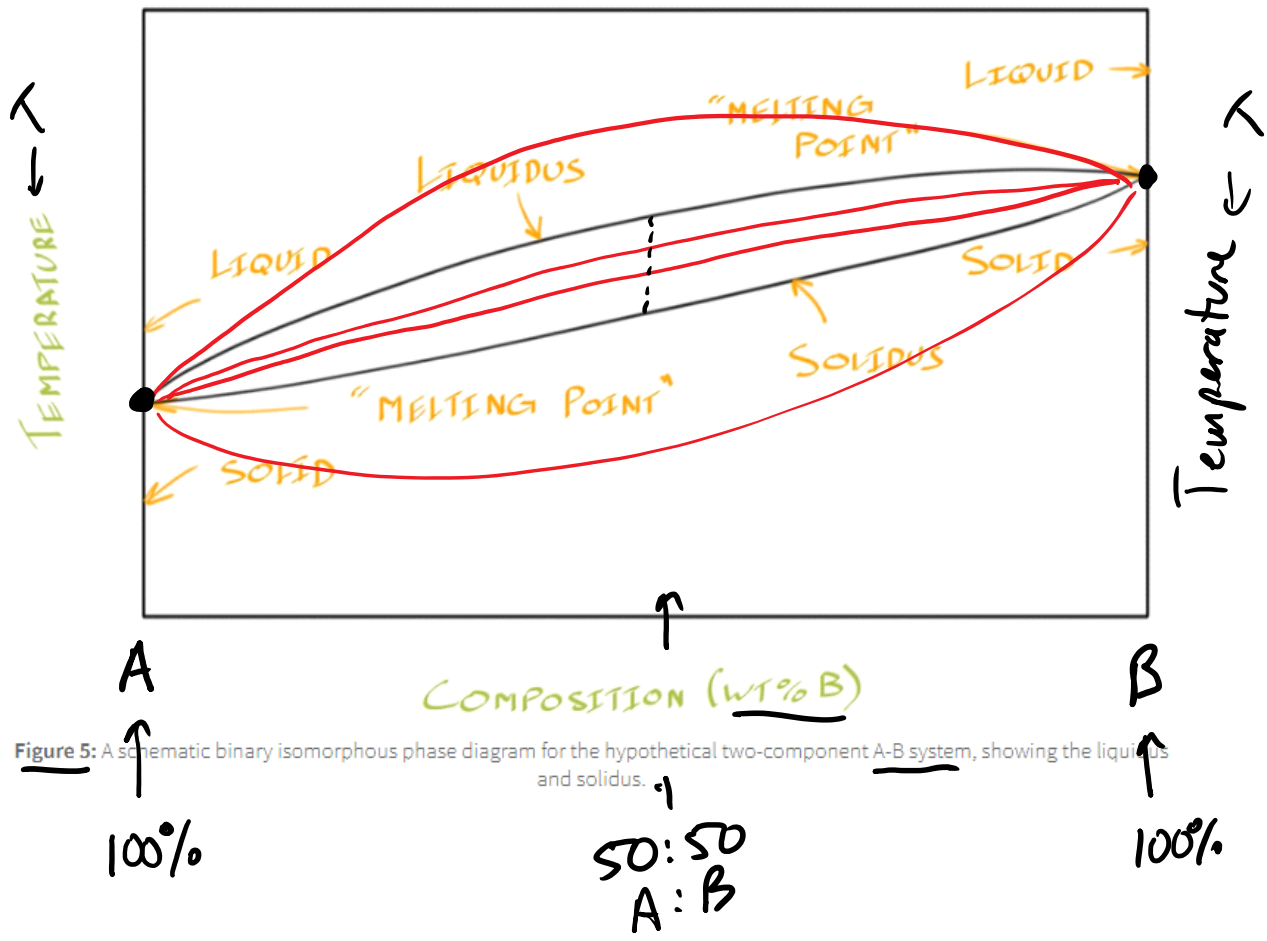


Figure 5: A schematic binary isomorphous phase diagram for the hypothetical two-component A-B system, showing the liquidus and solidus.

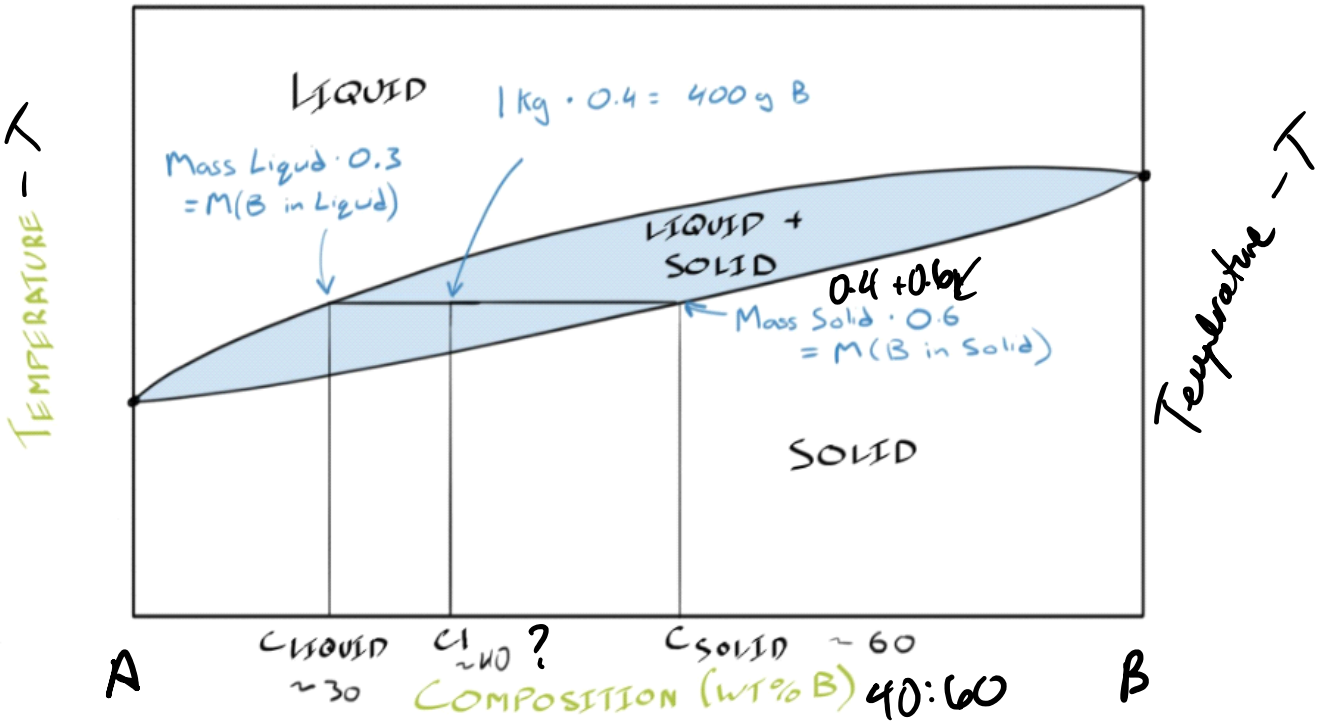


Figure 11: A 1 kg sample having a composition of 40 wt% B contains 400 grams of component B, separated into a mass of B in the liquid, M(B in Liq) and a mass of B in the solid, M(B in Solid).