5/22/14

? KMT Kinetic Molecular Theory – constant motion

↑T then motion ↑ ↓T motion ↓ (direct relationship)

Phases of Matter

Solid – locked into position – intermolecular forces are strong

Liquid – movement, restrained – intermolecular forces med-strong

Gas – constant movement – intermolecular forces are weak
Unrestricted

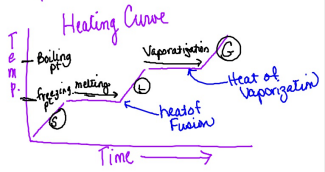
To change phase energy (heat) must be added to
break the strength of the intermolecular forces.

Intermolecular Forces

Weak: London (VanDer Waals) dispersion forces
Temporary based on movement of e⁻ (on/off)

moderate: dipole (permanent +/−)

Strongest: hydrogen bond H w/ NOF



Plateaus

Energy = $H_{f\,fusion}$ × mass

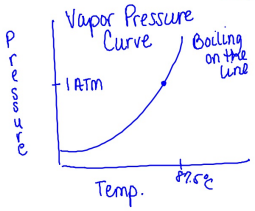
Energy = $H_{vaporization}$ × mass

(watch to see if moles so check labels!)

ΔT

Energy = (mass)(ΔT)(C_p) ← specific heat

$C_{p_{H_2O}} = 1\ cal/g°C$ or $4.184\ J/g°C$

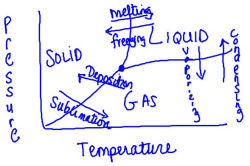


Standard Pressures

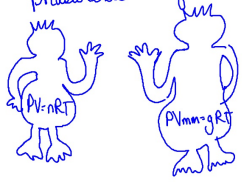
1 ATM 101.3 kPa 760 mmHg

normal boiling point is measured at standard pressure

phase diagram



Triple point – where all 3 phases exist in equilibrium



Gas Laws

↑T ↑V
↓T ↓V
> direct relationship $\frac{V_1}{T_1} = \frac{V_2}{T_2}$

↑P ↓V
↓P ↑V
inverse relationship $P_1V_1 = P_2V_2$

Combined gas Law $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$

Ideal Gas Law

$PV = nRT$ (mole) $\quad PV_{mm} = gRT$ (gram)

Dalton Partial Pressures:

$P_{TOTAL} = P_1 + P_2 + P_3 + \ldots$

Half life

Time required for half the material to decay.

whole amt	Time 0
54g	0 mil.
27g	3 mil.
13.5	6
6.75	9
3.375g	12

C-13 has ½ life of 3 million years. if we begin w/ 54g of C-13 how much is left after 12 million years.

alpha $^{4}_{2}\alpha$ β $^{0}_{-1}\beta$

$^{13}_{6}C \longrightarrow {}^{4}_{2}\alpha + {}^{9}_{4}Be$

$^{9}_{4}Be \longrightarrow {}^{0}_{-1}\beta + {}^{9}_{5}B$