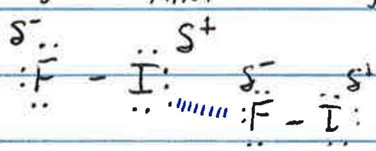
Today: ch 11 review
Friday: ch 11 review
Sunday: problem club with Ali
Monday: Review for CK4
Tuesday: Expt 13, problem club with Ali
Wednesday: CK4

Intermolecular forces

dipole-dipole

3-4 kJ/mol

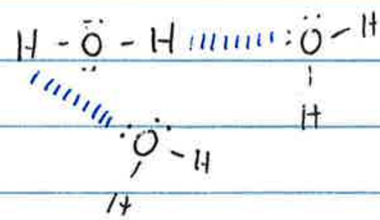
1) lewis dot structure → are there E groups?
yes: dipole-dipole   no: probably not dipole-dipole



H-bonding (special dipole-dipole)

10-40 kJ/mol

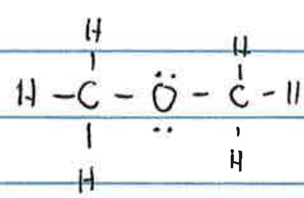
H - Ö - ?



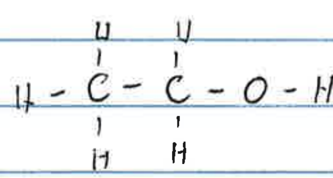
H - N - ?
?

H - F

C_2H_6O



or



dipole-dipole only

H-bonding
· much higher boiling point

london dispersion force

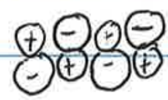
- 1-10 kJ/mol
- all molecules have them
- LDF $\propto$ MM

F_2 (g), Cl_2 (g) } only LDF
Br_2 (l), I_2 (s)

as MM increases LDF increases ↓

* all covalents with MM > 250 g/mol are solids at room temp.

Ionic substances



~1000 kJ/mol +

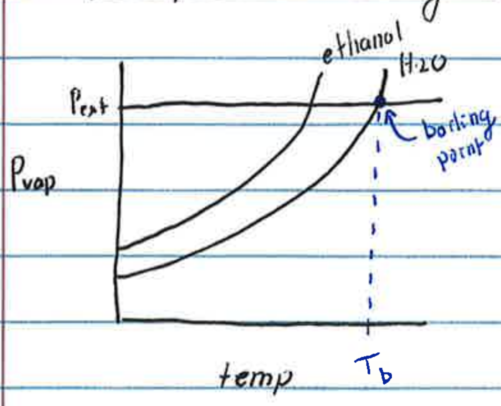
- all ionics are solids at room temp

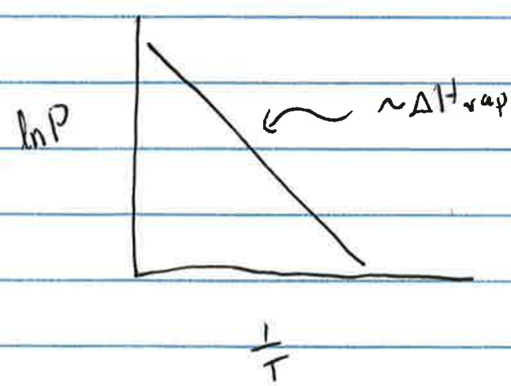
covalent bonds

~325 kJ/mol

C - H

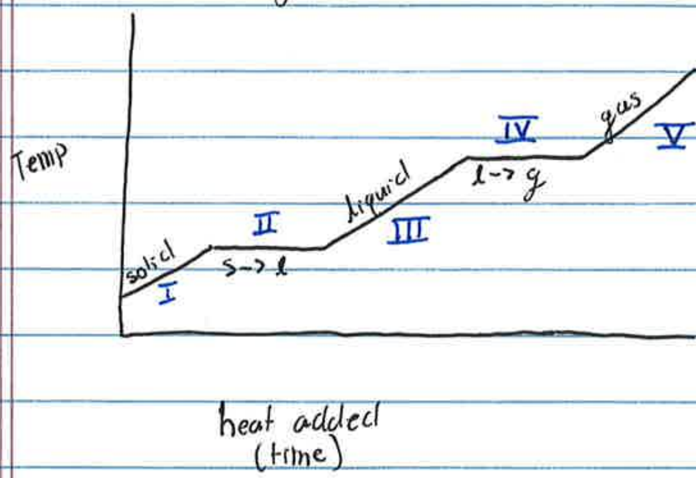
Vapor pressure diagrams





$\Delta H_{vap}(H_2O) = 40.67$ kJ/mol

"heating curve"



I. $q = SH * m * \Delta T$ (SH = specific heat) (m of solution)

$q = C_m * n * \Delta T$ (s) (Cm = molar specific heat capacity)

$(J) = \left(\frac{J}{mol \cdot deg}\right)(mol)(deg)$

- Cm is different for s, l, g of same molecule ($H_2O_{(s)}$, $H_2O_{(l)}$, $H_2O_{(g)}$)

III $q = C_m * n * \Delta T$ (l)

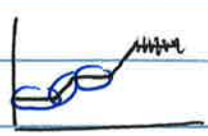
V $q = C_m * n * \Delta T$ (g)

II $q = \Delta H_{fus} * n$

IV $q = \Delta H_{vap} * n$

*all q values are positive when adding heat

example problem: what regions would you need to calculate the heat transferred when H_2O is raised in temp from -10°C to +50°C?



I, II, III

- if you have 400g H_2O calculate heat transferred.

$$\frac{400g\ H_2O \mid mol}{\mid 18.02g} = 22.2\ mol$$

$q_I = (36.7\ J/mol \cdot k)(22.2\ mol)(0° - (-10°)) = 8147.4\ J = 8.147\ kJ$

$q_{II} = (6.01\ kJ/mol)(22.2\ mol) = 133.4\ kJ$

$q_{III} = (75.4\ J/mol \cdot k)(22.2\ mol)(50° - 0°) = 83.7\ kJ$

$q_{tot} = 225.2\ kJ$