

Test #1

partial pressures

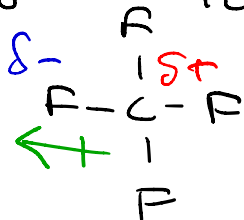
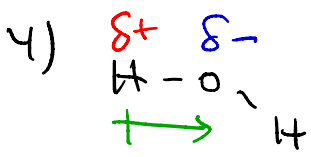
1a)  $P_T = P_{H_2O} + P_{Eth}$

$1.25 = 0.50 + P_{Eth}$

$P_{Eth} = 0.75$   
atm

b) IMF may cause the total pressure to be lower than expected, which may mean the individual pressures are themselves higher,

3)  $\frac{r_{H_2O}}{r_{Eth}} = \sqrt{\frac{M_{Eth}}{M_{H_2O}}} = \sqrt{\frac{46}{18}} = 1.60$

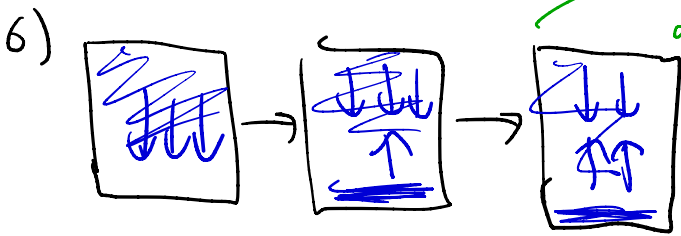


asymmetric polar

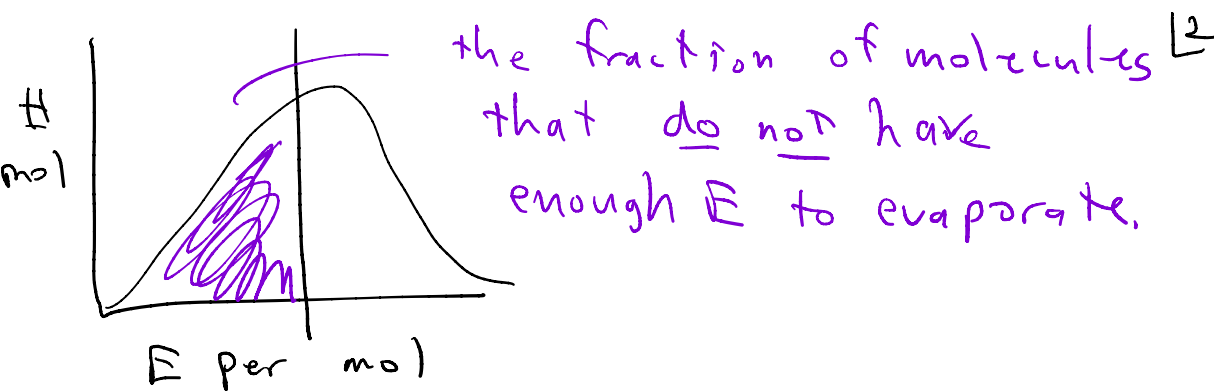
symmetric non-polar



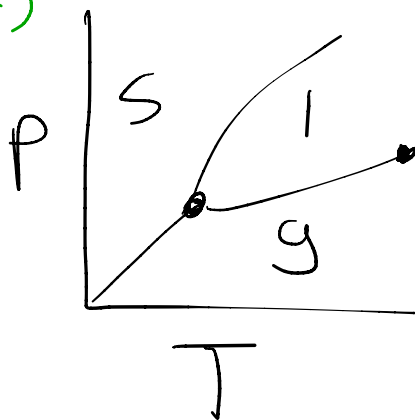
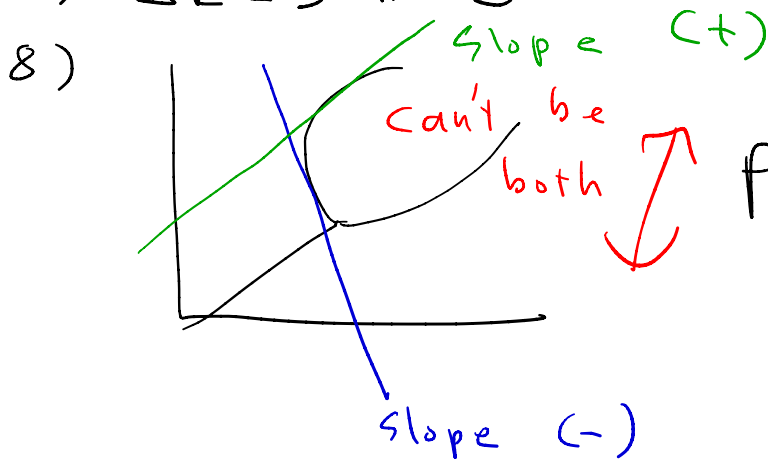
polarizability



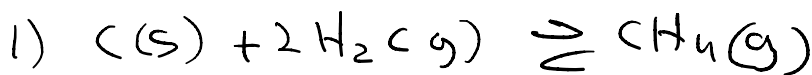
these diagrams demonstrate why equilibrium occurs, but not evaporation or condensation



7)  $\Delta E = S \cdot m \cdot \Delta T$



## Test #2



$K_p = \frac{P_{CH_4}}{(P_{H_2})^2}$  — carbon (solid) not included

$K_p = 0,262$

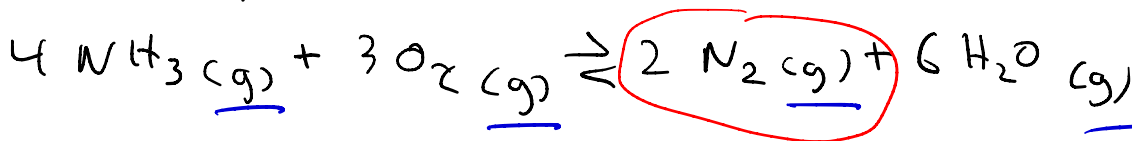
$0,262 = \frac{P_{CH_4}}{(1,22)^2} \Rightarrow P_{CH_4} = 0,39 \text{ atm}$

2)  $\text{NH}_3$  0,015 mol       $\text{O}_2$  0,015 mol      [3]

→ 1L container

@ equilibrium  $[\text{N}_2] = 1,96 \times 10^{-3}$

$K_c$ ?



I    0,015      0,015      0      0

C    -4x      -3x      2x      6x

E    0,015-4x    0,015-3x    2x      6x

$$2x = 1,96 \times 10^{-3} \quad (\text{given})$$

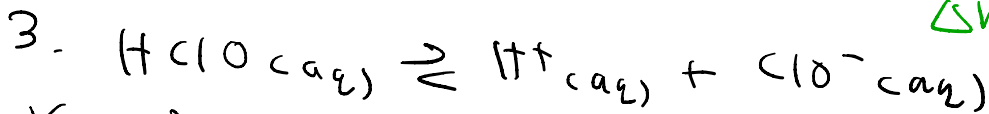
0,01108    0,01206      0,00196    0,00588

$$K_c = \frac{[\text{N}_2]^2 [\text{H}_2\text{O}]^6}{[\text{NH}_3]^4 [\text{O}_2]^3} = \frac{(0,00196)^2 (0,00588)^6}{(0,01108)^4 (0,01206)^3}$$

$$= 6,0 \times 10^{-6}$$

$$K_p = K_c (RT)^{\Delta n}$$

$\Delta n = 1$



$K_a = 2,95 \times 10^{-8} \ll 1 \rightarrow$  weak acid

I    0,20M      0      0

C    -x      +x      +x

E    0,20 - x    x      x

$$x \ll 0,20$$

$$K_a = \frac{[H^+][A^-]}{[HA]} = \frac{(x)(x)}{.2} = 2.95 \times 10^{-8} \quad [4]$$

$$x^2 = (.2)(2.95 \times 10^{-8}) = 5.9 \times 10^{-9}$$

$$x = [H^+] = 7.68 \times 10^{-5}$$

$$pH = -\log_{10} [7.68 \times 10^{-5}] = 4.11$$

