

Wednesday, May 8, 2019

Start Unit 13...

EQUILIBRIUM & K_{eq} NOTES

REVERSIBLE REACTION: reaction where the reactants form the products, then the products re-form the reactants

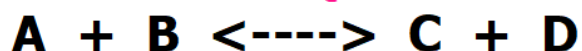
* can proceed in **either direction**

* represented by $\langle \text{-----} \rangle \rightleftharpoons$
(**"double arrow"**)

Reactions that are NOT reversible:

- reactions that produce a precipitate (solid formed from 2 aqueous solutions)
- combustion

GENERALIZED EQUILIBRIUM RXN:



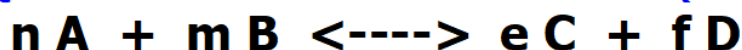
• $A + B \rightarrow C + D$ **"forward"** rxn

• $C + D \rightarrow A + B$ **"reverse"** rxn

CHEMICAL EQUILIBRIUM:

- occurs when **the rate of the forward reaction is equal to the rate of the reverse reaction; appears like nothing is happening**
concentration of the products and reactants remain unchanged

EQUILIBRIUM CONSTANT EXPRESSION (K_{eq})



lowercase letters (n, m, e, f) = **coefficients**

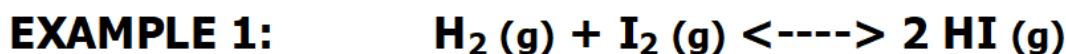
CAPITAL LETTERS (A, B, C, D) = **substances**

$$K_{eq} = \frac{[C]^e [D]^f}{[A]^n [B]^m} \quad * [] \text{ means } \\ \text{"concentration of"}$$

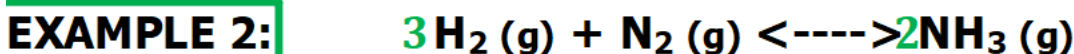
$$K_{eq} = \frac{\text{[right] side}}{\text{[left] side}}$$

EXTRA K_{eq} NOTE:

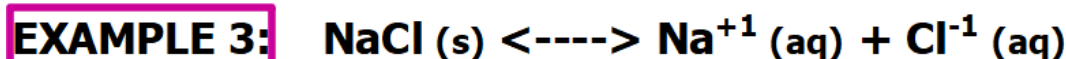
Do NOT include (s) or (l) in K_{eq} expressions – (aq) and (g) only!



$$K_{eq} = \frac{[HI]^2}{[H_2][I_2]}$$



$$\frac{[NH_3]^2}{[H_2]^3 [N_2]}$$

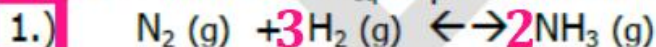


$$K_{eq} = [Na^{+1}][Cl^{-1}]$$

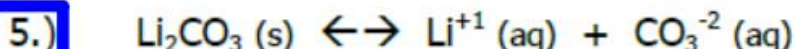
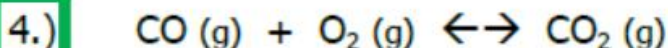
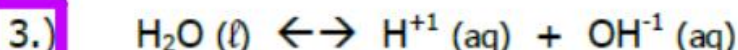
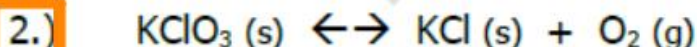
do not include solids or liquids

EQUILIBRIUM CONSTANT WORKSHEET

Part 1 – Write the K_{eq} expressions for the reactions below. NOTE: Equa



$$\frac{[NH_3]^2}{[N_2][H_2]^3}$$



Use the K_{eq} expressions written above to determine the value conditions.

1.) $[N_2] = 0.0200 \text{ M}, [H_2] = 0.0200 \text{ M}, [NH_3] = 0.0100 \text{ M}$

2.) $[O_2] = 0.0500 \text{ M}$

3.) $[H^{+1}] = 1 \times 10^{-8} \text{ M}, [OH^{-1}] = 1 \times 10^{-6} \text{ M}$

4.) $[CO] = 2.0 \text{ M}, [O_2] = 1.5 \text{ M}, [CO_2] = 3.0 \text{ M}$

5.) $[Li^{+1}] = 0.2 \text{ M}, [CO_3^{-2}] = 0.1 \text{ M}$

$$\frac{[NH_3]^2}{[N_2][H_2]^3} \quad K_{eq} = 625$$

LAB: Solubility (paper given in class)

HOMEWORK:

→ Finish K_{eq} wksht from above (with unit 13 materials)

→ Finish lab equations and calculations.