CHM 2046 **Worksheet 1**

1. A reaction Forming a "Complex ion."

$$Fe^{+3}(aq) + SCN^{-}(aq) \leftrightarrow Fe(SCN)^{+2}(aq)$$

Without performing calculations, we want to determine which reactant is limiting. We shall "divide and test" to see which reactant, when added, will produce more products.
Experimental Result:

2. Writing Equilibrium Constant Expressions.

- In general, for **Reactants ↔ Products,**
- For **A + 2 B ↔ 3 C + 4 D,**

3. The Units of Concentration used in K Expressions:

State or Phase	Symbol	Property Type and Units Used
Gases	(g)	
Solutes in solution	(aq)	
Solvent, other liquids	(l)	
Solids	(s)	

4. Write out K expressions for each reaction. Use the proper term for each R and P.

$Fe^{+3}(aq) + SCN^{-}(aq) \leftrightarrow Fe(SCN)^{+2}(aq)$

$2\ ICl(g) \leftrightarrow I_2(g) + Cl_2(g)$

$2\ ICl(g) \leftrightarrow I_2(s) + Cl_2(g)$

$CaCO_3(s) \leftrightarrow CaO(s) + CO_2(g)$

$Mg(OH)_2 \leftrightarrow Mg^{+2}(aq) + 2\ OH^{-}(aq)$

$2\ H_3O^{+}(aq) + Ag_2S(s) \leftrightarrow 2\ Ag^{+}(aq) + H_2S(g) + 2\ H_2O(\ell)$

Notes: - It is concentration (not the amount in moles) that determines reaction rates and the dynamic equilibrium state.

-The number value of K depends on the particular reaction, the units of concentration used (Kp or Kc) and the temperature.

-Usually the units of K are omitted.

5. The following equilibrium data (all at 30.°C) are available for this reaction:

$$\mathbf{N_2O_4(g) \leftrightarrow 2\ NO_2(g)}$$

Experiment	$P_{N_2O_4}$	P_{NO_2}	Kp
1	0.723 atm	0.393 atm	_____
2	0.184 atm	0.197 atm	_____
3	_____	0.250 atm	_____
4	0.500 atm	_____	_____

(a) Write out the K expression for this reaction:

(b) Calculate the value for Kp for Experiments 1 and 2. What important point is illustrated by these two results?

(c) Find the missing entries for Experiments 3 & 4