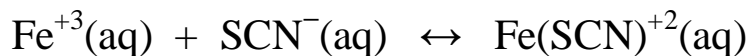


**1. A reaction Forming a “Complex ion.”**

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:

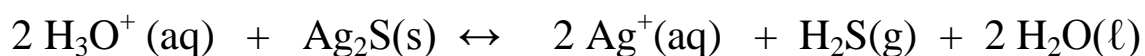
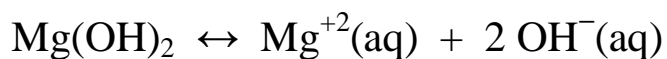
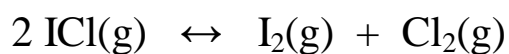
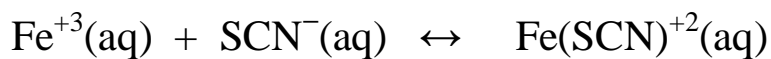
**2. Writing Equilibrium Constant Expressions.**

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

**3. The Units of Concentration used in K Expressions:**

<u>State or Phase</u>	<u>Symbol</u>	<u>Property Type and Units Used</u>
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.

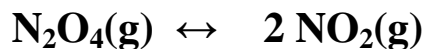


Notes: - It is concentration (not the amount in moles) that determines reaction rates and the dynamic equilibrium state.

-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:



Experiment	$P_{\text{N}_2\text{O}_4}$	$P_{\text{NO}_2}$	$K_p$
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  $K_p$  for Experiments 1 and 2. What important point is illustrated by these two results?

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