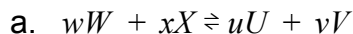
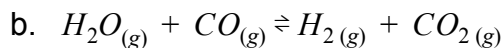


Equilibrium Constant - Worksheet 1

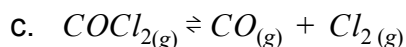
1. Write the equilibrium expression for the following reactions:



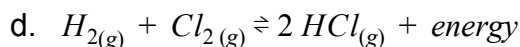
$$K = \frac{[U]^u [V]^v}{[W]^w [X]^x}$$



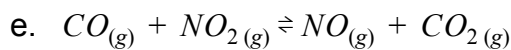
$$K = \frac{[H_2][CO_2]}{[H_2O][CO]}$$



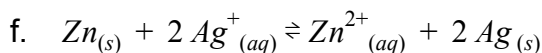
$$K = \frac{[Cl_2][CO]}{[COCl_2]}$$



$$K = \frac{[HCl]^2}{[H_2][Cl_2]}$$

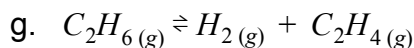


$$K = \frac{[NO][CO_2]}{[NO_2][CO]}$$



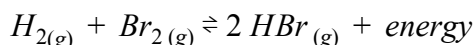
$$K = \frac{[Zn^{2+}]}{[Ag^+]^2}$$

*Note: solids are not included



$$K = \frac{[H_2][C_2H_4]}{[C_2H_6]}$$

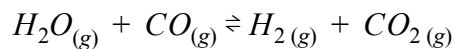
2. Consider the following equilibrium reaction:



The K_{eq} for this reaction at 25°C is 1.02. At equilibrium the concentration of HBr is 0.50 mol/L. Assuming H_2 and Br_2 are present in equal amounts, calculate the concentration of H_2 at equilibrium.

$$[H_2] = 0.50 \text{ mol/L}$$

3. Analysis of the following equilibrium reaction at 900°C provides the concentrations listed below:



Experiment	[H ₂ O]	[CO]	[H ₂]	[CO ₂]
1	0.352	0.352	0.148	0.648
2	0.266	0.266	0.234	0.234
3	0.686	0.186	0.314	0.314

Write the equilibrium expression for the reaction and calculate the value of the equilibrium constant for each experiment.

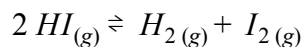
$$K = \frac{[H_2][CO_2]}{[H_2O][CO]}$$

Expt 1: $K = 0.774$

Expt 2: $K = 0.774$

Expt 3: $K = 0.773$

4. In the following reaction at 448°C, the equilibrium concentrations are HI = 0.0040M, H₂ = 0.0075M, I₂ = 0.000043M. Calculate the equilibrium constant given the reaction below:



$K = 0.020$

5. If the temperature of an exothermic reaction at equilibrium is lowered, is the value of K_{eq} increased or decreased?

K will increase if the temperature at equilibrium is lowered.