

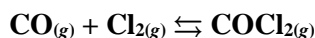
Unit A – Chapter 15

Chemical Equilibrium Extra Exercises

Section 15.1

1. For each of the following, write the chemical reaction equation with appropriate equilibrium arrows.
- (a) pH measurements indicate that acetic acid in vinegar is approximately 1% ionized into hydrogen ions and acetate ions.
- (b) Quantitative analysis of the reaction of sodium sulfate and calcium chloride solutions shows that the products are favoured.
- (c) Aluminium sulfate solution reacts quantitatively with a sodium hydroxide solution.

2. Chlorine and carbon monoxide gases are mixed in a 1.00 L container and the following equilibrium is established.



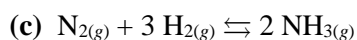
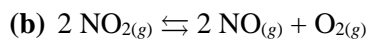
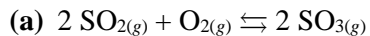
Initially, 1.50 mol of chlorine was present with 2.55 mol of carbon monoxide. At equilibrium, 0.80 mol of $\text{COCl}_{2(g)}$ was found.

- (a) Create an ICE table and calculate the percent reaction of chlorine.

Concentration	[] (mol/L)	[] (mol/L)	[] (mol/L)
<i>Initial</i>			
<i>Change</i>			
<i>Equilibrium</i>			

- (b) Write the equilibrium law for this reaction.
- (c) At equilibrium, 1.75 mol of carbon monoxide and 0.70 mol of chlorine were present. Calculate the equilibrium constant.

3. Write the equilibrium law for each of the following chemical reaction equations.



4. In an experiment at a high temperature, 0.500 mol/L of hydrogen bromide gas is placed into a sealed container and decomposes into hydrogen and bromine gases.

(a) Write the equilibrium equation and law for this reaction.

(b) The equilibrium concentration for $\text{Br}_{2(g)}$ in this system is found from calorimetry to be 0.130 mol/L. Use an ICE table to help calculate the equilibrium constant.

Concentration	[] (mol/L)	[] (mol/L)	[] (mol/L)
<i>Initial</i>			
<i>Change</i>			
<i>Equilibrium</i>			