Non Sibi High School

Andover's Chem 250: Introductory/Basic Chemistry
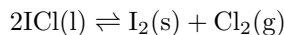
Chapter 15, Review Quiz 1

1

a. Write the K_c and K_p expressions for the reaction $\frac{1}{2}I_2(s) + \frac{1}{2}Cl_2(g) \rightleftharpoons ICl(l)$.

b. If $K_c = 1.19 \times 10^3$ for this reaction, calculate the equilibrium molarity of chlorine gas.

2

For the reaction $\frac{1}{2}I_2(s) + \frac{1}{2}Cl_2(g) \rightleftharpoons ICl(l)$, the value of $K_p = 241$. Calculate the value of K_p for the following reaction:

$$2ICl(l) \rightleftharpoons I_2(s) + Cl_2(g)$$

3

a. Write the K_c expression for the reaction $2Cr(s) + 3Ge^{4+}(aq) \rightleftharpoons 2Cr^{3+}(aq) + 3Ge^{2+}(aq)$.

b. Solid chromium metal is added to a solution containing the initial concentrations 0.30 M Ge^{4+}, 0.86 M Cr^{3+}, and 0.73 M Ge^{2+}. When equilibrium is reached, the molarity of Cr^{3+} is found to be 0.68 M. Calculate the equilibrium molarity of Ge^{2+} and Ge^{4+} as well as K_c for the reaction.

4

For the reaction $2CO(g) + O_2(g) \rightleftharpoons 2CO_2(g)$, $K_p = 7.7$. If a mixture initially contains 0.79 atm CO, 0.67 atm O_2, and 0.21 atm CO_2, calculate the equilibrium pressure of each gas and the total pressure at equilibrium.

5

a. Write the K_p expression for the decomposition of liquid bromine trifluoride to form bromine gas and fluorine gas:

$$2BrF_3(l) \rightleftharpoons Br_2(g) + 3F_2(g)$$

b. After a 0.85 gram sample of liquid bromine trifluoride was placed in a 225 mL container and heated to 75°C, the equilibrium pressure of fluorine gas was found to be 0.51 atm. Calculate the equilibrium pressure of bromine gas, K_p for this reaction, and the total pressure at equilibrium.

c. Calculate the mass of liquid bromine trifluoride present at equilibrium.

6

Consider the reaction:

$$2K(s) + Cl_2(g) + 3O_2(g) \rightleftharpoons 2KClO_3(s) \quad \Delta H < 0$$
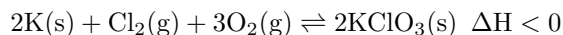
a. State whether the amount of chlorine gas present at equilibrium will increase, decrease, or remain unchanged when each of the following occurs:

    i. Helium gas is added at constant volume.
    ii. Oxygen gas is removed.
    iii. The volume of the container is decreased.
    iv. The temperature is increased.
    v. A catalyst is added.
    vi. Solid potassium metal is added.

b. Of the changes above, which will change the value of K_c and K_p, and will K_c and K_p increase or decrease?