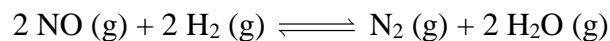


REVIEW QUESTIONS

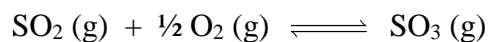
Chapter 15

1. A mixture of 0.10 mol of NO, 0.050 mol of H₂ and 0.10 mol of H₂O is placed in a 1.0-L flask and allowed to reach equilibrium as shown below:

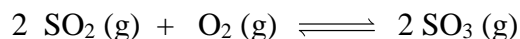


At equilibrium [NO] = 0.062 M. Calculate the equilibrium constant, K_c, for this reaction.

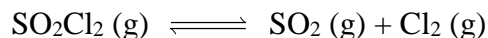
2. At 700°C, K_c = 20.4 for the reaction shown below:



Calculate K_c and K_P for the reaction shown below:

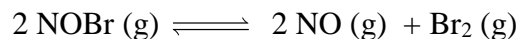


3. At 100°C, K_c = 0.078 for the following reaction:



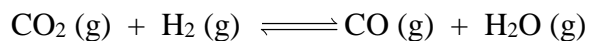
In an equilibrium mixture, [SO₂Cl₂] = 0.136 M and [SO₂] = 0.072 M. What is the concentration of Cl₂ in the equilibrium mixture?

4. At 373 K, $K_p = 0.416$ for the equilibrium:



If the partial pressures of NOBr and NO are equal at equilibrium, what is the partial pressure of Br_2 ?

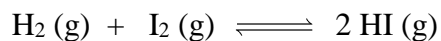
5. A mixture of 0.100 mol CO_2 , 0.0500 mol H_2 and 0.100 mol H_2O are placed in a 1.00-L flask and allowed to come to equilibrium as shown below. At equilibrium $[\text{CO}_2] = 0.0954 \text{ M}$.



- a) What are the equilibrium concentrations of H_2 , CO and H_2O ?

- b) Calculate K_c and K_p for this reaction at 25.0°C .

6. When 2.00 mol each of hydrogen and iodine are mixed in a 1.00-L flask, 3.50 mol of HI is produced at equilibrium:



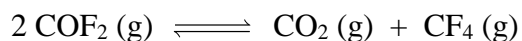
Calculate the equilibrium constant K_c for this reaction.

7. The equilibrium constant for the reaction



has a numerical value of 3.00 at a given temperature. 1.50 mol each of SO_2 and NO_2 are mixed in a 1.00-L flask and allowed to reach equilibrium. What percent of SO_2 is converted to product?

8. The following equilibrium exists at 1000 °C with $K_c = 2.00$.

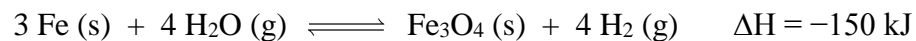


If a 5.00-L mixture contains 0.145 mol COF_2 , 0.262 mol of CO_2 and 0.074 mol of CF_4 at 1000 °C, in which direction will the mixture proceed to reach equilibrium?

9. A 0.831-g sample of SO_3 is placed in a 1.00-L flask and heated to 1100 K. The SO_3 decomposes to SO_2 and O_2 , as shown below. At equilibrium, the total pressure in the container is 1.300 atm. Find the values of K_p and K_c for this reaction at 1100 K.



10. Predict how each of the following changes affect the amount of H₂ present in an equilibrium mixture in the reaction



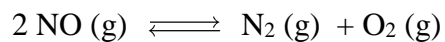
- a) Raising the temperature of the mixture.

- b) Adding more H₂O (g).

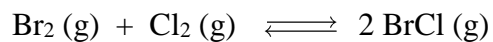
- c) Doubling the volume of the container holding the mixture.

- d) Adding a catalyst.

11. At 2000 °C the equilibrium constant for the reaction below is $K_c = 2.4 \times 10^3$. If the initial concentration of NO is 0.500 M, what are the equilibrium concentrations of each substance?



12. The reaction below has an equilibrium constant $K_c = 6.90$. If 0.100 mol of BrCl is placed in a 500-mL flask and allowed to come to equilibrium, what are the equilibrium concentrations of each substance?



13. An equilibrium mixture of H_2 , I_2 , and HI at 458°C contains $2.24 \times 10^{-2} \text{ M H}_2$, $2.24 \times 10^{-2} \text{ M I}_2$ and 0.155 M HI in a 5.00-L flask. What are the equilibrium concentrations when equilibrium is reestablished following the addition of 0.100 mol of HI?