

Workbook



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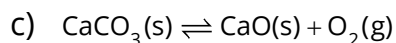
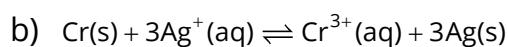
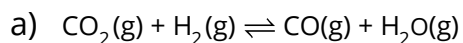
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Chemical Equilibria

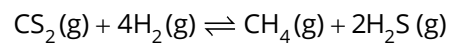
Reactions at Equilibrium

Questions

1) Write the equilibrium constant expression, K_c , for the following reactions:



2) Write the equilibrium constant expressions, K_c and K_p , for the following reaction:



Answer Key

1) a) $K_c = \frac{[\text{CO}][\text{H}_2\text{O}]}{[\text{CO}_2][\text{H}_2]}$

b) $K_c = \frac{[\text{Cr}^{3+}]}{[\text{Ag}^+]}$

c) $K_c = [\text{O}_2]$

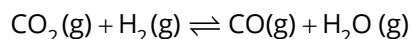
2) a) $K_c = \frac{[\text{CH}_4][\text{H}_2\text{S}]^2}{[\text{CS}_2][\text{H}_2]^4}$

b) $K_p = \frac{(P_{\text{CH}_4})(P_{\text{H}_2\text{S}})^2}{(P_{\text{CS}_2})(P_{\text{H}_2})^4}$

Tools For Equilibrium Calculations

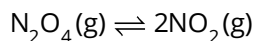
Questions

- 1) Calculate the equilibrium constant, K_p , for the following reaction:



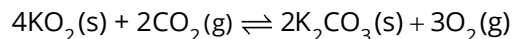
$$K_c = 1.4 \text{ at } 1200 \text{ K}$$

- 2) Calculate the equilibrium constant, K_p , for the following reaction:



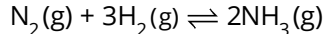
$$K_c = 4.61 \times 10^{-3} \text{ at } 298 \text{ K}$$

- 3) Calculate the equilibrium constant, K_c , for the following reaction:



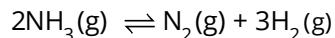
$$K_p = 28.5 \text{ at } 298 \text{ K}$$

- 4) Given the following reaction:

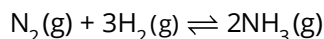


$$K_p = 4.34 \times 10^{-3} \text{ at } 300 \text{ K}$$

What is the value of the equilibrium constant, K_p , for the following reaction?

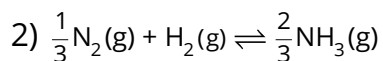
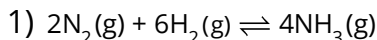


- 5) Given the following reaction:



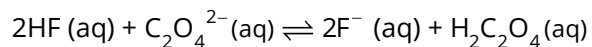
$$K_p = 4.34 \times 10^{-3} \text{ at } 300 \text{ K}$$

What is the value of the equilibrium constant, K_p , for the following reactions?

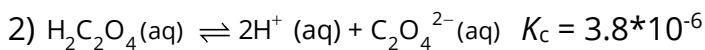
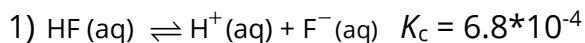


General Chemistry Workbook

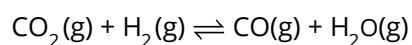
6) What is the value of the equilibrium constant, K_c , for the following reaction?



Given:

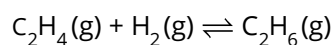


7) Calculate the value of K_c for the following reaction if 0.19 mol CO_2 , 0.1 mol H_2 , 0.0096 mol CO and 0.0096 mol H_2O are present in a 2 L reaction vessel at equilibrium.



8) Calculate the value of K_c for the following reaction if the initial concentration of ethane, $\text{C}_2\text{H}_4(\text{g})$, equals 0.412 M and the initial concentration of $\text{H}_2(\text{g})$ equals 0.632 M.

The concentration of $\text{C}_2\text{H}_6(\text{g})$ at equilibrium equals 0.136 M.



Answer Key

1) $K_p = 1.4$

2) $K_p = 0.114$

3) $K_c = 1.15$

4) $K_p = 230.41$

5) 1) $K_p = 1.89 \times 10^{-5}$

2) $K_p = 0.163$

6) 0.121

7) $K_c = 0.0049$

8) $K_c = 0.99$