

Chemistry Unit 15: Chemical Equilibrium Worksheet**Practice 15.1 Writing Equilibrium Equations**

Write the equilibrium expressions (K_{eq}) for the following reactions

1. $2\text{CO(g)} \leftrightarrow \text{C(s)} + \text{CO}_2\text{(g)}$
2. $\text{N}_2\text{O}_4\text{(g)} \leftrightarrow 2\text{NO}_2\text{(g)}$
3. $2\text{HCl(g)} \leftrightarrow \text{I}_2\text{(g)} + \text{Cl}_2\text{(g)}$
4. $\text{Fe}_2\text{O}_3\text{(s)} + 3\text{H}_2\text{(g)} \leftrightarrow 2\text{Fe(s)} + 3\text{H}_2\text{O(g)}$
5. $2\text{CO(g)} + 4\text{H}_2\text{O(g)} \leftrightarrow 3\text{O}_2\text{(g)} + 2\text{CH}_4\text{(g)}$
6. $\text{P}_4\text{(s)} + 6\text{NO(g)} \leftrightarrow \text{P}_4\text{O}_6\text{(s)} + 3\text{N}_2\text{(g)}$

15.2 Calculating Equilibrium Constants

Be sure to write out the equilibrium (K_{eq}) expression for each problem before trying to solve it!

1. What is the equilibrium expression for the following reaction?
 $\text{SeO}_2\text{(s)} + 2\text{CO(g)} \leftrightarrow \text{Se(s)} + 2\text{CO}_2\text{(g)}$
2. At equilibrium the following concentrations are recorded: 20.0 M of H_2 , 18.0 M of CO_2 , 12.0 M H_2O , and 5.9 M of CO at 427°C. What is the value of K_{eq} at this temperature for the following reaction?
 $\text{CO}_2\text{(g)} + \text{H}_2\text{(g)} \leftrightarrow \text{CO(g)} + \text{H}_2\text{O(g)}$
3. At equilibrium a mixture of N_2 , H_2 , and NH_3 gas at 500°C is determined to consist of 0.602 M N_2 , 0.420 M H_2 , and 0.113 M of NH_3 . What is the equilibrium constant at this temperature? Does this equilibrium favor the reactants or the products?
 $\text{N}_2\text{(g)} + 3\text{H}_2\text{(g)} \leftrightarrow 2\text{NH}_3\text{(g)}$
4. Given the equilibrium concentrations of 0.15 M NO , 0.12 M H_2 and 1.6 M N_2 . Calculate the equilibrium constant for the following reaction. Does this reaction favor the reactants or the products?
 $2\text{NO(g)} + 2\text{H}_2\text{(g)} \leftrightarrow \text{N}_2\text{(g)} + 2\text{H}_2\text{O(l)}$
5. What is the equilibrium constant for the following reaction if the equilibrium concentrations for the gases are 0.3 M for C_2H_6 , 0.6 M for O_2 , 1.3 M for CO_2 and 1.8 M for H_2O ? Does the reaction favor the reactants or products?
 $2\text{C}_2\text{H}_6\text{(g)} + 7\text{O}_2\text{(g)} \leftrightarrow 4\text{CO}_2\text{(g)} + 6\text{H}_2\text{O(g)}$
6. Nitrogen dioxide reacts to form dinitrogen tetraoxide. What is the equilibrium concentration of N_2O_4 if the $K_{eq} = 4.70$ and the equilibrium concentration of NO_2 is 0.0310 M?
 $2\text{NO}_2\text{(g)} \leftrightarrow \text{N}_2\text{O}_4\text{(g)}$

Calculating Equilibrium Constant Chem Worksheet 18 3

Answers

John T. Donoghue



Calculating Equilibrium Constant Chem Worksheet 18 3 Answers:

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Equilibrium Calculations John T. Donoghue, 1971 *Study Guide for Chemical Principles* Thomas Elliott Taylor, 1979 *Chemical Equilibrium* William Guenther, 1975-12 The present work is designed to provide a practical introduction to aqueous equilibrium phenomena for both students and research workers in chemistry biochemistry geochemistry and interdisciplinary environmental fields The pedagogical strategy I have adopted makes heavy use of detailed examples of problem solving from real cases arising both in laboratory research and in the study of systems occurring in nature The procedure starts with mathematically complete equations that will provide valid solutions of equilibrium problems instead of the traditional approach through approximate concentrations and idealized infinite dilution assumptions There is repeated emphasis on the use of corrected conditional equilibrium constants and on the checking of numerical results by substitution in complete equations and or against graphs of species distributions Graphical methods of calculation and display are used extensively because of their value in clarifying equilibria and in leading one quickly to valid numerical approximations The coverage of solution equilibrium phenomena is not however exhaustively comprehensive Rather I have chosen to offer fundamental and rigorous examinations of homogeneous step equilibria and their interactions with solubility and redox equilibria Many examples are worked out in detail to demonstrate the use of equilibrium calculations and diagrams in various fields of

investigation *Study Guide [to Accompany] General Chemistry* James E. Brady, 1982 *Chemical Equilibrium In a Nutshell* Brian Coleman, 2018-06-25 Understanding the math and minutiae of chemical equilibrium can be a tall task for anyone so why not enlist the help of a scientific squirrel to guide you on your journey Join Dr Wash as we dabble in equilibrium constants and other tools needed to predict chemical processes This book focuses on introductory concepts at the high school and early university level focusing on identifying equilibrium calculating K and Q discussing Le Chatelier's principle and tying equilibrium with the field of Thermodynamics Full of step by step instructions and practice questions this book aims to simplify one of the more complex topics found within the field of chemistry *Equilibrium* Thomas R. Blackburn, 1969

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