

1. Record Nr.	UNINA9910956916603321
Autore	Sato Norio
Titolo	Chemical energy and exergy : an introduction to chemical thermodynamics for engineers / / Norio Sato
Pubbl/distr/stampa	San Diego, CA ; ; Amsterdam, : Elsevier, 2004
ISBN	1-281-05800-9 9786611058005 0-08-050100-1
Edizione	[1st ed.]
Descrizione fisica	1 online resource (161 p.)
Disciplina	541.36902462 541/.36 22
Soggetti	Thermochemistry Irreversible processes Exergy
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. [145]) and index.
Nota di contenuto	Front Cover; Chemical Energy and Exergy: An Introduction to Chemical Thermodynamics for Engineers; Copyright Page; CONTENTS; PREFACE; CHAPTER 1. THERMODYNAMIC STATE VARIABLES; 1.1. Thermodynamic systems; 1.2. Variables of the state; 1.3. Extensive and intensive variables; 1.4. Partial molar quantities; 1.5. The extent of a chemical reaction; CHAPTER 2. CONSERVATION OF ENERGY; 2.1. Energy as a physical quantity of the state; 2.2. Conservation of energy; 2.3. Internal energy U with independent variables T, V, and P; 2.4. Enthalpy H with independent variables T, p, and P; 2.5. Enthalpy and heat of reaction; 2.6. Enthalpy of pure substances; CHAPTER 3. ENTROPY AS A STATE PROPERTY; 3.1. Introduction to entropy; 3.2. Reversible and irreversible processes; 3.3. The creation of entropy and uncompensated heat; 3.4. The creation of entropy and thermodynamic potentials; 3.5. Affinity of irreversible processes; 3.6. Entropy of pure substances; 3.7. Entropy of heat transfer; 3.8. Entropy of gas expansion; 3.9. Entropy of mixing; CHAPTER 4. AFFINITY IN IRREVERSIBLE PROCESSES; 4.1. Affinity in chemical reactions; 4.2. Affinity and heat of reaction

4.3. The average heat of reaction 4.4. The average affinity of reaction;
 CHAPTER 5. CHEMICAL POTENTIAL; 5.1. Thermodynamic potentials in open systems; 5.2. The partial molar quantity of energy and the chemical potential; 5.3. Chemical potentials and the affinity of reaction; 5.4. Chemical potentials and thermodynamic energy functions; 5.5. Chemical potentials in homogeneous mixtures: the Gibbs-Duhem equation; 5.6. Chemical potentials of substances in ideal mixtures; 5.7. Activity and activity coefficient; 5.8. Chemical potentials of pure substances
 5.9. Thermodynamic potentials in ideal mixtures 5.10. The unitary and mixing terms of thermodynamic potentials; CHAPTER 6. UNITARY AFFINITY AND EQUILIBRIUM; 6.1. Affinity and equilibrium in chemical reactions; 6.2. The unitary affinity; 6.3. Equilibrium constants and concentration units; 6.4. Equilibrium constants as a function of pressure and temperature; CHAPTER 7. GASES, LIQUIDS, AND SOLIDS; 7.1. Perfect and ideal gases; 7.2. Non-ideal gases; 7.3. Liquids and solids; 7.4. The state equation and thermodynamic functions of condensed substances; CHAPTER 8. SOLUTIONS
 8.1. Ideal and non-ideal solutions 8.2. Perfect solutions and ideal solutions; 8.3. Reference systems for thermodynamic unitary quantity; 8.4. Thermodynamic excess functions in non-ideal solutions; 8.5. Units of the concentration; 8.6. Osmotic pressure; 8.7. Electrolytic solutions; CHAPTER 9. ELECTROCHEMICAL ENERGY; 9.1. Electrochemical potential of charged particles; 9.2. Transfer of charged particles between two condensed phases; 9.3. Electrode and electrode potential; 9.4. Electrochemical cells; 9.5. Equilibrium electrode potential of electronic transfer reactions
 9.6. Equilibrium electrode potential of ionic transfer reactions

Sommario/riassunto

This book is a beginners introduction to chemical thermodynamics for engineers. In the textbook efforts have been made to visualize as clearly as possible the main concepts of thermodynamic quantities such as enthalpy and entropy, thus making them more perceivable. Furthermore, intricate formulae in thermodynamics have been discussed as functionally unified sets of formulae to understand their meaning rather than to mathematically derive them in detail. In this textbook, the affinity of irreversible processes, defined by the second law of thermodynamics, has been treated as the main