1. Record Nr. UNINA9910877824303321 Autore Soustelle Michel Titolo Handbook of heterogeneous kinematics // Michel Soustelle Pubbl/distr/stampa London, : ISTE Hoboken, N.J., : Wiley, 2010 **ISBN** 1-118-55773-5 1-299-31531-3 1-118-61766-5 Descrizione fisica 1 online resource (961 p.) **ISTE** Collana Disciplina 541.0421 Soggetti Chemical kinetics Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia First published in 4 volumes entitled: Cinetique heterogene, France: Note generali Hermes Science/Lavoisier, 2006 and 2007. Includes bibliographical references and index. Nota di bibliografia Nota di contenuto Cover: Handbook of Heterogenous Kinetics: Title Page: Copyright Page: Table of Contents; Preface; List of Symbols; Chapter 1. Definitions and Experimental Approach; 1.1. Thermal transformations of solids; 1.2. Classification of transformations; 1.2.1. Transformation without formation of a new solid phase; 1.2.2. Transformation with formation of a new solid phase; 1.3. Speed and rate of reaction; 1.3.1. Speed of reaction; 1.3.2. Fractional extent and rate of a reaction; 1.3.3. Volumes of the phases and coefficient of expansion of the reaction; 1.4. Reaction zones of a transformation 1.4.1. Definition1.4.2. Classification; 1.4.3. Sizes of a reaction zone; 1.5. Chemical characterizations; 1.5.1. Analyses of the gas phases; 1.5.2. Elementary analyses of the solids; 1.6. Structural characterizations of the solids; 1.7. Textural characterizations of the solids; 1.7.1. The marker method; 1.7.2. The cavity method; 1.8. Characterization of the evolution of the systems; 1.8.1. Curves of evolution: definitions; 1.8.2. Curves of evolution: experimental obtaining; 1.8.3. Curves of evolution: obtained laws; 1.9. Influence of various variables on speed; 1.9.1. Influence of temperature 1.9.2. Influence of partial pressures of gases 1.9.3. Influence of the shapes and sizes of solid particles; Chapter 2. The Real Solid: Structure Elements and Quasi-Chemical Reactions; 2.1. Structure elements of a

solid; 2.1.1. Definition of a structure element; 2.1.2. Binary solids; 2.1.3. Symbolic notation of structure elements; 2.1.4. Building unit of a solid; 2.1.5. Description and composition of a solid; 2.2. Structure elements of a stoichiometric binary solid; 2.2.1. Schottky disorder; 2.2.2. Frenkel disorder; 2.2.3. Antistructure disorder; 2.2.4. S.A. disorder

2.3. Structure elements of a non-stoichiometric binary solid2.3.1. Distance from stoichiometry and structure element; 2.3.2. The approximation of Wagner of the prevalent defect for ionic solids; 2.3.3. More complex binary compounds; 2.4. Extension to non-binary compounds; 2.4.1. The pseudo-binary approximation; 2.4.2. Generalization of the approximation of the prevalent defect; 2.5. Quasi-chemical reactions; 2.5.1. Definition and characteristics of quasi-chemical reactions; 2.5.2. Homogenous quasi-chemical reactions in the solid; 2.5.3. The interphase reactions

2.5.4. Reactions of solid destruction2.6. Introduction of foreign elements into a solid; 2.6.1. Concepts of impurity and doping agent;

 $2.6.2. \ The \ controlled \ atomic \ imperfection \ in \ stoichiometric \ solids;$ 

2.6.3. The controlled electronic imperfection in non-stoichiometric solids; 2.6.4. Concept of induced valence; Chapter 3. Thermodynamics of Heterogenous Systems; 3.1. Introduction: aims of thermodynamics; 3.2. General survey of thermodynamics of equilibrium; 3.2.1. Chemical potential of a component in a phase; 3.2.2. Variance of a system at

equilibrium 3.2.3. Associated extensive properties of a transformation, partial molar properties

## Sommario/riassunto

This book presents all the theoretical and practical basements of heterogeneous kinetics and reactivity of solids. It applies the new concepts of reactivity and spatial function, introduced by the author, for both nucleation and growth processes, with a unified presentation of the reactivity of bulk and powder solids, including gas-solid reactions, thermal decompositions, solid-solid reactions, reactions of solid solutions, and coalescence of solid grains. It also contains many exercises and problems with solutions included, allowing readers to understand and use all the concepts and methods d