

1. Record Nr.	UNINA9910459992703321
Autore	Thomas J. M.
Titolo	Principles and practice of heterogeneous catalysis // J. M. Thomas and W. J. Thomas
Pubbl/distr/stampa	Weinheim, Germany : , : Wiley-VCH, , 2015 ©2015
ISBN	3-527-68378-X 3-527-68380-1
Edizione	[Second revised edition.]
Descrizione fisica	1 online resource (767 p.)
Disciplina	541.3/95
Soggetti	Heterogeneous catalysis Electronic books.
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 at the end of each chapters and index.
Nota di contenuto	Principles and Practice of Heterogeneous Catalysis; Contents; Preface; Chapter 1 Setting the Scene; 1.1 Prologue: Advances since the Early 1990s; 1.2 Introduction; 1.2.1 Selectivity of Catalysts; 1.3 Perspectives in Catalysis: Past, Present and Future; 1.3.1 Applied Catalysis since the 1940s; 1.3.2 Some Current Trends in Applied Catalysis; 1.3.2.1 Auto-Exhaust Catalysts; 1.3.2.2 Catalysts in Electrochemistry and Photoelectrochemistry; 1.3.2.3 Immobilized Metals; 1.3.2.4 Immobilized Enzymes and Cells: Present and Future; 1.3.2.5 Ribozymes; 1.4 Definition of Catalytic Activity 1.4.1 Magnitude of Turnover Frequencies and Active Site Concentrations 1.4.2 Volcano Plots; 1.4.3 Evolution of Important Concepts and Techniques in Heterogeneous Catalysis; 1.4.3.1 Mechanistic Insights from Isotopic Labelling; 1.4.3.2 Concepts from Organometallic Chemistry; 1.5 Key Advances in Recent Theoretical Treatments: Universability in Heterogeneous Catalysis; 1.5.1 Some Major Current Developments in Heterogeneous Catalysis; 1.6 Milestones Reached in Industrial Catalysis in the Twentieth Century, and Some Consequential Challenges; Problems; References; Further Reading Chapter 2 The Fundamentals of Adsorption: Structural and Dynamical

Considerations, Isotherms and Energetics
2.1 Catalysis Must Always Be Preceded by Adsorption; 2.1.1 Physical Adsorption, Chemisorption and Precursor States; 2.2 The Surfaces of Clean Solids are Sometimes Reconstructed; 2.3 There Are Many Well-Defined Kinds of Ordered Adlayers; 2.4 Adsorption Isotherms and Isobars; 2.4.1 The Empirical Facts; 2.4.2 Information That Can Be Gleaned from Isotherms; 2.4.3 Adsorption Is Almost Invariably Exothermic; 2.5 Dynamical Considerations; 2.5.1 Residence Times; 2.5.2 Rates of Adsorption 2.5.3 Applying Statistical Mechanics to Adsorption 2.5.4 Adsorption Kinetics Can Often Be Represented by the Elovich Equation; 2.5.5 Rates of Desorption; 2.5.6 Applying Statistical Mechanics to Desorption; 2.5.7 Influence of a Precursor State on the Kinetics of Desorption; 2.6 Relating the Activation Energy to the Energy of Chemisorption. Universality in Heterogeneous Catalysis and the Brønsted-Evans-Polanyi (BEP) Relation; 2.6.1 Pareto-Optimal Catalysts; 2.7 Deriving Adsorption Isotherms from Kinetic Principles 2.7.1 Using the Langmuir Isotherm to Estimate the Proportions of Non-dissociative and Associative Adsorption 2.7.2 Other Adsorption Isotherms; 2.7.2.1 Henry's Adsorption Isotherm; 2.7.2.2 Freundlich Isotherm; 2.7.2.3 Temkin Isotherm; 2.7.2.4 Brunauer-Emmett-Teller Isotherm; 2.7.2.5 Developments from Polanyi's Adsorption Theory; 2.7.2.6 Kaganer's Isotherm and the DKR Equation; 2.7.2.7 Virial Equation of State; 2.8 Energetics of Adsorption; 2.8.1 Estimating the Binding Energies of Physically Adsorbed Species; 2.8.2 Binding Energies of Chemisorbed Species 2.8.3 Estimating Heats of Adsorption from Thermodynamic Data

Sommario/riassunto

This long-awaited second edition of the successful introduction to the fundamentals of heterogeneous catalysis is now completely revised and updated. Written by internationally acclaimed experts, this textbook includes fundamentals of adsorption, characterizing catalysts and their surfaces, the significance of pore structure and surface area, solid-state and surface chemistry, poisoning, promotion, deactivation and selectivity of catalysts, as well as catalytic process engineering. A final section provides a number of examples and case histories. With its color and numerous graphics plus refere
