1. Record Nr. UNINA9910139538903321

Titolo	Scanning tunneling microscopy in surface science, nanoscience and catalysis / / edited by Michael Bowker and Philip R. Davies
Pubbl/distr/stampa	Weinheim, : Wiley-VCH, c2010
ISBN	9786612385230 9781282385238 1282385232 9783527628827 3527628827 9783527628834 3527628835
Descrizione fisica	1 online resource (260 p.)
Classificazione	530 540 UH 6320
Altri autori (Persone)	BowkerM (Michael) DaviesP. R <1964-> (Philip Rosser)
Disciplina	502.825
Soggetti	Scanning tunneling microscopy Surface chemistry Surfaces (Physics) Nanoscience
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 and index.
Nota di contenuto	Scanning Tunneling Microscopy in Surface Science, Nanoscience and Catalysis; Contents; Preface; List of Contributors; 1 Chirality at Metal Surfaces; 1.1 Introduction; 1.1.1 Definition of Chirality; 1.1.2 Nomenclature of Chirality: The (R),(S) Convention; 1.2 Surface Chirality Following Molecular Adsorption; 1.2.1 Achiral Molecules on Achiral Surfaces; 1.2.2 Lattice Matching; 1.2.3 Chiral Molecules on Achiral Surfaces; 1.2.4 Chiral Molecules on Chiral Surfaces; 1.2.5 Chiral Etching; 1.3 Chiral Amplification and Recognition; 1.3.1 Chiral Amplification in Two Dimensions; 1.3.2 Chiral Switching 1.3.3 Chiral Recognition1.3.4 Prochiral Molecules Interacting with

Chiral Surfaces; 1.4 Conclusions; References; 2 The Template Route to Nanostructured Model Catalysts; 2.1 Introduction; 2.2 Surfaces as Two-Dimensional Templates; 2.3 STM Imaging of Oxide Films; 2.4 STM Imaging of Metal Particles on Oxide Films; 2.5 Template-Controlled Growth of Model Catalysts; 2.5.1 Oxides as Templates; 2.5.2 Modified Templates; 2.6 Conclusions; References; 3 In Situ STM Studies of Model Catalysts; 3.1 Introduction; 3.2 Instrumentation; 3.3 Visualizing the Pathway of Catalytic Reactions
3.3.1 Imaging of Adsorbates and Reaction Intermediates3.3.2 Imaging Chemisorption on Metals; 3.3.3 Determining the Sites for Chemisorption on Oxide Surfaces; 3.3.4 Visualizing Reaction Intermediates and the Mechanism of Hydrogen Oxidation; 3.3.5 Measuring the Reaction Kinetics of CO Oxidation; 3.4 Metal Surfaces at High Pressures; 3.5 In Situ Studies of Supported Model Catalysts; 3.5.1 Monitoring the Growth Kinetics of Supported Metal Catalysts; 3.5.2 Studies of the SMSI Effect; 3.5.3 Sintering Kinetics of Supported Au Clusters; 3.6 Outlook; References
4 Theory of Scanning Tunneling Microscopy and Applications in Catalysis4.1 Catalysis and Scanning Tunneling Microscopy; 4.2 Image Formation in an STM; 4.3 Simulating Tunneling Currents; 4.4 Simulating Chemical Reactivity; 4.5 Catalytic Water Production; 4.5.1 TiO2: A Catalytic Model System; 4.6 Outlook; References; 5 Characterization and Modification of Electrode Surfaces by In Situ STM; 5.1 Introduction; 5.2 In Situ STM: Principle, Technical Realization and Limitations; 5.2.1 Principle Considerations for In Situ Operation; 5.2.2 Technical Realization; 5.2.2.1 Tip Preparation and Isolation
5.2.2.2 Electrochemical Cell5.2.2.3 Vibration Damping; 5.2.3 Limitations; 5.3 Imaging Single-Crystal Surfaces of Catalytically Relevant Systems; 5.3.1 Preparation and Imaging of Metal Single-Crystal Surfaces; 5.3.2 Bimetallic Surfaces; 5.4 Strategies for Nanostructuring Surfaces; 5.4.1 Oxidation-Reduction Cycles for Roughening and Faceting Surfaces; 5.4.2 Surface Modification by an STM: An Overview; 5.4.3 Metal Nanocluster Deposition via Jump-to-Contact; References; 6 STM Imaging of Oxide Nanolayer Model Systems; 6.1 Introduction; 6.2 Experimental Aspects and Technical Developments
6.3 Case Studies: Selected Oxide-Metal Systems

Sommario/riassunto

Here, top international authors in the field of STM and surface science present first-class contributions on this hot topic, bringing the reader up to date with the latest developments in this rapidly advancing field. The focus is on the nanoscale, particularly in relation to catalysis, involving developments in our understanding of the nature of the surfaces of oxides and nanoparticulate materials, as well as adsorption, and includes in-situ studies of catalysis on such model materials. Of high interest to practitioners of surface science, nanoscience, STM and catalysis.