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2.6 Temperature-Programmed Reaction Spectroscopy in UHV; References; 3 Photoemission and Auger Spectroscopy; 3.1 Introduction; 3.2 X-Ray Photoelectron Spectroscopy (XPS); 3.2.1 XPS Intensities and Sample Composition; 3.2.2 XPS Binding Energies and Oxidation States; 3.2.3 Shake Up, Shake Off, Multiplet Splitting and Plasmon Excitations; 3.2.4 Experimental Aspects of XPS; 3.2.5 Charging and Sample Damage; 3.2.6 Dispersion of Supported Particles from XPS; 3.2.7 Angle-Dependent XPS; 3.2.8 In-Situ and Real Time XPS Studies; 3.3 Ultraviolet Photoelectron Spectroscopy (UPS); 3.3.1 Photoemission of Adsorbed Xenon; 3.4 Auger Electron Spectroscopy; 3.4.1 Energy of Auger Peaks; 3.4.2 Intensity of Auger Peaks; 3.4.3 Application of AES in Catalytic Surface Science; 3.4.4 Scanning Auger Spectroscopy; 3.4.5 Depth-Sensitive Information from AES; References; 4 The Ion Spectroscopies; 4.1 Introduction; 4.2 Secondary Ion Mass Spectrometry (SIMS); 4.2.1 Theory of SIMS; 4.2.2 Electron and Photon Emission under Ion Bombardment; 4.2.3 Energy Distribution of Secondary Ions; 4.2.4 The Ionization Probability; 4.2.5 Emission of Molecular Clusters; 4.2.6 Conditions for Static SIMS; 4.2.7 Charging of Insulating Samples; 4.2.8 Applications on Catalysts; 4.2.9 Model Catalysts; 4.2.10 Single Crystal Studies; 4.2.11 Concluding Remarks; 4.3 Secondary Neutral Mass Spectrometry (SNMS); 4.4 Ion Scattering: The Collision Process; 4.5 Rutherford Backscattering Spectrometry (RBS); 4.6 Low-Energy Ion Scattering (LEIS); 4.6.1 Neutralization; 4.6.2 Applications of LEIS in Catalysis; References; 5 Mossbauer Spectroscopy; 5.1 Introduction; 5.2 The Mossbauer Effect; 5.3 Mossbauer Spectroscopy; 5.3.1 Isomer Shift; 5.3.2 Electric Quadrupole Splitting; 5.3.3 Magnetic Hyperfine Splitting; 5.3.4 Intensity; 5.4 Mossbauer Spectroscopy in Catalyst Characterization; 5.4.1 In-Situ Mossbauer Spectroscopy at Cryogenic Temperatures; 5.4.2 Particle Size Determination; 5.4.3 Kinetics of Solid-State Reactions from Single Velocity Experiments; 5.4.4 In-Situ Mossbauer Spectroscopy Under Reaction Conditions; 5.4.5 Mossbauer Spectroscopy of Elements Other Than Iron; 5.5 Conclusion; References; 6 Diffraction and Extended X-Ray Absorption Fine Structure (EXAFS); 6.1 Introduction; 6.2 X-Ray Diffraction; 6.2.1 In-Situ XRD: Kinetics of Solid-State Reactions; 6.2.2 Concluding Remarks; 6.3 Low-Energy Electron Diffraction (LEED)

Sommario/riassunto

"... this book is a uniquely helpful guide to many of the major (and some minor) techniques used to investigate the structures of solid catalysts and model systems and is written from the perspective of a prolific researcher in the field. The writing is enjoyable to read, the illustrations are clear, and the reader is guided efficiently to key technical references for further details..." -Journal of the American Chemical Society
Superbly organized and of great pedagogic value, Spectroscopy in Catalysis describes the most important modern analytical techniques used to inv