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Nota di contenuto	Metal Oxide Catalysis; Contents to Volume 1; Contents to Volume 2; Preface; List of Contributors; 1: EPR (Electron Paramagnetic Resonance) Spectroscopy of Polycrystalline Oxide Systems; 1.1 Introduction; 1.2 Basic Principles of EPR; 1.2.1 The Electron Zeeman Interaction; 1.2.2 Relaxation Processes; 1.2.3 The Nuclear Zeeman Interaction; 1.2.3.1 Isotropic Hyperfine Coupling; 1.2.3.2 Analysis of Isotropic EPR Spectra; 1.2.4 The g Tensor: Origin and Significance; 1.2.5 The A Tensor; Significance and Origin; 1.2.6 The D Tensor; Significance and Origin; 1.2.7 Powder EPR Spectra 1.2.8 Analysing EPR Powder Spectra Experimental Considerations; 1.2.8.1 Quantification of Number of Spins; 1.2.8.2 Effects of Sample Tumbling and Rotation; 1.2.8.3 Physical State of the Sample; 1.2.8.4 Multifrequency Measurements; 1.2.8.5 Variable Power and Temperature; 1.2.9 A Case Study: Surface Adsorbed NO <sub>2</sub> ; 1.3 Example Applications in Oxide Systems; 1.3.1 Surface Defects; 1.3.2 Inorganic Radicals; 1.3.3 Transient Radical Intermediates; 1.3.4 Supported Transition Metal Ions; 1.4 Conclusions; References; 2: The Application of UV-Visible-NIR Spectroscopy to Oxides; 2.1 Introduction

2.2 Types of Electronic Transitions Producing UV-Vis-NIR Bands  
2.2.1 Metal-Centered Transitions; 2.2.2 Charge-Transfer ( CT ) Transitions;  
2.2.3 Transitions between Electron Energy Bands in Solids; 2.3 UV-Vis-NIR Absorption Spectroscopy; 2.3.1 Theory of Diffuse Reflectance ( DR ) Spectroscopy; 2.3.2 General Remarks on Methodologies for DR UV-Vis-NIR Measurements; 2.3.3 UV Absorption Bands of Insulating Oxides: Excitonic Surface States; 2.3.4 UV Absorption Bands of Semiconductor Oxides; 2.3.5 Highly Dispersed Supported Oxo-Species and TMI  
2.3.5.1 LMCT Transition Bands as Source of Structural Insight  
2.3.5.2 d-d Transition Bands as a Source of Structural Insight; 2.4 UV-Vis-NIR Photoluminescence Spectroscopy; 2.4.1 Franck-Condon Principle; 2.4.2 Quantum Efficiency and Lifetime; 2.4.3 General Remarks on Methodologies Applied for PL Measurements; 2.4.4 Characterization of Oxide Catalysts by PL; 2.4.4.1 Insulating Oxides: the Case of AEO; 2.4.4.2 Investigations of Highly Dispersed Transition Metal Ions in Oxides or Zeotype-Systems by PL Spectroscopy; 2.5 Conclusions; References

3: The Use of Infrared Spectroscopic Methods in the Field of Heterogeneous Catalysis by Metal Oxides  
3.1 Introduction; 3.1.1 The Evolution of Vibrational Spectroscopies; 3.1.2 Application of IR Spectroscopy to the Surface Chemistry of Oxide-Based Materials: a Historical Perspective; 3.2 Experimental Techniques; 3.2.1 The Detection of the Vibrational Spectrum of a Polyatomic Chemical Species: IR and Raman Spectroscopies; 3.2.2 The Transmission/Absorption IR Technique; 3.2.3 The Reflection Techniques; 3.2.4 The Diffuse Reflectance Technique; 3.2.5 The Emission Technique  
3.2.6 Photoacoustic and Photothermal Techniques

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### Sommario/riassunto

With its two-volume structure, this handbook and ready reference allows for comprehensive coverage of both characterization and applications, while uniform editing throughout ensures that the structure remains consistent. The result is an up-to-date review of metal oxides in catalysis. The first volume covers a range of techniques that are used to characterize oxides, with each chapter written by an expert in the field. Volume 2 goes on to cover the use of metal oxides in catalytic reactions. For all chemists and engineers working in the field of heterogeneous catalysis.

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