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2.2 Types of Electronic Transitions Producing UV-V is-NIR Bands2.2.1 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-V is-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 Insight2.3.5.2 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 Oxides3.1 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

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.