1. Record Nr. UNINA9910146098803321

Titolo	Electron paramagnetic resonance [[electronic resource]] : a practitioner's toolkit / / edited by Marina Brustolon, Elio Giamello
Pubbl/distr/stampa	Hoboken, N.J., : Wiley, c2009
ISBN	1-282-36816-8 9786612368165 0-470-43223-3 0-470-43222-5
Descrizione fisica	1 online resource (568 p.)
Altri autori (Persone)	BrustolonMarina GiamelloGiacomo
Disciplina	543/.67
Soggetti	Electron paramagnetic resonance
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di contenuto	ELECTRON PARAMAGNETIC RESONANCE; CONTENTS; FOREWORD; PREFACE; CONTRIBUTORS; I PRINCIPLES; 1 Introduction to Electron Paramagnetic Resonance; 1.1 Chapter Summary; 1.2 EPR Spectrum: What Is It?; 1.3 The Electron Spin; 1.4 Electron Spin in a Magnetic Field (Zeeman Effect); 1.5 Effect of Electromagnetic Fields; 1.6 Macroscopic Collection of Electron Spins; 1.7 Observation of Magnetic Resonance; 1.8 Electron Spin in Atoms and Molecules; 1.9 Macroscopic Magnetization; 1.10 Spin Relaxation and Bloch Equations; 1.11 Nuclear Spins; 1.12 Anisotropy of the Hyperfine Interaction; 1.13 ENDOR 1.14 Two Interacting Electron Spins1.15 Quantum Machinery; 1.16 Electron Spin in a Static Magnetic Field; 1.17 Electron Spin Coupled to a Nuclear Spin; 1.18 Electron Spin in a Zeeman Magnetic Field in the Presence of a Microwave Field; 2 Basic Experimental Methods in Continuous Wave Electron Paramagnetic Resonance; 2.1 Instrumental Components of a Continuous Wave Electron Paramagnetic Resonance (CW-EPR) Spectrometer; 2.2 Experimental Techniques; Acknowledgment; References; Bibliography; 3 What Can Be Studied with Electron Paramagnetic Resonance?; 3.1 Introduction; 3.2 Organic Radicals

3.3 Organic Molecules with More than One Unpaired Electron3.4 Inorganic Radicals, Small Paramagnetic Molecules, and Isolated Atoms; 3.5 Transition Metal Ions; 3.6 Natural Systems and Processes; 3.7 Tailoring and Assembling PS for Magnetic Materials; 3.8 Industrial Applications of EPR; References; Bibliography; 4 Electron Paramagnetic Resonance Spectroscopy in the Liquid Phase; 4.1 General Considerations; 4.2 Generation of Radicals and Radical Ions; 4.3 Basic Interactions and Principles; 4.4 Patterns and Line Shapes of Fluid-Solution EPR Spectra; 4.5 Transition-Metal Ions; 4.6 Biradicals
4.7 Simulation Software4.8 How Fluid-Solution Spectra are Analyzed; 4.9 Calculation of EPR Parameters; 4.10 Molecular Properties Mirrored by EPR Spectra in Fluid Solution; 4.11 Chemically Induced Dynamic Electron Polarization (CIDEP) and CID Nuclear Polarization (CIDNP): Methods to Study Short-Lived Radicals; Acknowledgments; References; Further Reading; 5 Pulsed Electron Paramagnetic Resonance; 5.1 Introduction; 5.2 Vector Model for Pulsed EPR; 5.3 Pulse Sequences; 5.4 Data Analysis; 5.5 Spectrometer; References; 6 Electron Paramagnetic Resonance Spectra in the Solid State; 6.1 Introduction
6.2 Anisotropy of the Zeeman Interaction: The g Tensor6.3 The Hyperfine Interaction in the Solid State; 6.4 TMIs; 6.5 EPR Spectra for S > 1/2: ZFS; References; Appendix A.6.1 Simple Matrix Manipulations; Appendix A.6.2 Pauli Matrices; Appendix A.6.3 Transformation of Tensor Coordinates Via Matrices; Appendix A.6.4 Euler Angles; Appendix A.6.5 Matrix Elements of Spin-Orbit Coupling; Appendix A. 6.6 Origin of the g and A Values for simple TMIs; Appendix References; 7 The Virtual Electron Paramagnetic Resonance Laboratory: A User Guide to ab initio Modeling; 7.1 Introduction; 7.2 Modeling Tools
7.3 Tutorial and Case Studies

Sommario/riassunto

Easy-to-follow guide helps you take full advantage of EPR spectroscopy's capabilities Electron Paramagnetic Resonance: A Practitioner's Toolkit serves as a practical guide that enables you to navigate through and make sense of the complex maze of electron paramagnetic resonance (EPR) spectroscopy fundamentals, techniques, and applications. The first half of this book is dedicated to explaining the core principles of EPR spectroscopy, using clear, easy-to-follow explanations and examples while avoiding complex physics and mathematics. The second half of the book focuses on applications