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Nota di contenuto	Historical Developments and Future Perspectives in Nuclear Resonance Scattering -- Synchrotron-Radiation-Based Mössbauer Spectroscopy and Nuclear Resonant Quasi- and Inelastic-Scattering -- Quantum Optical Phenomena in Nuclear Resonant Scattering -- From Small Molecules to Complex Systems: A Survey of Chemical and Biological Applications of the Mössbauer Effect -- Mössbauer Spectroscopy with High Spatial Resolution -- Molecular Magnetism of Metal Complexes and Light-Induced Phase Transitions -- Applications of Mössbauer Spectroscopy for Li-Ion and Na-Ion Batteries -- Mössbauer Spectroscopy in External Magnetic Fields -- Mössbauer Spectroscopic Microscope Studies on Diffusion in Solids.
Sommario/riassunto	This book presents an overview of the latest Mössbauer spectroscopy research. It sheds light on various cutting-edge research subjects: (i) nuclear resonance scattering experiments implemented at synchrotron radiation facilities, e.g., ESRF, DESY and Spring-8; (ii) multidisciplinary materials research related to chemistry, biology, geoscience, molecular magnetism of metal complexes, batteries, and magnetism; (iii) novel imaging techniques based on probing diffusion in solids using Mössbauer spectroscopy. The first three chapters introduce recent research on modern Mössbauer spectroscopy, including nuclear resonant scattering experiments and development of related techniques at synchrotron accelerator facilities. Chapters 4 and 5 then

demonstrate the applications of such pioneering techniques to chemistry, biology and geoscience. Chapters 6 and 7 describe the applications to new functional materials, i.e., metal complexes and Li- and Na-ion batteries, while the final two chapters are devoted to two important measuring techniques: Mössbauer spectroscopy under external magnetic fields, and microscopic Mössbauer techniques on diffusion in solids, which are expected to play an essential role in the investigation and characterization of magnetic structures and microstructures in materials. The cutting-edge content provides readers with quick updates on the latest research topics in the field, while the tutorial-style descriptions allow readers unfamiliar with Mössbauer spectroscopy to learn and implement the techniques. As such, the book is especially useful for advanced undergraduate and early graduate students who have recently been assigned to a laboratory.