1. Record Nr. UNINA9910983356703321

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Titolo	Introduction to Raman Spectroscopy and Its Applications / / by Carlos Vargas Hernández
Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Springer, , 2025
ISBN	9783031775512 3031775511
Edizione	[1st ed. 2025.]
Descrizione fisica	1 online resource (291 pages)
Disciplina	543.54
Soggetti	Molecular spectroscopy Atomic structure Molecular structure Microscopy Atoms Molecules Optics Physics Astronomy Molecular Spectroscopy Atomic and Molecular Structure and Properties Optical Microscopy Atomic, Molecular and Chemical Physics Optics and Photonics Physics and Astronomy
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Introduction -- Optical Parameters -- Mathematical Fundamentals of Perturbation Theory -- Harmonic Crystals -- Raman Spectroscopy.
Sommario/riassunto	The book explores theoretical foundations of Raman spectroscopy, looking into key concepts such as parameters, perturbation theories, normal vibration modes, and the application of group theory to specific structures. It also examines modifications of the Raman technique,

particularly in the Surface Enhanced Raman Scattering (SERS) modality. Practical aspects of both Raman and SERS spectroscopy are covered in detail. Additionally, the book presents the characteristic Raman spectra of various materials measured by the author, along with a basic analysis of their molecular structures. This comprehensive approach ensures that readers gain a thorough understanding of both the theoretical and practical elements of Raman spectroscopy. Developed from the author's notes, research, and over a decade of teaching the Raman spectroscopy course, this book underscores the vital importance of spectroscopies in both academia and industry. These techniques are invaluable in the analytical field, offering powerful tools for the study and diagnosis of materials due to their capabilities for both quantitative and qualitative applications. Optical spectroscopies, inherently non-invasive, have gained popularity due to advancements in monochromatic sources and high-performance, high-resolution detectors, resulting in more versatile and portable instruments. Additionally, new methodologies for data acquisition and statistical analysis have been developed, reducing acquisition time and increasing the signal-to-noise ratio. Innovations in acquisition techniques, such as SERS, enable the acquisition of high-quality spectra from sample concentrations far below those required by conventional methods. The book offers a comprehensive introduction to one of the fastest-growing optical techniques, driven by advancements in optoelectronic and control devices. Aimed at final-year students in science and engineering, the text features clear mathematical explanations and explicit steps to help readers grasp the scope and applicability of the mathematical concepts involved. It serves as a foundational guide, equipping readers with the essential knowledge needed to tackle more complex models found in specialized literature. .