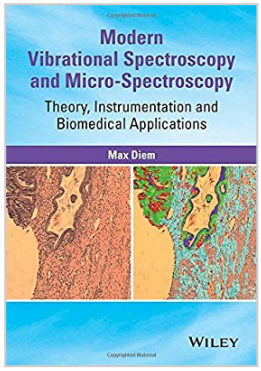

Modern Vibrational Spectroscopy and Micro-Spectroscopy: Theory, Instrumentation and Biomedical Applications

By Max Diem

Modern Vibrational Spectroscopy and Micro-Spectroscopy: Theory, Instrumentation and Biomedical Applications By Max Diem

Modern Vibrational Spectroscopy and Micro-Spectroscopy: Theory, Instrumentation and Biomedical Applications unites the theory and background of conventional vibrational spectroscopy with the principles of microspectroscopy. It starts with basic theory as it applies to small molecules and then expands it to include the large biomolecules which are the main topic of the book with an emphasis on practical experiments, results analysis and medical and diagnostic applications. This book is unique in that it addresses both the parent spectroscopy and the microspectroscopic aspects in one volume.

Part I covers the basic theory, principles and instrumentation of classical vibrational, infrared and Raman spectroscopy. It is aimed at researchers with a background in chemistry and physics, and is presented at the level suitable for first year graduate students. The latter half of Part I is devoted to more novel subjects in vibrational spectroscopy, such as resonance and non-linear Raman effects, vibrational optical activity, time resolved spectroscopy and computational methods. Thus, Part 1 represents a short course into modern vibrational spectroscopy.

Part II is devoted in its entirety to applications of vibrational spectroscopic techniques to biophysical and bio-structural research, and the more recent extension of vibrational spectroscopy to microscopic data acquisition. Vibrational microscopy (or microspectroscopy) has opened entirely new avenues toward applications in the biomedical sciences, and has created new research fields collectively referred to as Spectral Cytopathology (SCP) and Spectral Histopathology (SHP). In order to fully exploit the information contained in the micro-spectral datasets, methods of multivariate analysis need to be employed. These methods, along with representative results of both SCP and SHP are presented and discussed in detail in Part II.

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Review

"Graduate students who are entering the complex and rapidly developing field of vibrational biospectroscopy or microscopy would find this book useful. Experienced scientists and instructors in vibrational spectroscopy and microspectroscopy will also find this book a valuable reference for their work." (*Optics & Photonics News*, 1 January 2016)

From the Back Cover

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This book is a useful guide for graduate students who are entering the complex and rapidly developing field of vibrational bio-spectroscopy or microscopy, as well as a valuable reference for experienced scientists and instructors in this subject area.

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