

Friedrich Siebert and Peter Hildebrandt, vibrational spectroscopy in life science

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Infrared and Raman spectroscopy are well-established techniques and have been invaluable tools in analytical and physical chemistry for decades. The technological advances in fourier transform infrared spectroscopy (FTIR) and Raman spectrometers allow carrying out static and time-resolved experiments in large and complex systems. Unlike nuclear magnetic resonance, vibrational spectroscopy is applicable regardless of the size and state of the sample, i.e. it can be used to study bulk samples, solutions, monolayers, etc. Hence, FTIR and Raman spectroscopy are very promising tools for biophysical studies.

A serious reason for the limited application of these techniques to life sciences is that the physicists and physico-chemists are not usually acquainted with the concepts of biology and the biologists have an inadequate background in spectroscopy. The main scope of this book is to introduce the basic concepts of vibrational spectroscopy in molecular biophysics to both spectroscopists and biologists.

The book consists of two parts. The first one provides a theoretical background (Ch. 2), avoiding lengthy math-

ematical derivations, making it easier to follow by non-specialists. The instrumentation and sampling techniques, including several methods to improve spatial, spectral and temporal resolution as well as to limit or avoid artifacts, are discussed in Ch. 3 and 4. The second part analyses structural studies of proteins using vibrational spectroscopy (Ch. 5) and the last three chapters (6–8) deal with specific protein classes. The book is not intended to cover the extremely broad range of biomolecules that can be studied but provides practical details on real-world experiments, which can be used as examples for future studies.

In conclusion, the book is a successful effort to bridge the gap between physical and life sciences, by providing spectroscopists and biologists the basic knowledge they need to apply vibrational spectroscopy to biomolecules. It gives only the necessary theoretical background and deals more with practical aspects of the experimental setup and procedures, which are very helpful to “newcomers” to this exciting field.

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