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Book Review

Vibrational Spectroscopy in Diagnosis and Screening, edited by Feride Severcan and Parvez I. Haris, Advances in Biomedical Spectroscopy, Vol. 6, IOS Press, 2012, 421 pp.

The book *Vibrational Spectroscopy in Diagnosis and Screening*, edited by Severcan and Haris is one of serial survey volumes, which addresses educative, comprehensive and current topics in diverse areas of life science. It is a well-organized book that represents methodological approaches and applications of vibrational spectroscopy particularly to biomedical field. It consists of a series of chapters that provide updated detailed knowledge and applications of the well-known near infrared (NIR), mid-infrared and Raman spectroscopic methods as well as a new vibrational technique, Terahertz (THz) spectroscopy through reviews of current studies. These chapters were written by the professional experts who are well known in the field of biomedical spectroscopy. At first glance you can recognize that the book mainly discusses diagnosis and screening of different biological systems such as hard and soft tissues, cells and single molecules. In this book in addition to biomedical applications of vibrational spectroscopy, applications of this technique to dental research, food science, pharmaceutical area, and forensic and aquatic science that are not commonly handled were also discussed. As seen from the content, different from the other books, this book addresses a wide range of topics. The first chapter covers explanatory information step by step for the spectroscopic study, which includes experimental, instrumentation, data processing and computational analysis steps. This is followed by a chapter that discusses monitoring of proteins in biological systems. In this chapter, an extensive overview of the vibrational spectroscopic methods and applications is presented. The authors focused on data analysis including spectral subtraction, curve fitting analysis, Fourier-self deconvolution, second derivative and vector normalization etc, with technical details and several experimental applications. Furthermore, the chapters about classification of drug modes of action on cancer cells by FTIR fingerprinting and discrimination of breast tissue structures by FT-IR FPA imaging also provide fundamental information about quality, analysis and evaluation of spectra. They could give hint to researchers to interpret and evaluate spectra accurately. In fact, almost each chapter contains some information in terms of sample preparation, recording and interpreting of spectra, analysis steps, and statistical evaluation in different fields of applications of vibrational spectroscopy that one may find useful. If you are new in the spectroscopic area or you have difficulties in handling of spectral data, undoubtedly these chapters will be very informative and helpful for you.

After page 118, characterization, diagnosis and screening of variety of diseases such as protein misfolding diseases, cancer and diabetes, bone and cartilages disease etc, are presented dominantly in separate chapters. Although, such diseases have also been covered by other reviews and books, this book presents theoretical and technical information together with many applications and offers great insight into different research topics. Moreover, it is instructive and provides a comparative approach for beginners and who are interested in biomedical spectroscopy.

Chapter 6 gives information about application and potential of vibrational spectroscopy on stem cells, which is a very popular and compelling research area in the medical field. Application of spectroscopic methods for analysis of aquatic environment is presented in Chapter 13. This chapter presents a range of application of vibrational spectroscopy from characterization and classification of various aquatic

species to evaluation of water quality. Chapter 15 covers feed and food quality including valuable knowledge about diagnosis and screening of food. This is a relatively virgin area in terms of application of the vibrational spectroscopy and is likely to grow in coming years.

This book demonstrates the advantages and potential, but also limitations and challenges of vibrational spectroscopy as applied to diagnosis and screening. There are only two points to take into consideration in the next editions. First, some background knowledge related to experimental and analysis parts such as sampling methods, principal component analysis and cluster analysis were repeated in a few chapters. Second, Raman spectroscopy was less extensively discussed compared to other techniques. Nonetheless, there is no doubt that the editors, Severcan and Haris, cover a wide spectrum of application of vibrational spectroscopic techniques very well. They focused on potentially attractive research topics. Moreover, they hold the language of book generally simple, despite the cooperative nature of the work. Although, it is written in a technical manner it is easy to understand. Most of the complicated topics have been explained comprehensibly with the tables and figures, which illustrate key concepts.

In conclusion, the book *Vibrational Spectroscopy in Diagnosis and Screening* is a comprehensive reference guide for post-graduate students as well as experienced researchers in academia and industry who are interested in broadening their knowledge about the latest application and potential of vibrational spectroscopy in different area of biological and biomedical sciences.

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