

authors, mostly European authors. This volume has a collection of ten review articles on five major topics: (1) theoretical techniques for structural determination (empirical Hamiltonian methods with high-order corrections for extraction of molecular geometry from rotational constants, molecular potential function for equilibrium structure from gas-phase electron diffraction data, and ab initio and density functional theory methods); (2) experimental techniques for structural determination (matrix-isolation absorption spectroscopy, rotation-vibrational spectroscopy, and gas-phase electron diffraction); (3) molecular structures of several groups of compounds (small carbon molecules, compounds containing C-C, C-N, C-O, N-O, and O-O single bonds, carbocyclic  $\pi$ -systems, difluoramines, and binary and ternary Se-N and Te-N species); (4) intermolecular interactions (conjugated hydrogen bonds and contacts of benzene rings and isostructurality of organic crystal); and (5) structure-thermochemistry relationships (congested hydrocarbons, metal complexes, etc.).

Each article begins with a short table of contents and a brief abstract (100–200 words). The style and length, however, vary considerably from article to article. The first article, for example, titled Determination of Reliable Structures from Rotational Constants, by J. Demaison, G. Wlodarczak, and H. D. Rudolph, is a thorough review on structural determination using rotational constants from rovibrational spectra. It covers many new concepts and techniques along with a series of latest literature examples and carefully chosen references through 1997. Most of other articles are generally shorter in length but are thorough and careful with up-to-date research results and references. One of the articles, titled Specific Intermolecular Interactions in Organic Crystals: Conjugated Hydrogen Bonds and Contacts of Benzene Rings, by P. M. Zorky and O. N. Zorkaya, discusses two important types of intermolecular interactions in conjugated organic systems: conjugated hydrogen bonds (CHB) and specific benzene contacts (BzC). The subject matter in this review is carefully presented with ample illustrative examples. The list of references appears unusually short (21 entries; 11 of them are the author's own publications), which might cause the reader to question the thoroughness of the review.

An easily noticeable feature in the majority of the reviews is the frequent reference to ab initio results. Theoretical calculation using ab initio theory or density functional theory has been established as an important source of molecular structure data. The articles recognize this fact and have cited extensive computational data with favorable commentaries.

In general, this volume is a worthy member of the series reporting the recent progress in molecular structure research and will be a useful reference resource for workers interested in the topics covered in the book.

Fu-Ming Tao, *California State University, Fullerton*

JA975655N

10.1021/ja975655N

**Topics in Fluorescence Spectroscopy. Vol. 5. Nonlinear and Two-Photon-Induced Fluorescence.** Edited by J. R. Lakowicz. Plenum: New York. 1997. \$135.00, v + 544 pp. ISBN 0-306-45553-6.

Multiphoton excitation and stimulated emission methods for studies of biological species and cellular imaging have become a major focus of research in fluorescence spectroscopy. Predicted as early as 1931, two-photon excitation (2-PE) was observed experimentally first in 1961. Since the 1980s we have witnessed rapid growth in the popularity of 2-PE, particularly in the biological sciences. In 2-PE, molecules that absorb light in the UV and visible only are electronically excited by near-IR laser pulses (thereby violating Vavilov's "law"). This allows selective excitation of chosen volumes and may pave the way to 3-dimensional imaging with suppression of out-of-focus fluorescence comparable to confocal microscopy. 2-PE also has the potential of decreased photobleaching and background fluorescence, as well as excitation to different excited states.

The book is divided into 11 chapters that range from pure theory to experimental studies on (small) fluorophores. Theory prevails throughout. Chapters 1 and 2 cover two-photon-induced fluorescence anisotropy. Chapter 1 gives a brief introduction into this area and describes the properties of several basic fluorophores including benzene, tyrosine, and tryptophan. The second chapter is a more extended and rather

theoretical treatment which the nonspecialist probably is unable to follow. Of much larger interest to the chemist and biochemist is Chapter 3 (on multiphoton excitation of fluorescent probes and natural fluorophores). The specific features of two- and three-photon excitation are nicely demonstrated in studies on lipid membranes, stained DNA, and HSA. A final section is on two-color-two-photon excitation. Chapter 4 claims to cover aspects of 2-PE and anisotropy decays in membranes and oriented systems but is purely theoretical and a nightmare to read. The excessive equations are tiring, the results are not at all underpinned by experimental data, and the relationship to membranes is far-fetched. Chapter 5 (2-PIF of proteins) therefore comes as a relief, is a pleasure to read, and also contains numerous interesting experimental results. Chapter 6 contains studies on the weak short-wavelength emission of highly excited molecules created by 2-PE. It also demonstrates the possibilities of transient resonant multiwave mixing experiments for studies of ultrafast molecular photodynamics.

Stimulated emission is treated in Chapters 7, 8, and 10. Highlights include the analysis of the information contained in vibrational population relaxation, the quenching of luminescence by light, and pump-probe time-resolved microscopy. Fluorescence microscopy is also treated in Chapters 9 and 11. A method referred to as "point-spread function engineering", introduced in Chapter 9, increases the resolution in the far field. 4-Pi confocal microscopy appears particularly promising. Multiphoton microscopy of confined volumes and deep imaging are some of the highlights of Chapter 11.

Overall, the book is mainly theoretical and will appeal to physicists more than chemists or biologists. It is the most comprehensive book on the subject at present. Some overlap does exist but is acceptable. Another volume, written for biologists, is desirable.

Otto S. Wolfbeis, *University of Regensburg*

JA9856396

10.1021/ja9856396

**Studies in Natural Products Chemistry, Volume 19, Structure and Chemistry (Part E).** Edited by Atta-ur-Rahman. Elsevier Science Publishers B.V.: Amsterdam. 1997. xi + 627 pp. \$250.00. ISBN 0-444-82815-X.

This latest volume of *Studies in Natural Products Chemistry* contains thirteen chapters which span the interface between chemistry and biology. More specifically, the following topics have been surveyed: Recent Advances in the Synthesis of Dendrobatid Alkaloids written by C. Kibayashi and S. Aoyagi, Synthesis of Some Aspidosperma and Related Alkaloids written by G. Kalas, I. Greiner, and C. Szantay, Synthesis of Natural Products via Aliphatic Nitroderivatives written by R. Ballini, Stereospecific Cannabinoid Synthesis: the Application of New Techniques to a Classical Problem written by M. A. Tius, Methods for Construction of Sidechain of Brassinosteroids and Application to Syntheses of Brassinosteroids written by B. Jiang, L. Huang, W. Tian, and W. Zhou, Total Synthesis of Quinocarcin and its Related Compounds written by T. Katoh and S. Terashima, Synthesis of Mannostatins and Cyclophellitols, New Cyclitol Inhibitors for Glycoside Metabolism of Glycoproteins and Glycolipids written by Y. Nishimura, Molecular Rearrangement in the Derivatives of Grandifloreneic Acid [(-)-kaura-9(11),16-diene-19-oic Acid] and Some Related Diterpenes written by T. Nakano, Total Syntheses of Cyclic Halo Ether Compounds from Marine Origin written by A. Murai, Oxidative Ring Transformation of 2-Furylcarbinols in Natural Product Syntheses written by T. Honda, Stereoselective Synthesis of C-Branched Nucleoside Analogues written by P. N. Jørgensen and J. Wengel, Bioactive Marine Macrolides written by T. Higa and J. Tanaka, and lastly Hormones in the Red Swamp Crayfish written by A. Yasuda and Y. Naya. Albeit rather expensive, this latest volume continues the high standards and elements of timeliness for which this long-standing series of texts is known.

George Majetich, *The University of Georgia*

JA985616R

10.1021/ja985616R