

Biochemical Applications of Raman and Resonance Raman Spectroscopies

by P.R. Carey

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The vibrations of a biological molecule provide one of the most sensitive probes of its conformation and environment. Raman spectroscopy, now experimentally facilitated by laser light sources, allows these vibrations to be monitored without their being obscured by bands from the water solvent. Raman spectra can be obtained on samples in any physical state, including in situ in whole organisms, and the resonance Raman effect, the $\leq 10^5$ enhancement of certain bands of a chromophore, allows specific groups in a biological macromolecule to be monitored. Dr Carey, a leading researcher in the field, has written this book with the stated purpose of both introducing the biochemist to the physical chemistry of the technique, and the physical chemist to the biochemical problems his technique can address. He has succeeded in his purpose most excellently.

An introductory chapter (10 pp.) is followed by one devoted to the theory of the Raman and resonance Raman effects and their more elaborate variants (47 pp.). This treatment is very comprehensible – this reviewer had to enlist the aid of a tame theoretical physicist only for a short section, clearly marked as impassable to biochemists,

on the theory of the resonance Raman effect. Chapter 3 (23 pp.) deals with 'state-of-the-art' instrumentation. Chapters on applications to biochemical systems comprise the remainder of the book: protein conformation (28 pp.); resonance Raman studies of natural, protein-bound chromophores (55 pp.); resonance Raman labels (28 pp.); nucleic acids and nucleic acid-protein complexes (24 pp.) and lipids, membranes and carbohydrates (30 pp.). For the most part, alas, these chapters show the various Raman techniques confirming what we already know, rather than contributing substantially to the development of new ideas, although I expect Dr Carey's book, by making the techniques accessible to the non-specialist, will go a long way towards remedying this.

A useful index and lists of general references are provided, as well as references to the primary literature up to 1980. The book is substantially free of mis-prints and well produced, except for one feature – the cheap and nasty modern habit of photocopying stencilled drawings of organic structural formulae, rather than setting them in type.

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