

Molecular spectroscopy. Vol. 1. By A. C. LEGON, R. F. BARROW and D. J. MILLEN. Pp.xv + 621. Figs. 93, Tables 122. London: The Chemical Society, 1973. Price £12.00.

This is the first volume in the series of *Specialist Reports on Molecular Spectroscopy*. The editors indicate that they intend to cover the subject by emphasizing principles and practice, and only occasionally to organize material on a subject basis. This seems an admirable approach and, in this volume, the overall balance of the reviews is well maintained.

The first chapter is wide-ranging and contains a very readable account of the information obtainable from microwave spectroscopic studies, particularly with regard to conformational problems. The next chapter, on the electronic spectra of large (organic) molecules, is concerned mainly with rotational band contour analysis (including a useful tabulation of results to date); but there is also a coverage of selected vibrational analyses, as well as an interesting section on transition and excited-state dipole moments.

Chapter 4 is concerned with the low-lying states of diatomic halogens and interhalogens. There is also a useful comparative compilation of ionization energies and electron affinities for these species. Chapter 3 contains a helpful introduction to the problem of relating the energy levels of a diatomic molecule near dissociation to the form of a model long-range interaction potential: an approach which is shown to be useful for determining accurate values for bond dissociation energies.

The remaining chapters are all concerned with the application of infrared and Raman spectroscopy: from conformational studies of polypeptides, proteins, nucleic acids

and polymers (Chapter 7), to detailed and wide-ranging structural studies of diatomic, triatomic and small polyatomic molecules (Chapters 5, 6, 8, 9). Chapter 5, on far infrared spectroscopy, gives detailed references to existing reviews, and the coverage ranges from instrumentation to the use of the technique to probe different physical properties: of particular interest is the table of multipole moments. Chapter 8 is subject-oriented, and concentrates on a detailed structural study (in the gaseous, liquid and solid states) of the family of molecules XCN, where X=H, Hal, CN. Finally, Chapter 9 contains a broad review of the matrix isolation technique, together with some useful hints on possible pitfalls in interpreting experimental results. The appendix, which is of considerable value, contains a detailed tabulation in note form of species, source, matrix and results found.

All in all there is a wealth of structural and chemical information packed into the 600 pages. It is a pity, however, that the volume lacks a comprehensive molecule index (with brief notes) to coordinate the results from different chapters: as it is, HCN, for example, is discussed from different points of view in four separate chapters. Despite this minor criticism, the volume forms a valuable addition to the literature, and will be of interest not only to spectroscopists, but to a much wider range of chemical physicists, chemists and biophysicists.

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