

Electron donor-acceptor complexes

Catalysis by Electron Donor-Acceptor Complexes: Their General Behaviour and Biological Roles. By Kenzi Tamaru and Masaru Ichikawa. Pp. viii+208. (Kodansha: Tokyo; Wiley: New York and London, March 1976.) \$23.40; £11.70.

IN view of the large number of recent books and reviews dealing with various aspects of electron donor-acceptor (EDA, or charge-transfer) complexes, one must ask whether this book contributes anything new. Unfortunately, aside from one chapter, the answer is no.

The central theme of the book is the chemical properties of EDA complexes, including their reactions, catalysis by EDA complexes, and the biological importance of EDA complexes. Chapters 1 (Introduction, 8 pages) and 2 (Formation of EDA Complexes, 44 pages) present a brief general introduction to the subject of EDA complexes. Most of this material is covered more clearly and accurately in earlier books and reviews.

Chapter 3 (Homogeneous Catalysis by EDA Complexes, 40 pages) discusses reactions of EDA complexes and catalysis by complexing in solution. This chapter contains numerous inaccurate and confusing statements and is neither complete nor up to date. Again, this subject is covered much more adequately in any one of several recent books and reviews.

Chapter 4 (Heterogeneous Catalysis by EDA Complexes, 66 pages) deals with the subjects of adsorption through EDA complexing and by EDA complexes, and catalysis by solid EDA complexes. This topic, being the main interest of the authors, is covered in much more detail with numerous references to recent work. I found the chapter interesting and relatively free from errors. No comparable review of these subjects is available elsewhere.

Chapter 5 (Role of EDA Complexes in Biochemical Reactions, 40 pages) is again neither complete nor up to date and the subject is covered more adequately elsewhere.

A very substantial fraction of Chapter 5 as well as smaller parts of Chapters 2 and 3 are copied almost verbatim from earlier books and reviews. Perhaps this is why, with the exception of Chapter 4, there are few references later than 1968.

In summary, the only very useful part of this book is the chapter dealing with heterogeneous catalysis. Only persons actively interested in this area

are likely to consider paying \$23.40 for a 66-page review on the subject.

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Vibrational spectroscopy

Vibrational States. By S. Califano. Pp. xii+335. (Wiley-Interscience: London and New York, April 1976.) £16.75; \$34.50.

THIS is a textbook on the theory of vibrational spectroscopy for graduate students. It evolved from a lecture course given by the author in the University of Florence, and is restricted to the theoretical treatment of vibrations of isolated molecules.

The book consists of nine chapters, plus two appendices containing group-theoretical character and correlation tables. Chapter 1 is a short introduction to infrared and Raman spectroscopy. Chapter 2 presents the classical theory of small molecular vibrations and includes a very clear account of the separation of translational, rotational and vibrational motion (the Eckart or Sayvetz conditions). The quantum theory is given in Chapter 3; it deals with the one-, two- and three-dimensional harmonic oscillator and with the quantum radiation field. Chapter 4 is concerned with the transformation to internal coordinates and the construction of the F and G matrices for the

force constants and the kinetic energy in terms of the internal coordinates. Chapters 5 and 6 are devoted to the principles of group theory and its applications to molecular vibrations, and Chapter 7 to selection rules in infrared and Raman spectra. Various potential functions, including the general valence force field and the Urey-Bradley force field, are discussed in Chapter 8 which includes a brief description of Coriolis coupling, centrifugal distortion, and the *ab initio* computation of force constants. The final chapter is concerned with anharmonicity and Fermi resonance.

The author has given us a clear and detailed account of the main topics in the theory of molecular vibrations. There are omissions, including vibronic coupling, internal rotation, circular dichroism, and Raman spectra resulting from the anti-symmetric part of the polarisability tensor; and a few obscurities and minor errors, such as the comparison at the foot of p20 of quantities having different dimensions. SI units are not used, nor are Mulliken's recommendations (*J. chem. Phys.*, 23, 1997, 1955) for the choice of molecule-fixed axes; the coordinate frames on p19 are left-handed and some of the diagrams (such as that showing a plane of symmetry on p103) are not clear. But overall this is a good book that will be a useful addition to the well-known texts by Herzberg and by Wilson, Decius and Cross.

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Environmental dictionary

Dictionary of Environmental Terms. By Alan Gilpin. Pp. 191. (Routledge and Kegan Paul: London and Henley, September 1976.) £3.50.

THIS book is attractively produced, easy to use, and has some very useful features: the list of abbreviations at the beginning (although why does the MW=megawatt come between p.p.m. and its expansion?) and the Appendix carrying the Statement of the Stockholm Conference on the Human Environment (1972). The important criteria in reviewing such a book are: "Does it contain puzzling words that the student/layman is likely to encounter?" and "Are the definitions sound?". The range of words is admirably broad, but there are some omissions, especially of

biological terms. No 'biotic index', 'sere' or 'ecotype', for instance, and only 'meteorological stability'. On the pollution side 'fanning' of plumes appears, but no 'slug' or 'slick'; and although 'effluent charge' is included 'consent' or 'consent conditions' is not.

'Qualitative and quantitative analysis' probably need not have been included, and the long description of Boulding's green stamp plan for creating a market in procreation, although intriguing, is of only marginal importance.

Some of the explanations are too discursive, more appropriate to a gazetteer than a dictionary. In spite of these criticisms, however, this is a helpful book reasonably priced.

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