

general nature of the polycyclic hydrocarbons and the definition of 'large'. The nomenclature of the systems is discussed, presumably for those who are not familiar with these compounds, and this could be made much easier to follow if the relevant letters were given to the faces of the relevant rings, for example to compare the name benzoghiperylene with the structure. The author also adopts an unusual style in not attaching the compound number to the structure named in the text but calling them *compound x*; this is of no consequence when each structure is addressed, but it becomes difficult for the reader when one is given lists (e.g. see page 46). The second chapter discusses the large polycyclic hydrocarbons (LPAHs), with sections on their properties, synthesis and theoretical studies. The theoretical section again suffers greatly from incorrect structures (e.g. **100**, **101**, **102**). The first sentence of section 2.2, 'Many PAH properties extend continuously upward with increasing molecular weight', may possibly be made to make sense, but this is followed by the discussion of two properties that diminish with increasing molecular mass. Chapter 3 discusses the electronic spectra, including solvent effects, and examples of spectra are reproduced. Fluorescence spectroscopy is discussed in Chapter 4, including narrow line-width spectral techniques and time-resolved methods. Infrared methods are discussed briefly in Chapter 5, and mass spectroscopy in more detail in Chapter 6. The interesting topic of the spectra of LPAHs in outer space is discussed in Chapter 7, with the observed bands correlated to the spectra of specific hydrocarbons. Chromatographic fractionation of the LPAHs by GLC, TLC and HPLC techniques is discussed in Chapter 8. Chapter 9 indicates where LPAHs may occur naturally and the difficulties of analysing for them because of the dearth of standard compounds. Chapter 10 examines methods for structural elucidation, including X-ray crystallography and NMR; there is a brief chapter on sample preparation, and the final chapter compares structural methods and the information they provide. There is an appendix of fluorescence spectra and a brief index.

PETER GARRATT  
*University College London*

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### **Chemical process technology**

J. A. Moulijn, M. Makkee and A. van Diepen

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xii + 453 pages. £27.50

ISBN 0-471-63062-4 (paperback)

Good books on industrial chemistry are almost as thin on the ground nowadays as industrial research laboratories. This book emanates from Holland, which is noted for having good relations between academic and industrial laboratories. Professor Moulijn has been at the forefront of research on industrial catalysis for many years.

This is a teaching text rather than a reference book. A small number of generic processes are treated in sufficient detail for the reader to appreciate the principles involved in their design. Petroleum refining and the heavy organic chemicals industry are the main foci, but there are also chapters on some bulk inorganic chemicals, catalysts, fine chemicals, and biotechnology.

Readers of *Applied Organometallic Chemistry* may turn first to the chapter on homogeneous catalysis. The examples here include Wacker oxidation, hydroformylation, and the production of acetic and terephthalic acids. The catalytic cycles involved in these processes are explained in sufficient detail for the average chemist to understand, but the underlying subtle reasons governing the choice of catalytic metal and ligand are, understandably, omitted.

Chemicals are given their common names, appropriate for an industrial text, except for ethene and propene. This inconsistency generates the clumsy names 'polyethene', 'poly-ethene terephthalate' and 'polypropene', which I have never seen elsewhere. Each chapter has a generous number of references, and there is a good index. The book is well written and attractively produced and should be required reading for all students of chemical engineering. Chemists should read it too.

ALAN E. COMYNS  
*A. E. Comyns & Associates, Chester, UK*

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