evaluation of the effective diffusion coefficients and effective rate constants.

3. This chapter deals with the Stephan flow which is mass flow perpendicular to a surface resulting from non-equi-volume counter diffusion in a heterogeneous reaction.

4. The theory of simultaneous heat and mass transfer is presented for conditions of non-isothermal diffusion.

5. After four chapters devoted to diffusion and heat transfer these phenomena are combined with the chemical kinetics of non-catalytic heterogeneous reactions. Dimensional analysis is applied to the rate of transfer in turbulent and laminar layers for both gases and liquids. The alternate theory of Landau and Levich is presented. These latter investigators deny the presence of a laminar layer in turbulent flow. A comparison is given of the different assumptions made in calculating velocity distributions in turbulent flow by the methods of Prandtl, Frank-Kamenetskii, and Karman. Diffusional equations are extended to fluidized solids, that is, to suspended particles moving with the fluid stream.

6. Several theories of combustion, thermal ignition, thermal explosion and flame propagation are developed by the methods of dimensional similitude. The theories of Darnell and of Zeldovich are included.

7. Methods of calculating temperature distribution in thermal explosions taking place in differently shaped reaction vessels are presented and supported by experimental evidence.

8. The rate of flame propagation under still conditions is developed with discussion of the effect of mixing of combustible gases with air. The propagation of flame by shock waves is not presented.

9. The dependence of the rate of non-catalytic heterogeneous exothermal reactions upon simultaneous diffusion and heat transfer is present from the phenomena of ignition and extinction with correction for Stephan flow and thermal diffusion.

10. In the final chapter periodic processes and transient phenomena in chemical kinetics are introduced without elaboration.

This text is an excellent review of the developments in Russia to 1947 of diffusional phenomena associated with the kinetics of reactions uncatalyzed by solid catalysts.

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Determination of Organic Structures by Physical Methods. By E. A. BRAUDE, Imperial College of Science and Technology, London, England, and F. C. NACHOD, Sterling-Winthrop Research Institute, Rensselaer, New York, Editors. Academic Press, Inc., Publishers, 125 East 23rd Street, New York 10, N. Y. 1955. xiii + 810 pp. 16 × 23.5 cm. Price, $15.00.

Modern organic chemists are very alert to the possibilities of using physical methods to aid solution of their structural and analytical problems. Almost all active organic research groups are now equipped with accurate and efficient recording ultraviolet and infrared spectrophotometers which will probably be generally implemented by Raman and nuclear magnetic resonance spectrometers within the next few years. In active use, such instruments quickly repay their large initial investment through savings of time and materials and, in combination with the more traditional arsenal of physical methods, have facilitated syntheses and structure determinations of extraordinary difficulty. Unfortunately, a practicing chemist often has trouble in learning about the capabilities of the various physical methods as well as where and how a given technique can be applied to his research. The present volume is almost ideally set up to enable an organic researcher or student with a modicum of physical theory to locate illustrative examples and references for the application of some thirty physical methods to the determination of organic structures.

The work has twenty-two authors in all but nonetheless the style is pleasingly uniform and the degree of duplication small. The fifteen chapters range from 18–88 pages and are generally organized so as to have a brief introduction followed by some description of experimental procedures and finally by theory and examples. The level of presentation is uniformly high but, in the opinion of the reviewer, not unduly so. The only exception is the chapter on magnetic susceptibility (and nuclear magnetic resonance absorption) which is almost wholly theoretical and will be largely incomprehensible to anyone who lacks the equivalent of an advanced course in electricity and magnetism. This is quite unfortunate in view of the current rapid development of high-resolution nuclear magnetic resonance spectroscopy as applied to organic compounds. Many interesting subjects are covered which are relatively unusual to a book of this character such as selection rules in Raman spectroscopy, structure determinations from heat capacity and entropy measurements, microwave spectroscopy, properties of surface films, and the use of dissociation constants for determination of structures of natural products. Each chapter is very thoroughly documented and, in all, some 1800 literature citations are given.

The book is attractively printed except for a number of needlessly distorted typeset formulas as on pp. 359, 386, 397, 408, 629, 641, 653, and 701. Few typographical errors were encountered.

This volume is warmly recommended to both students and organic research workers as a useful and informative reference book.

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Handbook of Hydrocarbons. By S. W. FERRIS, Chief, Industrial Products Section, Research and Development Department, Sun Oil Company, Marcus Hook, Pennsylvania. Academic Press, Inc., Publishers, 125 East 23rd Street, New York 10, N. Y. 1955. ix + 324 pp. 16 × 23.5 cm. Price, $8.50.

This excellent summary of hydrocarbons is not recommended for an afternoon of light reading. The introduction, covering 17 pages is a most informative and instructive dissertation on chemical nomenclature. Anyone at all interested in this subject should certainly read Mr. Ferris' introductory remarks.

The remainder of the book is an excellent compilation of data on physical properties of hydrocarbons. It should prove to be invaluable to those needing information either about a specific hydrocarbon or about compounds present in a cut of known boiling range. The properties covered are boiling point, melting point, index of refraction and density. Data available in the literature up through the early part of 1954 are included. The information is presented by means of four tables. Table A lists hydrocarbons in the order of their boiling points at 760 mm. Methods of correcting boiling points to other pressures are given in the Appendix. Table B arranges hydrocarbons in groups of the same molecular weight and type, *i.e.*, alkanes, alkenes, cyclanes, aromatics, etc. This table is useful when either a systematic name, structural formula or empirical formula is known. Table C lists alternate names for the compounds listed in the previous Table. Table D gives names, carbon–hydrogen numbers, and numbered structural formulas for representative cyclic hydrocarbons.

The book is extremely simple to use and Mr. Ferris is to be congratulated for making it available to other workers in the field of hydrocarbon chemistry.

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