

Book Reviews

Gmelin Handbook of Inorganic and Organometallic Chemistry, 8th edition Th, Thorium, Supplement Volume D4, Chromatography, Chemistry in Nonaqueous Solutions

Springer-Verlag, Berlin, 1991, pp. 215 + xiv. ISBN 3-540-93636X

This is the last volume of the current opus to deal with thorium, and it covers the literature to the end of 1990. It deals with two different subjects. The first 128 pages deal with chromatography of thorium compounds of Th^{IV}, with the exception of ion exchange column chromatography, to which an entire volume has already been devoted. As is usual with Gmelin, the data are presented in tremendous detail. If you need to chromatograph thorium compounds, the methods are all described, column size, packing, temperatures, retention volumes, separations on papers, etc., etc. The question which springs to mind concerns the size of the constituency for such information.

The next 85 pages deal with thorium chemistry in non-aqueous solutions. The principal concern is not with reactivity but with conductivities and molecular-weight data (all tabulated in detail), solubility and dissolution, and finally complexes with agents such as Schiff bases, amines, cycloalkenes, though this is a very small part of the material.

This book is written by two experts, who are clearly meticulous in the usual Gmelin fashion and highly competent. My reservation is the potential market for material of this kind. The Gmelin series is a treasure of value to all the community. I hope it can survive the competition of the newer methods of data retrieval. If problems do arise, perhaps concentration on the more marketable areas of the subject may help to overcome them.

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Solid Supports and Catalysts in Organic Synthesis

Ed. K. Smith, Ellis Horwood and Prentis Hall, New York, 1992, 338 pages, US\$85.00. ISBN 0-13-639998-3

This book contains an interesting collection of twelve reviews by an international panel of authors. It begins with two chapters, one describing the nature and structure of the various inorganic solids which are used as catalysts and supports, and one dealing with the preparation and relevant properties of organic polymers as supports. This section is followed by four chapters dealing with various traditional organic reactions which can be improved by the use of solid supports and catalysts. The chapters in this section are classified by the type of solid used rather than reaction type and so there are chapters dealing with amorphous inorganic solids; clays and other lamellar solids; zeolites; and polymeric resins. Part three of the book contains three chapters on solid supports and catalysts in biological chemistry and molecular biology, and, as one would expect, the topics of solid phase peptide synthesis; solid phase oligonucleotide synthesis; and immobilised biocatalysts are dealt with. A final part contains chapters on individual topics of current research, such as hydrogenation; designing microreactors; and microwave activation of reactions on solid supports.

This is useful complication, being an excellent introductory reference book for the practising synthetic organic chemist. Under its title it deals with a wide variety of topics. It is an excellent primer on the use of solid supports and catalysts and details of practical techniques are not neglected. The book is well indexed.

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Academic Press Dictionary of Science and Technology
C.G. Morris (ed.), Academic Press, San Diego, CA, 1992, xxxii + 2342 pages. £68.00. ISBN 0-12-200400-0

This book is described as 'The New Standard of Excellence' by the publishers, who state that to ensure

their accuracy the definitions it contains were arrived at in the following way:

(a) The Reference Division of Academic Press developed a vocabulary list for each of the 124 individual fields covered.

(b) These lists were verified by an Advisory Board (including eminent chemists).

(c) Outside experts were invited to write the definitions; each definer was assigned a word-list for the particular field in which he or she had expertise.

(d) All definitions were reviewed and edited by the Reference staff, and then further reviewed by editors from Academic Press Books and by certain members of the Advisory Board.

(e) The definitions were independently verified by a Review Panel, a group of peer reviewers.

(f) The entire text was given a final reading for correctness and consistency at the page proof stage by editors from Academic Press Journal and Book Divisions. This final reading was independent of all earlier stages of the project and provided a fresh eye on the manuscript.

The success of this procedure as far as chemical terms are concerned can be judged from the sample definitions below:

allyl Organic Chemistry. An unsaturated radical ($-\text{CH}_2=\text{CHCH}_2$) that is derived from allyl alcohol by the removal of hydrogen.

balanced salt solution Chemistry. A solution of salts in which the ratio of salts is balanced proportionally so that the toxic effects of each salt are eliminated.

bidendate Chemistry. Describing a molecule whose atoms are joined to a metal atom or ion to form a coordination complex.

bonding orbital Physical Chemistry. A relationship between an electron and a nucleus in which the electron's energy decreases as it draws closer to the nucleus, causing them to unite.

chiral Chemistry. Of a molecule in a given configuration, not symmetrical with its mirror image.

conjugation Chemistry. The joining together of two compounds to produce another compound.

deactivating group Organic chemistry. A substituent group that when added to benzene causes the derivative molecule to react more slowly than benzene.

dihydro- Chemistry. A combining form indicating the presence of two hydrogen atoms in a compound.

flash point Chemistry. The lowest temperature at which a vapor above a liquid will quickly ignite when the liquid is heated under standard conditions. [Correct definition: The temperature to which a liquid must be heated before the vapor will ignite when exposed to a free flame in the presence of air.]

Grignard reaction Organic Chemistry. A reaction in which the addition of organomagnesium compounds to

carbonyl groups or other unsaturated groups produces alcohols or ketones.

Grignard reagent Organic Chemistry. A class of reagents with the general formula of RMgX , where R is an alkyl or aryl group (or other such organic group), Mg is a metallic magnesium, and X is a halogen formed in the Grignard reaction; used in synthetic organic chemistry.

hard base Chemistry. An acid having low polarizability and high electronegativity.

inert Chemistry. Not reacting with other elements.

isocyanide Organic Chemistry. Any compound of the type $\text{R}-\text{N}=\text{C}=\text{O}$.

metal-cluster compound Chemistry. A compound in which two or more metal atoms are within bonding distance of each other, and each is in turn bonded to at least two other metal atoms.

methyl silicone Organic Chemistry. $[(\text{CH}_3)_2\text{SiO}]_n$, a class of silicone compounds that occur as volatile, colorless oils with boiling points ranging from 118°C to 134°C ; used as transformer liquid and brake fluid.

o-nitrobiphenyl Organic Chemistry. $\text{C}_6\text{H}_5\text{C}_6\text{H}_4\text{NO}_2$, a combustible, light yellow to reddish solid or liquid ...; melts at $36\text{--}38^\circ\text{C}$ and $165\text{--}170^\circ\text{C}$ (13 torr) and boils at 330°C

nonbonding orbital Physical Chemistry. A relationship between an electron and a nucleus in which the electron's energy remains constant as it draws closer to the nucleus so that neither bonding nor repulsion is expected to take place.

P (sic) electron Atomic Physics. One of the electrons that is found in the P shell of an atom and displays the characteristics of the principal quantum number 6.

reflux condenser Chemical Engineering. A process device connected to the top of distillation column that condenses the vapor drawn off the top of the column.

sigma bond Physical Chemistry. A covalent bond that forms at the point where the electron orbitals of two adjoining atoms overlap.

silicon fluoride Inorganic Chemistry. SiF_4 , a colorless fuming gas...; freezes at 90.2°C and boils at 86°C .

stereospecific synthesis Organic Chemistry. A synthetic reaction of a single stereoisomeric monomer that produces a single stereoisomeric polymer.

Traube's rule Physical Chemistry. The observation that the addition of a methylene substance causes the surface tension of a dilute solution to decrease three-fold.

trans Organic Chemistry. A form of a molecule in which the unsaturated bonds of a monomer are located in opposite sides of the molecule.

It would be wrong to leave the impression that all the chemical definitions are as bad as these, since most are of the simple, and rather unhelpful, type exempli-

fied by: '2,6-dichloro-4-nitroaniline, $C_6H_4Cl_2N_2O_2$, a yellow solid that is soluble in alcohol and melts at $191^\circ C$ '. However, there are errors even in many of these, especially where structural formulae are displayed.

It is possible that the standard is higher in fields other than chemistry, but in many cases in which I felt competent to judge the definitions appeared to be either faulty, uninformative, or pointless. Some of the illustrations could be of value; for example, someone who wished to know what a rhinoceros looks like would be helped by the drawing of the animal. However, many others are remarkably uninformative; see, for example, those of a dive bomber (shown in level flight), an atomic clock, a diffusion pump, a ramjet engine, and a hurricane. Yet others are incorrectly labelled; thus the drawing said to be of ragweed is actually of ragweed pollen.

Academic Press should be ashamed of this publication, and would be well advised to withdraw it. It has a certain entertainment value, since many hours can be spent searching through the 124,000 entries for the most incorrect, unhelpful, or absurd definitions and showing them to one's colleagues, but it is rather costly to buy for that purpose alone.

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Advanced Organic Chemistry

J. March, Wiley, New York, 4th Edn., 1992, xv + 1495 pages. £24.50 (soft cover; hard cover £45.50). ISBN 0-471-601802

This book has, deservedly, been so well known and so highly regarded for so long that a detailed outline of its contents is unnecessary. It is important to note, however, that although the organization remains unchanged, this edition is substantially updated, as illustrated by the fact that of the *ca.* 15,000 references it contains, some 5000 appear in it for the first time, and there are 149 additional pages. The mechanism and scope of about 580 reactions are surveyed, arranged systematically in terms of reaction type and the identities of the bonds formed and broken. As the author states, it is intended primarily to serve as a text book, but it is also extremely valuable as a reference work.

Readers will be very grateful to Professor March for continuing with his giant task, and congratulate him for maintaining the quality of his effort. This new edition can be recommended unreservedly, and the soft cover version in particular represents wonderful value for money.

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