

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/244439375>

# Catalytic Enantioselective Hetero Diels–Alder Reactions of $\alpha,\beta$ -Unsaturated Acyl Phosphonates with Enol Ethers J. Am. Chem. Soc. 1998 , 120 , 4895–4896

ARTICLE in JOURNAL OF THE AMERICAN CHEMICAL SOCIETY · JUNE 1998

Impact Factor: 12.11 · DOI: 10.1021/ja9855085

---

CITATION

1

---

READS

4

2 AUTHORS, INCLUDING:



David A. Evans

Harvard University

410 PUBLICATIONS 31,158 CITATIONS

SEE PROFILE

## Additions and Corrections

**Catalytic Enantioselective Hetero Diels–Alder Reactions of  $\alpha,\beta$ -Unsaturated Acyl Phosphonates with Enol Ethers** [*J. Am. Chem. Soc.* **1998**, *120*, 4895–4896]. DAVID A. EVANS\* AND JEFFREY S. JOHNSON

Due to an oversight, a reference germane to the current study was omitted.

Evans and co-workers<sup>1</sup> have reported their findings on the achiral Mukaiyama Michael reaction of crotonyl phosphonates with silyl enol ethers, a reaction similar to the asymmetric hetero Diels–Alder reaction that we have disclosed:

(1) Telan, L. A.; Poon, C.-D.; Evans, S. A., Jr. *J. Org. Chem.* **1996**, *61*, 7455–7462.

JA9855085

S0002-7863(98)05508-5

Published on Web 06/05/1998

## Computer Software Reviews

**Ullmann's Encyclopedia of Industrial Chemistry, Fifth Edition on CD-ROM.** Edited by H. Arpe et al. (Hoechst Aktiengesellschaft). Wiley-VCH: Weinheim, Germany. 1997. \$14300.00 (CD version); \$16450 (both the print and CD versions). Annual updates of the CD version will be available for approximately \$1150. ISBN 3-527-20159-9.

For years, *Ullmann's Encyclopedia of Industrial Chemistry* has been a standard reference in applied chemistry. The fifth edition is the first to be published entirely in English. The "A" series of this edition comprises 28 volumes on industrial chemicals, production processes, and product groups. Articles on chemicals or product groups generally contain sections on history, properties, production, uses, chemical analysis, economic aspects, environmental protection, and toxicology. The "B" series contains an additional eight volumes on chemical engineering fundamentals, such as plant design, analytical methods, and environmental protection. *Ullmann's Encyclopedia of Industrial Chemistry on CD-ROM* includes all 36 volumes and is a comprehensive, user-friendly reference on industrial chemistry and chemical engineering. It contains about 1000 articles written by 2800 international authors from both academia and industry. Its powerful search software enables the user to search for specific words or phrases, authors, or references. Beginning in 1998, annual updates will be made to the CD version to incorporate new material.

**Requirements:** An IBM-compatible PC with an 80386 or higher processor, 66 MHz or faster, 8 Mbyte of RAM, and 8 MB of hard disk space are required. The operating system must be at least Microsoft Windows 3.1 or MS-DOS 5.0. A double speed (minimum) CD-ROM drive and a mouse are also required. The CD-ROM was evaluated on a 233 MHz Pentium II PC running Windows 95 with 32 MB of RAM and a 24X CD-ROM drive. Response time was excellent. While no technical problems were encountered during installation or use, the only contacts provided for technical assistance are a fax number in Germany and an e-mail address. The CD-ROM can be installed on a single PC or on a local area network for a single concurrent user. Multi-user licenses are available.

The software was easily and quickly installed. The screen layout was clear. The default layout consists of two frames, a main display window on the right and a list window on the left. The list window shows the table of contents, author listing, or CAS registry numbers, while the main window shows the selected article. The list window can be closed to view the article on the full screen. Hyperlinks in the articles can be clicked on to view tables and figures. Clicking on reference numbers in the articles brings up a pop-up window containing

the reference. While viewing the reference list, each reference is preceded by an arrow, which takes the reader to the section of the article where that reference is made. Most commands can be run from the menu, from icons on the toolbar, or by using keystrokes.

*Ullmann's* has a powerful search engine that allows for two levels of searches. Index searching allows a quick search of a variety of indexes, including full text, author, CAS number, keyword, subject area, table of contents, references, and tables. A more versatile search option, the Profiled Search Function, is also available. This function allows several indexes to be combined using Boolean or proximity operators. It also allows truncated search terms, wild cards, case-sensitive terms, and phrase searching. A third quick search option is also available. While viewing an article, the user can highlight a word or phrase and then right-click the mouse. By choosing "Lookup Selection" from the window, the highlighted word or phrase is searched and the articles where it appears are displayed in a results list.

Articles are separated into sections, allowing for fast, specific retrieval. For example, the Polymers and Plastics article is divided into 62 sections, such as films, alkylid resins, plasticizers, and polyolefins. Each of those sections is split into subtopics, which cover the chemistry of the product, as well as its production and economic aspects. Articles can be printed, and text can be copied into word processing programs.

A history list is created during each session to allow the user to backtrack to any articles viewing during that session. Articles can also be put into a temporary memory list or "spiked" where they can later be retrieved during the session. Another feature allows the user to add notes to an article. An icon appears in the article to indicate where user notes have been added. User notes can also be searched.

In addition to *Ullmann's Encyclopedia*, a German–English dictionary of technical terms is also available on the CD-ROM. All defined terms in the dictionary are hyperlinked to the *Encyclopedia*. When a term is entered into the dictionary, the translation is shown, if available. The English translation can be clicked on to initiate a keyword search in *Ullmann's Encyclopedia*. The current dictionary is fairly small, but the publisher claims that future versions will include a more extensive dictionary.

A 96-page manual is provided with the CD-ROM. The manual is well organized and includes installation instructions, an overview of the CD-ROM, and detailed descriptions of the functions. A particularly useful section on sample searches provides guidance on both basic and advanced search strategies, such as using Boolean operators, looking for specific properties of a chemical substance, and searching for phrases.

In summary, *Ullmann's Encyclopedia of Industrial Chemistry on CD-ROM* is a user-friendly product that provides quick access to a substantial collection of well-written, informative articles on all aspects of industrial chemistry. The product was easy to install and simple to learn and ran flawlessly. The search engine allows the user to conduct simple or advanced searches with nearly immediate results. Its pricing,

however, may preclude libraries or companies with limited budgets from purchasing it.

**Munmaya Mishra and Anita Feidler, Ethyl Corporation**

JA9859023

S0002-7863(98)05902-2

## Book Reviews

**Physical Adsorption; Forces and Phenomena. Series: International series of Monographs on Chemistry. No. 33.** By L. W. Bruch, Milton W. Cole, and Eugene Zaremba. ix + 340 pp. \$85.00. ISBN 0-19-855638-1.

This book is a monograph on the physics of adsorption on clean, single solid surfaces. A clear understanding of the equilibrium behavior of such adsorbed films has emerged over the last twenty years or so, and a book drawing together this knowledge is timely. Previous influential monographs have included those by Steele (*The Interaction of Gases with Solid Surfaces*, 1974), Dash (*Films on Solid Surfaces*, 1975) and Nicholson and Parsonage (*Computer Simulation and the Statistical Mechanics of Adsorption*, 1982), but these are inevitably somewhat dated now. Experimental work in this area has been much influenced by advances in scattering probes of monolayers and the availability of high vacuum techniques, while on the theoretical side there have been substantial advances in our understanding of dense fluid systems and phase transitions. Much of the book is based on these more recent developments.

The focus of the book is on monolayer physics and its relation to two-dimensional behavior. The emphasis is on simple molecules and surfaces, in particular inert gases adsorbed on graphite, metals, and oxides, but there is some discussion of molecular fluids and multilayer growth on surfaces. Experimental and theoretical work up to 1995 is covered. The coverage of the theory is particularly detailed and very clear; this is hardly surprising since the authors are theoretical physicists. Fluids in pores and chemisorption are not covered, and the coverage of molecular (as opposed to atomic) fluids is brief. Those interested in molecular simulation studies of these systems are likely to be disappointed; simulation work is dealt with in a sub-sub-section (5.2.1.6) of only two pages, and is somewhat dated.

The first chapter gives an elementary and helpful overview of monolayer physics, including a description of monolayer and multilayer adsorption, interaction potentials, and experimental techniques. Intermolecular interactions are described in more detail in Chapter 2, with emphasis on interactions between the adsorbate and substrate. Ab initio approaches are described, including density functional theory, followed by a brief account of more empirical potentials. The structure of monolayers is described in Chapter 3. The geometry of monolayer lattices and the definition of commensurate structures are covered, together with a brief survey of orientational structure in molecular films. The theory of monolayer adsorption is covered in Chapters 4 and 5. The simpler theories are covered in Chapter 4: the Langmuir and Brunauer–Emmett–Teller (BET) equations, based on the assumption of identical adsorption sites and no lateral adatom–adatom interactions; equations for two-dimensional systems, including the 2D ideal gas and virial expansion (classical and quantal); topological defects and superfluidity. These simple treatments do not describe phase transitions in the film. More advanced treatments, which include both adsorbate–adsorbate and adsorbate–substrate interactions, are given in Chapter 5. Lattice gas models, including renormalization group mappings and continuum treatments, are described. These more complete treatments make possible a study of the monolayer phase transitions, and examples of these are given together with some discussion of critical exponents and universality. In Chapter 6 the adsorption of inert gases on graphite, metal surfaces (the 111 surfaces of Ag and Pt, and the 100 surface of Pd), and oxides (especially MgO) are described. This is a very useful survey; experimental phase diagrams are given, and the behavior is related to the theory. Several appendices describe the classical thermodynamics of monolayers, derivations of several theoretical formulas, tables of adatom–substrate dispersion energies, and units. The latter appendix is welcome, since chemists, physicists, and engineers working on adsorption frequently use different units.

This book is an authoritative and well-written account of the theory of monolayer films of monoatomic adsorbates, and the relation between theory and experiment, and is likely to prove to be the classic text in this area for some time to come.

**Keith E. Gubbins, North Carolina State University**

JA975618W

S0002-7863(97)05618-7

**Monosaccharide Sugars. Chemical Synthesis by Chain Elongation, Degradation, and Epimerization.** By Zoltan Gyorgydeak and Istvan F. Pelyvas (Lajos Kossuth University, Debrecen, Hungary). Academic Press: San Diego. 1997. xviii + 508 pp. \$89.95. ISBN 0-12-550360-1.

Carbohydrate chemistry has played a pivotal role in the development of organic chemistry, in general, because of the unique features of the “simple” carbohydrate molecule. The monosaccharides are probably the most densely functionalized naturally occurring molecules and the most densely packed with chiral centers, and since they are polyols, they are usually difficult subjects to bridle and command in organic syntheses. Thus, most organic chemists approach their tasks with the expectation of accomplishing highly regioselective and stereoselective reactions, while carbohydrate chemists are grateful for modest regioselectivity in most of their nonanomeric reactions, and are thrilled by modest stereoselectivity in their reactions at the anomeric center.

Many textbooks written on carbohydrate chemistry focus on the speculative, mechanistic aspects of carbohydrate chemistry, and the reader is usually left quite unaware of the challenging experimental requirements of the carbohydrate reactions. Most carbohydrate reactions are subject to kinetic or thermodynamic controls, and unless one has had a chance to examine the experimental details of these reactions, all sense of the important manipulation of these important factors is lost, and so too is the excitement of the carbohydrate chemistry.

Drs. Gyorgydeak and Pelyvas have succeeded in producing a landmark text on carbohydrate chemistry not only by carefully reviewing some of the most important areas of synthetic carbohydrate chemistry, but also by allowing the reader to simultaneously assimilate representative examples of the experimental details of the reactions involved. In this single text, almost every important method for the ascending synthesis of monosaccharides from smaller units has been reviewed, and so too have the methods for the stepwise, controlled degradation of monosaccharides.

The authors have succeeded in locating excellent examples of the experimental procedures they wished to highlight, and the span of the references, both old and very recent, will give the reader a feeling of confidence in the authors' grasp and presentation of this complex area. Their limited examination of mechanistic speculations is exactly what one would expect in a text that is obviously focused on synthetic methods, and does not, in any way, detract from the excellence of the effort.

I certainly have not derived as much pleasure from reading a text on carbohydrate chemistry as I have with *Monosaccharide Sugars. Chemical Synthesis by Chain Elongation, Degradation, and Epimerization*. This text will undoubtedly save me many hours of searching the library for both references to important procedures in synthetic carbohydrate chemistry and important examples of experimental procedures.

**Vernon G. S. Box, City College of the City University of New York**

JA985617J

S0002-7863(98)05617-0