

Additions & Corrections

Catalytic Oxidation of Acenaphthene and Its Derivatives in Acetic Acid

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(*Org. Process Res. Dev.* 2002, 6, 394–400).

On page 398 there is a mistake in the list of products of acenaphthene oxidations. Unfortunately, we omitted the data for acenaphthene quinone. The correct version of the list of products should be as follows:

acenaphthene	0
acenaphthenone	0.0090 mol·L ⁻¹
trans-acenaphthylene glycol	0.0123 mol·L ⁻¹
naphthalide	0.0110 mol·L ⁻¹
acenaphthene quinone	0.0175 mol·L ⁻¹
naphthalic anhydride	0.0454 mol·L ⁻¹

We are grateful to Dr. Robert C. Mott of Bayer Corporation who attracted our attention to the error.

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Book Reviews *

Applied Homogeneous Catalysis with Organometallic Compounds, 2nd Edition. Edited by B. Cornils and W. A. Herrmann. Wiley–VCH: Weinheim. 2002. 1493 pp. Price \$375 (three volumes). ISBN 3-527-30434-7.

Since the first edition (two volumes) of this excellent compilation appeared in 1996, there have been tremendous advances in the understanding of organometallic homogeneous catalysis and in the applications on industrial processes. This second, completely revised, edition has been expanded, and the work now covers three volumes.

Volume one covers applied homogeneous catalysis, focusing on carbon monoxide chemistry, hydrogenation, reactions of unsaturated compounds, oxidation, hydrocyanation, hydrosilylation, hydroamination, asymmetric synthesis, Suzuki coupling, and so forth. These chapters not only cover the science in great detail but economics, catalyst lifetimes, and production capacities of various plants and leading manufacturers are also mentioned. At the end of each chapter, a most interesting feature on new developments, future trends, or outlook allows each chapter author to do some crystal-ball gazing! This first volume (approx 600 pages) will be of great interest to all industrial chemists, and therefore no chemist can afford NOT to read this volume.

Volumes 2 and 3 cover recent developments in homogeneous catalysis and are therefore much more academic in nature. However, all chapters are written with the application of technology to industrial processes in mind. Thus, the first chapter in this section, simply entitled “Development of Methods”, includes key issues such as immobilisation, modelling, high-throughput approaches, reaction engineering aspects, multicomponent/multifunctional catalysts, supercritical fluids and miscellaneous catalysis before moving on to to cover well-known reactions/methodologies such as Heck, cyclopropanation, Fischer–Tropsch, or arene-coupling processes.

The chapter on special catalysts and processes includes biocatalysis, template reactions, membrane reactors, phase-transfer catalysis, rare earth catalysts, homologation, electrocatalysis, photocatalysis, McMurry coupling, and so forth. The final section on special products begins with an outstanding review of enantioselective synthesis listing all industrial applications with tonnage, turnover number, and frequency for each application. Other chapters include asymmetric dihydroxylation, hydrovinylation, CO₂ as a building block, reductive carbonylation, Pauson–Khand reaction, cyclooligomerisation of alkynes, chemicals from renewable resources, and so on.

The Epilogue is a provocative discussion of future trends

*Unsigned book reviews are by the Editor.

entitled "Homogeneous Catalysis—Quo Vadis"—required reading for all chemists whether in university or in industry.

The two editors have done an outstanding job in persuading over 120 contributors to deliver manuscripts on such a variety of topics. Most of the individual reviews are up to date—one even has a 2002 reference in it! Of course, for many authors who completed their section in 2000, this fast-moving subject will already be a little out of date, but no doubt a third edition is already being planned to get around this.

A minor criticism is that the order of the subsections and the chapters seems a little haphazard, often necessitating a visit to the excellent 65-page index to find what I was looking for.

In summary, you must read this book if you are involved in any industrial process chemistry—you will learn so much.

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High Pressure Chemistry: Synthetic Mechanistic and Supercritical Applications. Edited by R. van Eldik and F. G. Klärner. Wiley-VCH: Weinheim, 2002. 139 Euro/£89. 474 pp. ISBN 3-527-30404-5.

The book is based on papers presented at the European High-Pressure Research Group meeting at Kloster Banz, Germany, in September, 2000, and covers both inorganic and organic chemistry.

Pressure in the range 1–20 kbar strongly influences rate, equilibrium, and selectivity. Processes where there is an overall decrease in volume, such as C–C bond formation are accelerated by pressure, and thus pressure is a useful way of controlling competitive and consecutive reactions. Reactions which have been widely studied include Diels–Alder and Baylis–Hillman reactions, but as far as I know, there is only one industrial process (in Japan) which uses pressures of over 20 kbar is such an application.

Industrial chemists will find that the most interesting chapters are on supercritical fluid technology. Chapter 12 on catalytic reactions in supercritical fluids is a brief review of the subject by Hyde, Leitner, and Poliakoff. This has obviously been updated since the lecture was given in Germany and contains many references to 2000 and occasional ones to 2001. Chapter 13, "Applications of Supercritical Fluids in the Fine Chemicals Industry" is written by Bonrath and Karge from the Vitamins and Fine Chemicals Division of Hoffmann-LaRoche. This is the only chapter where an industrial perspective—including scale-up, economics, and so forth—is used to critically analyse new methodology, and the chapter includes patent examples such as the methylation processes to produce α -tocopherol, which is operated continuously.

The final chapter is on "Applications of Supercritical Water" which describes both synthesis and degradation.

Supercritical water oxidation for effluent treatment seemed to offer much promise, but the corrosion problems are difficult to overcome. Only one commercial plant is operated, by Huntsman in Texas, at this time.

The book, as with all conference proceedings, lacks coherence, being a collection of individual reviews, some of them excellent. However, for the novice to the subject, there is a lack of practical information on equipment, safety, and so forth, although references are given to monographs where this information can be obtained. The lack of industrial input, apart from the chapters on supercritical fluids, is a disadvantage for process chemistry readers who wish to know if the technology, which has synthetic potential, is scale able.

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Handbook of Green Chemistry and Technology. Edited by J. Clark and D. MacQuarrie. Blackwell: Oxford. 2002. 540 pp. £160. ISBN 0-63205715-7.

The editors, who are also the editors of the journal *Green Chemistry*, have done an outstanding job in getting a group of distinguished authors to contribute to this excellent text. For the industrial chemist, there is an opportunity to review not only what has been achieved thus far in application of green chemistry principles to manufacture but also what can be done in the future (e.g., in photochemistry, electrochemistry, process intensification, supercritical fluids, microwave technology, ultrasound, fluorine-phase chemistry, etc.). As a result, this well-produced volume contains reviews of new technologies which are not necessarily green, but are currently being exploited using green chemistry principles.

Two chapters that process chemists will particularly relate to are "Waste Minimisation in Pharmaceutical Process Development, Principles Practice and Challenges" by Tony Zhang of Lilly, and "Green Catalysts for Industry" by Keith Martin of Contract Chemicals. Others I particularly enjoyed were Bill Sanderson's "Hydrogen Peroxide in Waste Minimisation", Joseph Bozell's "Green Chemistry in Practice", and Yoel Sasson and Gadi Rothenberg's "Recent Advances in Phase Transfer Catalysis". In the latter chapter the excellent review of applications of PTC could have discussed in more depth why PTC should be classed as green. Similarly the chapter on polymer-supported reagents failed to examine the environmental advantages of this methodology and in addition did not address the subject of application on large scale.

Despite these minor criticisms, this is a book which should be in every library, whether industrial or academic. At the high price of £160, there are not going to be many chemists who purchase a personal copy.

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