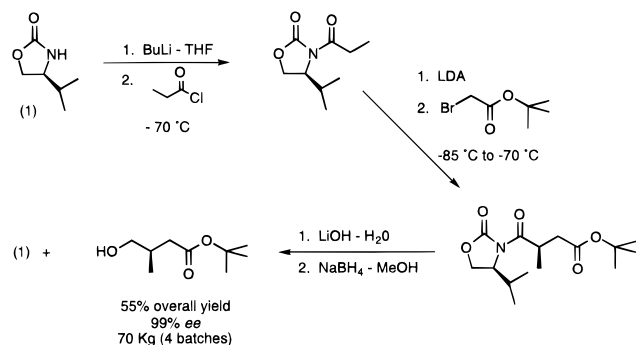


Book Reviews

Pilot Plants and Scale-up of Chemical Processes. Edited by W. Hoyle. Royal Society of Chemistry: London, UK. 1997. 98 pp. ISBN 0-85404-796-4. £42.50.

This small volume contains the proceedings of a one-day symposium organised by the Royal Society of Chemistry in September 1996, covering papers in three sections: design and control, general techniques, and specific technologies. The latter section will be of interest to most process development chemists, containing papers on “Heavy Metals from Effluent—Process Development from Laboratory through Pilot Plant” by R. A. Robinson (Ciba-Geigy) and “Plant Scale Reactions down to $-100\text{ }^{\circ}\text{C}$ ” by L. Powell (Zeneca). The Ciba paper describes separation and reuse of chromium-containing waste and electrochemical recovery and reuse of copper from metal-containing dyestuffs. In contrast the Zeneca chapter describes examples of low-temperature processes used at the Macclesfield (UK) plant for manufacture of aryl boronic acids, brominated thiophenes, and alkylated Evans auxiliaries. The boronic acids are prepared on a 25 kg scale by reaction of appropriate Grignard reagents in THF/toluene, cooled to $-60\text{ }^{\circ}\text{C}$ by direct liquid nitrogen injection, followed by addition of methyl borate and acid treatment. After work-up arylboronic acids were isolated in 75% yield from the bromoaromatic. The bromo thiophene work has already been described in the first issue of OPRD. The acylation of the Evans auxiliary was carried out on 1000 L scale at $-70\text{ }^{\circ}\text{C}$ followed by alkylation giving products in good yield and enantiomeric purity (Scheme 1).

Scheme 1



The general techniques section contains brief reviews of “GMP Applied to Pilot Plants” by H. M. S. Patel (Glaxo-Wellcome), the “Application of Statistical Methods to Pilot Plants” by R. J. Rowlands (University of Newcastle), and “Experiences in Heat Flow Calorimetry and Thermal Analysis” by P. E. Burke (FMC).

The first section—design and control—is also very general, including papers on “The place of chemical engineers in the design and control of pilot plants” by J. A. Yates (Ventron), “Batch versus continuous processing” by P. N. Sharratt (UMIST), and “Control and automation of batch processes” by P. E. Sawyer (PES Associates). The latter design chapters

were useful discussions but failed to distinguish between the differing needs (e.g., flexibility) of pilot plants and batch manufacturing.

Overall, this slim volume has some interesting points, but the first two sections are too general to benefit experienced practitioners and have few references to assist with further study (between 0 and 4 references per paper). In contrast the two special chapters are full of details and interest and are well-referenced.

The price of £42.50 for less than 100 pages (9 of which are blank or contain only two or three words!) does not represent good value for the money.

Trevor Laird

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Ullmann’s Encyclopedia of Industrial Chemistry, 5th Edition. VCH: Weinheim, Germany. 1996/1997. Section A, 28 vols. Section B, 8 vols. DM 19 400.

At last! The latest volumes (A27 and A28, ISBN 3-527-20127-0 and 3-527-20128-9, each approximately 600 pages) complete the latest revision of this outstanding compendium of industrial chemistry. I have always enjoyed dipping into the series to gain insight into a new area of industrial chemistry or chemical engineering, and the latest volumes will encourage me to continue to use the series as a first “point of call”. The series is a collection of monographs, mostly by industrially based authors, working for German and Swiss companies. The emphasis is always on what has been practical, and examples of key synthetic methodologies are included. For example, the section on triarylmethane dyes summarises “production examples” of typical industrial procedures, often on a multikilo scale. This review (47 pages) concisely summarises the field, but lists 462 references, mostly to the patent literature providing access to further information if more detail is required.

For the process chemist and engineer, *Ullmann* contains information not easily available elsewhere. For example, in the sections on vinyl esters and vinyl ethers, full details of all the main production processes are given, including important information such as space–time yields.

Other sections in volume A27 which may interest process chemists are on therapeutic agents, toluene, toluidines, turpentine, urea, veterinary drugs, and vitamins. The last section on vitamins covers 170 pages and is produced by 31 authors. For each vitamin, the industrial processes are detailed and well-referenced (up to 1995) particularly to the patent literature. I found this section particularly enjoyable; it was difficult to discern that this was a multiauthor work, so consistent was the style and content.

The final volume, A28, contains subjects in the W–Z group, beginning with water and ending with zirconium and zirconium compounds. For the organic process chemist, there is less of interest in A28 than in A27, since many of the subjects are general—wood, waxes, weed control, yeasts, zeolites—although I am sure most chemists would be interested in “wine”. A28 contains short sections on xanthates, xylenes, xylydines, and Ziegler processes which are useful, but it is disappointing that chapters on metals and metal salts do not contain any organic applications—e.g., organozinc or organozirconium chemistry—or references to it. Presumably these sections were written by inorganic chemists!

The Index Volume (702 pp) is comprehensive, containing an author index (40 pp), a subject index (625 pp), and an index dictionary of technical terms for German readers (45 pp).

Inevitably *Ullmann* will be compared to the *Kirk Othmer Encyclopedia*, and since they are both expensive, libraries may only be able to purchase one. For the process chemist and engineer, *Ullmann* contains more detail on processes, but less on marketing, use, economics, and safety than *Kirk Othmer*. *Ullmann* has the advantage of the B series with volumes on Fundamentals of Chemical Engineering, Unit Operations, Chemical Reaction Engineering, Analytical Methods, Environmental Protection, and Industrial Safety. These B volumes have all been updated in the last few years and make excellent reference works for the chemist and engineer.

Ullmann is beautifully produced with few errors for such a large multiauthor work. The high standard and quality of content means that a high price has to be paid (650 DM per volume); I still reckon that this is good value, but with library budgets trimmed to the minimum (a retrograde step in my opinion!), it will be a hard purchasing decision. My view is that good books, reviews, and encyclopedias pay for themselves very quickly! If library space is limited a CD ROM version will be available soon (a demo disc is available free of charge from VCH).

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Books of Interest

The Editor has received a number of volumes published by the Center for Chemical Process Safety (CCPS) of the American Institute of Chemical Engineers (AIChE). Whilst

chemical engineers may be familiar with the series, I have found that most chemists have not had access to these excellent books.

The CCPS was set up by the AIChE in 1985 to develop and disseminate technical information for use in the prevention of major chemical incidents. These publications are excellent resources for those dedicated to understanding the course of accidents and better means of preventing their occurrence and mitigating their consequences.

The CCPS has developed a process safety management model which includes the following twelve elements.

1. accountability: objectives and goods
2. process knowledge and documentation
3. capital project review and design procedures (new or existing plants, expansions, acquisitions)
4. process risk management
5. management of change
6. process and equipment integrity
7. human factor
8. training and performance
9. incident investigation
10. standards codes and regulations
11. audits and corrective actions
12. enhancement of process safety knowledge

A number of the recent books cover key aspects of these elements. The following books have been received.

Guidelines for Process Safety Documentation. American Institute of Chemical Engineers: New York. 1995. 386 pp. ISBN 0-8169-0625-4. \$120.

Guidelines for Investigating Chemical Process Incidents. American Institute of Chemical Engineers: New York. 1992. 347 pp. ISBN 0-8169-0555-X.

Guidelines for Chemical Reactivity Evaluation and Application to Process Design. American Institute of Chemical Engineers: New York. 1995. 210 pp. ISBN 0-8169-0479-0.

Guidelines for Safe Process Operations and Maintenance. American Institute of Chemical Engineers: New York. 1995. 319 pp. ISBN 0-8169-0627-0.

Guidelines for Safe Automation of Chemical Processes. American Institute of Chemical Engineers: New York. 1993. 424 pp. ISBN 0-3169-0554-1.

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