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## books

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### Practical laboratory guide for individual column makers

*Making and Manipulating Capillary Columns for Gas Chromatography*, by Kurt Grob, Hüthig, 1986, US\$ 39.00 (232 pages) ISBN 3-7785-1312-5

The quality of capillary columns used in gas chromatography has been greatly improved in recent years. Professor Grob, who regrettably passed away recently, was one of the leading figures in this development. After his retirement, he summarized his experience and methods in this book, which consists of three chapters and an appendix of 20 pages. The latter, written by Wolfgang Blum, describes silanol-terminated polysiloxane stationary phases and was originally published in *J. High Resolut. Chromatogr. Chromatogr. Commun.*

Fundamental concepts of column preparation are treated in Chapter 1 and this chapter should be of interest to anyone active in the field of capillary GC. Grob, together with his wife Gertrud, concentrated on the practical approach in their work, and the very core of this book is a complete description of their way of working; the scope is thus limited to the Grobs' own pursuits. Detailed descriptions of materials and tools are rarely given in articles, but these small although often important details are here conveniently collected in Chapter 2. Chapter 3 covers the practical aspects of column preparation. Much of the material presented in this chapter can be found scattered about in many previous articles, but now that the material has been gathered together, it becomes far more accessible and the internal coherence of the material becomes apparent. The major emphasis here is on the preparation of glass columns but fused-silica columns are also briefly described.

At present, very few chromatographers make their own columns, which is unfortunate because much can be gained from doing so. Grob thus strongly encourages users to consider the advantages, especially with a view to optimizing analytical procedures, and for economical reasons in laboratories that have a relatively high column consumption. It is to be hoped that this book, which

may be considered as a practical laboratory guide for individual column makers, will contribute to arousing interest in the laboratory preparation of capillary columns.

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### FIA: a very readable overview

*Flow-injection Analysis; Principles and Applications*, by M. Valcárcel and M. D. Luque de Castro, Ellis Horwood, 1987, £ 49.50 (x + 400 pages) ISBN 0-85312-904-5

At present more than 1200 papers have been published on flow injection analysis (FIA) since this unsegmented form of flow analysis was introduced in the beginning of the seventies. In spite of the widespread interest in this technique the present book is, to my knowledge, only the second one on this subject written in the English language. The first monograph by Růžička and Hansen, which appeared about 6 years ago, still had the touch of a new and challenging technique being described for readers who perhaps still needed to be convinced of the versatility of the technique. FIA is now generally accepted and the time has come for a more mature and comprehensive textbook. Valcárcel and Luque de Castro should be given full credit for providing the analytical community with a well organized and well balanced book on this subject.

In the first chapter some general aspects of automatic methods of analysis are briefly discussed, including continuous segmented flow anal-

ysis, unsegmented flow methods with and without sample injection and robotic analysers. After a short introduction to FIA in chapter 2, which also presents some definitions and a historical survey, an extensive description of the theoretical background is given in chapter 3.

At first sight, the number of different models together with the terminology, which probably is not familiar to many of the newcomers in the field, seems to be rather confusing, but the authors have succeeded in comprehensively reviewing the theory. However, I do not agree with the definition of dispersion as being '... the dilution undergone by a sample volume injected into the flowing stream'. The apparent contradictions between experimental results and Růžička and Hansen's 'rules of thumb' as mentioned on pages 63 and 76 are due to the fact that the conditions for Taylor flow are not fulfilled in the experiments that are described.

The basic FIA components for the composition of a manifold are extensively discussed in chapter 4. Here there is a wealth of useful information as also in chapter 5, which deals with detection systems. As far as ion selective electrodes are concerned many arrangements are discussed

but the wall-jet arrangement, which I have found is particularly useful for getting fast responses as required in FIA, has not been included.

The second half of the book consists of several chapters devoted to different modes of operation such as single and dual channel systems, closed loop systems, intermittent pumping, merging zones and 'reverse' FIA as well as to various gradient techniques and kinetic methods.

Chapter 10 summarizes two-phase

techniques including *inter alia* distillation, some modes of dialysis and liquid-liquid extraction. In the next two chapters the application of FIA in clinical chemistry and to environmental analysis are treated. The final chapter deals with features and trends in FIA.

In my opinion, the authors, who are leading experts in the field, have succeeded in writing a very readable book in which all important aspects of FIA are correctly discussed in a consistent manner. Analysts already

familiar with the technique as well as those who are not but want to get some idea about the merits of FIA in wet chemical analysis will appreciate this book and will find a lot of information. The book is very well printed with almost no errors and is well illustrated.

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## NMR for the next decade

*NMR in the Life Sciences*, (NATO ASI Series, Series A: Life Sciences Vol. 107), edited by E. M. Bradbury and C. Nicolini, Plenum, 1986, US \$ 45.00 (USA + Canada)/54.00 (rest of the world) (237 pages) ISBN 0-306-42279-4

This multiauthor text aims to provide a comprehensive description of the applications of NMR spectroscopy in biology. It sets out three clearly defined areas for discussion: the study of large macromolecules, *in vivo* spectroscopy and imaging. This well structured text provides a series of integrated articles, within the above categories, and free of undue repetition. It clearly indicates how the field will progress over the next decade and in so doing how three topics, with a common denominator, are developing into three distinct subject groups. This latter point creates a small dilemma: many readers will only be interested in certain specific subject areas. As a result this text is viewed as a good library acquisition.

### Macromolecular chemistry

The initial eight articles deal with spectroscopic problems associated with large bio-molecules. Weight is placed heavily on proteins and nucleic acids which reflects the popular interest of the day. However the principles put forward are sound and can easily be transcribed for other aspects of macromolecular chemistry

in general. The section opens with an immensely valuable article (A. G. Redfield) on water and the problems it presents within the framework of biological NMR. A wide variety of methods are discussed to circumvent these problems. The following four articles deal specifically with structure. Heavy emphasis is placed two-dimensional (2D) NMR methodology: applied to proteins (K. Wuthrich) and nucleic acids (B. R. Reid) as a demonstration. The latter describes how inversion recovery can be used to study base pair interactions and NOESY to the study of conformational dynamics in the nucleic acid helix. The limitations of NMR (M. A. Weiss) with the larger, more common, biological materials is illustrated by the bacteriophage  $\lambda$  repressor, genetic methods are proposed as one strategy for the retrieval of information. There is an excellent article (O. Jardetsky) on structure determination by NMR methods as a future complement to X-ray techniques. Again stress is given to the need to interface NMR with other methods. The subsequent three articles in this section deal with biomolecular reactivity. As is the nature with these subjects, detailed examples require to be chosen to illustrate the various strategies. The three articles try to span the general range of interests, enzyme-substrate interactions (G. C. K. Roberts), molecular recognition (H. M. McConnell) and metals in biology (B. D. Sykes).

### *In vivo* spectroscopy

This portion of the text is perhaps the most disappointing of the sections, mainly as a result of the narrow choice of subjects. The importance of  $^{31}\text{P}$  NMR of tissue is illustrated in the first two articles. Surface coil analysis of metabolites in brain and knee joint are discussed (R. J. Ordidge) using imaging to localise the signals (*cf* P. A. Bottomley's article in the imaging section). Another method of spectral localisation during metabolism is demonstrated (G. B. Matson), using spatially localised 2D metabolite maps of the eye and kidney. This latter paper also mentions  $^{23}\text{Na}$  NMR. The measurement of relaxation times in the speciation of water in the liver, intact and isolated cell fractions, is evaluated (C. Nicolini). The biophysical characterisation of the water is discussed and correlated using both NMR factors and other physical techniques. The measurement and correlation of relaxation times, principally water, in biological systems is not a new approach and as such it is unfortunate that the subsequent two articles (C. A. Boicella) centre on this topic rather than develop other aspects of *in vivo* spectroscopy.

### Imaging

The final section deals with imaging. An introductory article (E. R. Andrew) provides the necessary bridge between the simple NMR experiment and the production of an