CHROMATOGRAPHIA

An International Journal for Rapid Communication in Chromatography, Electrophoresis, and Associated Techniques

Abstracted in Anal. Abstr., ASCA. Biodet. Abstr., Biol. Abstr., Cadscan, Chem. Abstr., Chem. Cit. Ind., C.I.S. Abstr., Current Contents, Deep Sea Res. & Oceanogr. Abstr., Diary Sci. Abstr., Excep. Med., Food Sci. & Techn. Abstr., GeoRef., INIS Atormind. Ind. Sci. Rev., Ind. Vet., Lead Abstr., Mass Spectr. Bull., Nat. Sci. Cit. Ind., Rev. Med. & Vet. Mycol., Sci. Cit. Ind., Sel. Water Res. Abstr., Sugar Ind. Abstr., Vet. Bull., VITIS, Weed Abstr., W.R.C. Inf., Zine Scan

Volume 54, Supplement 2001

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CHROMATOGRAPHIA

An International Journal for Rapid Communication in Chromatography, Electrophoresis, and Associated Techniques

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The study of enantiomers is important because of the potential for differences in the changes they can produce in living systems. Analytical methods which separate enantiomers are tools which can make a major contribution to our understanding of the differences in their behaviour.

In the first chapter the author describes CE as an important additional tool for scientists interested in studying enantiomers and ensuring their quality and safety. After that he gives a short overview about the theory of the technique and the basic separation principles. The key to the separation of enantiomers in CE therefore lies in the introduction of additional agents which induce differences in their effective charges, sizes, or shapes. To understand the separation and resolution of enantiomers using CE there follows a discussion of the various physical and mathematical models and the underlying physical processes and interactions.

The use of a systematic approach to screening chiral selectors and optimising experimental conditions is also beneficial. In the last chapters the author therefore describes (i) cyclodextrins as a popular group of chiral selectors for the separation of enantiomers by CE and (ii) some of the selectors other than cyclodextrins which are used as buffer additives to separate enantiomers in free solution CE.

Vol. 54, Supplement 2001

Chromatographia was founded by R. E. Kaiser in 1968.

Publisher

Chromatographia is published by Friedr. Vieweg & Sohn Verlagsgesellschaft mbH, P.O. Box 1546, D-65173 Wiesbaden, Federal Republic of Germany, Tel. +49 (0)611 7878 380(-381); Telefax +49 (0)611 7878 439
Editorial office e-mail: CHROMATOGRAPHIA@bertelsmann.de; webpage: <http://www.chromatographia.de>
For more information regarding Vieweg's program for books and journals see our homepage: <http://www.vieweg.de>

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Distributors

Friedr. Vieweg & Sohn, P.O. Box 1546, D-65173 Wiesbaden, Germany;
Tel. +49 (0)611 7878 324; Telefax +49 (0)611 7878 423.
Elsevier Science Ltd., The Boulevard, Langford Lane, Kidlington, Oxford, OX5 1GB, UK.

Distributions in the USA

Chromatographia (USPS No. 374 810) is distributed by German Language Publications, Inc., 153 South Dean Street, Englewood, NJ 07631. Second class postage is paid at Englewood, NJ 07631.
Postmaster: send address changes to Chromatographia, German Language Publications, Inc., 153 South Dean Street, Englewood, NJ 07631.

Subscriptions

Chromatographia is published monthly. Up to three volumes may be published per year.
Vols. 53, 54, Supplements (2001) DM 2.364,- US \$ 1,243.00 öS 17.257,- sFr 2.103,- € 1.209,-
(approx. 2440 pp.)
Single copy DM 224,- US \$ 118.00 öS 1.635,- sFr 199,- € 115,-
For individual subscribers who will certify that Chromatographia is for their personal use only (to be ordered directly from the publisher):
Vols. 53, 54, Supplements (2001) DM 1.344,- US \$ 706.00 öS 9.811,- sFr 1.196,- € 687,-
All prices include postage. Subscriptions are renewed automatically for one year unless notice to terminate the subscription is given three months before the end of the current year.

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One original and two copies of manuscripts should be sent to Chromatographia, Editorial Office at the same address as the publisher, above. For papers intended for review-type articles, an outline of the proposed article should first be forwarded to the Editorial Office Manager for preliminary discussion, prior to preparation. For general information on the rules concerning style and format of manuscripts please refer to "Instructions to Authors" in every issue.

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Softcover reprint of the hardcover 1st edition 2001
Vieweg is a company in the specialist publishing group BertelsmannSpringer

Typesetting: Fotosatz Behrens, Ostersheim.
Printed on acid-free paper.
ISBN 978-3-322-83143-9 ISBN 978-3-322-83141-5 (eBook)
DOI 10.1007/978-3-322-83141-5

Chromatogram on front page: Gas chromatographic separation of gasoline hydro carbons (selected section of chromatogram) with glass capillary column.

Preface

It is now over twenty years since the publication of the pioneering investigations by Jorgenson and other workers on modern capillary electrophoresis, and over ten since the introduction of commercial high performance instruments suitable for automated analysis. During this time capillary electrophoresis has been transformed from a curiosity into a routine tool in industrial and academic laboratories throughout the world.

Capillary electrophoresis is now accepted alongside more mature separation techniques such as HPLC, and has established itself as a valuable complimentary approach in a number of areas of importance. One of the areas where capillary electrophoresis has had a significant impact is the subject of this book, the separa-

tion of enantiomers. Enantiomer separation is of particular importance in pharmaceutical analysis and capillary electrophoresis is beneficial because of the high efficiencies generated.

In this work I have tried to show both how and why capillary electrophoresis can be beneficially applied to enantiomer separation. I have attempted to cover the basic principles of movement and separation, how these principles can be used to develop theories describing enantiomer separation, and then how the theory can be used to assist the practitioner in the development and optimisation of methods suitable for routine use.

The field of enantiomer separation is obviously large and so any review is inevitably selective. In this book I have not at-

tempted a detailed summary of the complete body of publication, but rather to try and provide the reader with some useful insight.

I would like to express my thanks to friends and colleagues who have assisted in the writing of this book via their support, advice, patience and constructive comments.

Chinley, June 2001

Stephen Wren

Edited by Kevin D. Altria, Glaxo Wellcome R&D, UK

There are currently a number of general textbooks covering Capillary Electrophoresis where information on a range of applications and techniques can be found. Readers who are interested in a specific area of CE struggle to find truly comprehensive treatments of their areas of interest. The CHROMATOGRAPHIA CE series has been established to allow comprehensive books to be produced covering individual topics. The books are written by well known authors in their specialist application areas and cover CE topics such as DNA analysis, analysis of pharmaceuticals, chiral separations, MECC, carbohydrate analysis, biomedical applications and troubleshooting in CE.

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