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BOOKS AND SOFTWARE IN REVIEW

André M. Striegel, Wallace W. Yau, Joseph J. Kirkland, and Donald D. Bly (Eds.): Modern size-exclusion liquid chromatography. Practice of gel permeation and gel filtration chromatography, 2nd ed.

Melissa M. Phillips

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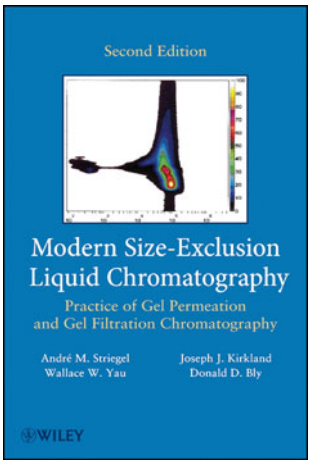

Bibliography
Modern size-exclusion liquid chromatography. Practice of gel permeation and gel filtration chromatography, 2nd ed.
André M. Striegel, Wallace W. Yau, Joseph J. Kirkland, and Donald D. Bly (Eds.)
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Book's topic *Modern size-exclusion liquid chromatography* encompasses the history and basic theory of size-based separations as well as a lifetime's worth of practical knowledge and applications of these techniques. The book includes an introduction to size-exclusion chromatography (SEC) followed by an in-depth discussion of chromatographic theories and relevant instrumentation. The second edition also contains four new applications chapters, detailing topics including quantitation of long-chain branching, aqueous applications such as protein and peptide separations, quantitation of oligomers such as resins and plasticizers, and utility of SEC in two-dimensional applications. Whether the discussion is centered on theory, instrumentation, or applications of SEC, the authors utilize equations, figures, and diagrams to convey effectively the topic at hand.

Contents The first four chapters discuss the basics of SEC, including an introductory chapter, a chapter on general retention theory and its application to size-based separations, and chapters on the concepts of band broadening and resolution in theoretical and practical contexts.

Chapters 5–10 detail instrumental considerations for application of modern SEC. Chapter 5 has been refocused on modern chromatographic pumps and to reflect increased use of automation tools such as autosamplers and computerized data systems. The next chapter describes the current state of column technology and mentions parameters of column performance provided by manufacturers. Chapter 7 provides a thorough description of the numerous experimental variables to guide a user through method development and optimization from start to finish. A discussion of calibration approaches follows in Chap. 9, including a new section detailing recent developments and recommendations on band-broadening correction. The instrumental content concludes with two extensive chapters on physical and chemical detectors for SEC. An improvement over the previous edition, the authors detail numerous detection options, including light scattering, viscometry, mass spectrometry, Fourier transform infrared spectroscopy, and nuclear magnetic resonance.

Chapters 11–14 are new in the second edition, expanding from a single chapter on applications in the previous

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M. M. Phillips (✉)
Analytical Chemistry Division, National Institute of Standards and Technology (NIST),
100 Bureau Drive,MS 8392,
Gaithersburg, MD 20899-8392, USA
e-mail: melissa.phillips@nist.gov

edition. In Chap. 11, the application of SEC and dilute solution thermodynamics to the determination of polymer architecture is presented. A discussion follows of the utility of aqueous SEC for applications such as protein and peptide separations as well as the study of synthetic polymer reactions by minimizing non-size-based consequences of working in an aqueous medium. Application to oligomer separations is presented in Chap. 13, with presentation of a unique set of considerations in comparison with those for polymer separations. The application discussion concludes with the role of SEC in modern two-dimensional chromatography, through exploration of the orthogonal nature of SEC with respect to other liquid chromatography methods in the context of polymer characterization.

The final chapters discuss the considerations required for special applications of SEC, including preparative, recycle, high-speed, and high-temperature variations.

Comparison with existing literature Several textbooks are available under the generic cover of SEC or polymer separations, with the publication of the most recent being over 10 years ago (*Size exclusion chromatography* by Sadao Mori and Howard G. Barth, Springer, 1999). None of the existing books appear as comprehensive as the book reviewed here, with extensive coverage of theory and background, instrumentation, as well as practical applications.

Critical assessment This book combines theory with practical current applications of SEC. The chapters balance the ideal situation from a theoretical standpoint with practical limitations of time and expense. A common theme throughout the book is a focus on accurate quantitative determinations and the difference between detectors that are concentration-sensitive and those that are not. Particularly effective and helpful are numbered lists with keywords in many locations throughout the text, detailing important points and providing a quick reference guide for the reader.

Summary *Modern size-exclusion liquid chromatography* is a comprehensive collection of the theory, instrumentation, and applications of SEC. Since the publication of the first edition in 1979, a more inclusive collection has yet to appear, and the authors have only improved on the previous version. The authors have balanced well-written text with diagrams, figures, and equations to provide a user-friendly guide to practical modern SEC. The inclusion of both classical and current references with each chapter demonstrates the utility of each chapter and discussion. This text would be useful for scientists at any level, whether using SEC for the first time or the 1,000th.