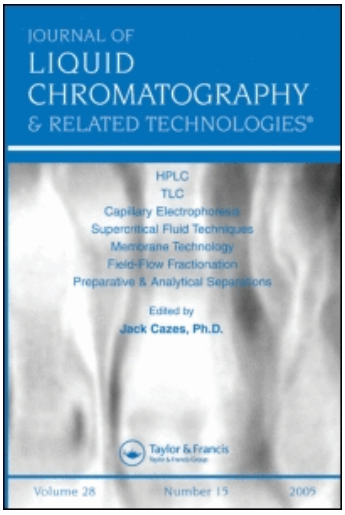

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THE BOOK CORNER

HANDBOOK OF AFFINITY CHROMATOGRAPHY, Edited by T. Kline, Chromatographic Science Series, J. Cazes, ed., Volume 63, Marcel Dekker, Inc., New York, 352 pages, 1993. Price: $135.00 (USA)

Traditional affinity chromatography relies on the high-affinity biospecific interactions as the means of separation. Thus, proteins are purified on immobilized substrates/inhibitors (for enzymes), antibodies (for antigenic proteins), nucleic acids (for DNA- or RNA-binding proteins), or ligands (for receptors).

In recent years, the definition of biology itself has expanded under the influence of fully functional engineered proteins, abzymes, and other evidence of our ability to understand and exploit natural principles. In the same sense, "biospecific interactions" can now be taken as a composite of forces that can be manipulated at the molecular level. This enables proteins and molecules other than proteins to be affinity-selected according to fundamental properties of hydrophobicity, charge, and polarity. Similarly, the exact degree of affinity is now controlled, and weak affinity adsorbtion has become a versatile technique for separations.

Advances in the field have made it realistic to create a customized separation system unique to each problem without having to invent a whole new technology to support it. This handbook is intended to be a practical guide to be used in the laboratory, and in the office before going into the laboratory, in the sense that it reflects the newer techniques and applications that affect the planning of both experimental tactics and research strategies, and is divided into three sections.

The first section outlines the fundamental principles by which all interactions occur and presents the details that harness these forces into a functional machine. Since the success of any affinity purification is dependent on the success of every step, we have tried to provide the basis for efficiently conducting a precious substance with confidence through each step of the procedure. Section II presents some of the current scope of the technique directed toward purifications of several classes of proteins. In Section III, aspects are presented of the current research on affinity chromatography as a topic in its own right in the field of biorecognition.

Providing more than 1200 literature citations to allow for in-depth study of specific topics, this book is an invaluable resource for analytical and protein chemists;

upper-level undergraduate and graduate students, and those interested in biochemical separations.

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CHEMICALLY MODIFIED SILICA SURFACES IN CHROMATOGRAPHY - A FUNDAMENTAL STUDY, M. J. J. Hetem, Huthig Buch Verlag Heidelberg, 175 pages, 1993.

This book is divided into two parts comprising seven chapters. Silica is usually employed as the substrate for the attachment of stationary phases for use in chromatography: this book describes several studies dealing with the behavior and performance of modified silica substrates.

The first part discusses several investigations into the optimization of deactivation and coating both of fused silica capillary columns for GC and of a non-porous silica model substrate. The second part describes surface characterization studies of a number of selected chemically modified silica gels: when modified silica gels are used in RPHPLC practice, unfavorable changes in chromatographic performance occur. The observed changes in surface structure are discussed in detail.

Following a general introduction Chapter 2 describes a solid state ^{29}Si CPMAS NMR study of the deactivation of a model silica substrate with diphenyltetramethyldisilazane (DPTMDS) and polydimethylsiloxane (PDMS). The formation of polymeric chains attached to the silica surface after silylation at high temperatures (T $\geq$350°C) is discussed.

Chapter 3 discusses deactivation of fused silica capillaries and a non-porous silica model substrate with polymethylhydrosiloxane (PMHS) at moderate silylation temperatures. Following silylation under such conditions the inner-wall of fused silica capillaries still contains active sites (silanol and siloxane groups) which degrade the chromatographic separation. The effect of subsequent coating of the deactivating film with polymethyloctadecylsiloxane (PMODS) is also discussed.

Chapter 4 describes the changes which occur to a number of chemically modified silicas used for RPHPLC (two different types of silica reacted with identical quantities of mono-, di- and tri-functional octadecylsilanes) during standard laboratory practice.

The RPHPLC phases described in Chapter 5 differ in n-alkyl chain length. The shielding properties of monofunctionally modified alkylsilanes with chain lengths between C_1 and C_{18} are studied with chromatography and methods of physico-chemical analysis, including techniques similar to those described in Chapter 4 and BET measurements. In the second part of the chapter dissolution of the different stationary phases is studied in an MAS rotor using ^{29}Si MAS NMR.

Two improved octadecyl RPHPLC phases which show better resistance towards stationary phase deterioration by aggressive solvents are discussed in Chapter 6. These phases are compared with C_{18} phases obtained by classical modification on the same batch of silica gel.

In the first part of the chapter the silica gel is subjected to acid pretreatment (hydrothermal washing with a 0.1% (w/w) solution of hydrogen fluoride) in order to increase the number of reactive silanol groups at the silica surface. In the second part of this chapter two polysiloxane-coated stationary phases are characterized. The polysiloxane contains methyl groups and n-octadecyl side chains and immobilisation of the polymer coating proceeds through cross-linking. One of the polymer-coated phases is precapped with trimethylsilane enolate and solid-state ^{29}Si CP-MAS NMR reveals that the polymer chains of this phase are probably only physisorbed at the trimethylsilane-modified surface. Although precapped improves the resistance of the polymer-coated phase towards deterioration, the use of high pH buffer solutions does cause a shift in selectivity.

The various solid state NMR techniques used in this book are discussed in Chapter 7. Solid state ^{29}Si CP-MAS NMR not only provides information about the chemistry and individual molecular mobilities of different surface moieties but can also detect interactions between deactivating layers and the stationary phases at the silica surface. Quantitative solid state ^{29}Si CP-MAS NMR measurements, however, are beset with difficulties.

The book is recommended to all chromatographers who use silica modified columns, and to physical chemists in general.

DIODE ARRAY DETECTION IN HPLC, Edited by L. Huber and S. A. George, Chromatographic Science Series, J. Cazes, ed., Volume 62, Marcel Dekker, Inc., New York, 416 pages, 1993. Price: $150.00 (USA)

This book discusses the principles and techniques of diode array detectors, compares them to conventional absorbance detectors, and examines their applications in high performance liquid chromatography.

Providing guidelines on how to optimize diode array detectors for high sensitivity, selectivity, linearity, and automation, *Diode Array Detection in HPLC* presents early developments in diode array technology, current areas of application, computer techniques for spectral library searching, the mathematical basis for spectral deconvolution, practical uses of ultraviolet spectra for peak purity control and peak confirmation, chromatographic examples for HPLC applications, and much more!

Diode array detectors are helpful for most HPLC laboratories, and familiarity with the theory, design, capabilities, optimization, and application is generally important for anyone dealing with HPLC. This book has been written to demonstrate the benefits that diode array detection can bring to HPLC.

This volume is composed of 14 chapters. The first two cover theory and design. Chapters 3-5 discuss the advantages of diode array detectors to chromatographers. Chapters 6-12 cover a variety of applications of diode array detectors. The last two chapters give guidelines on how to optimize diode array detectors for the highest sensitivity, selectivity, linearity, and automation. It is intended that this book aid analysts both in pointing out the many possible uses of the diode array detector and in providing the necessary information about its technical operation so that the detector and its applications can be adapted to individual requirements.

Generously referenced and illustrated, this book is a practical guide for analytical, food, and pharmaceutical chemists and biochemists; analytical laboratory managers, consultants, and operators; and upper-level undergraduate, graduate, and continuing education students in these disciplines.

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