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Book reviews

Advances in Chromatography, Vol. 44, Eli Grushka, Nelu Grinberg (Eds.). CRC Press, Boca Raton, FL, USA (2006). v + 337 pp, £109-00, ISBN: 1-57444-734-3

Chromatography has been developed as a powerful and rapid technique for separation of compounds with highly similar molecular characteristics. It has been recognised as the technique of enormous potential and has growing acceptance and expanding applications in various fields and industries. The more methods are available, the easier and faster specific compounds can be purified.

Capillary electrophoresis (CE) provides fast separation times and has small sample requirements, however sample application into a large number of capillaries is difficult and time consuming. To simplify this method, CE was miniaturised onto a microchip, which reduces both analysis time and reagent volumes. Microchip technology allows for the analysis of amino acids, small drug molecules, peptides and proteins, oligonucleotides and DNA fragments. Furthermore, attempts to achieve high throughput separation has led to multiplexing of many separation channels on a single microchip. Factors like fabrication, bonding, filling, sample introduction as well as simultaneous detection must be considered when dealing with multiplex microchips (Chapter 1).

Temperature is an important parameter in liquid chromatography (LC). It has a large effect on relation, selectivity, and column efficiency. Temperature control gives a great potential to achieve improvement in selectivity or efficiency. At high temperatures, the viscosity is reduced and the diffusion rate is increased. The following chapter discusses the influence of temperature on retention and selectivity as well as methods using temperature actively to optimise the separations both in conventional size columns and smaller-diameter columns.

Lipophilicity (widely discussed in Chapter 3) means that molecules have an affinity for fat and high lipid solubility. One of the methods for measuring lipophilicity is liquid chromatography (LC), including liquid–liquid chromatography, reversed-phase chromatography (detailed in Chapter 7), and countercurrent chromatography (CCC). Of all chromatographic method, LC is one of the particular interest for lipophilicity measurement, because of the similarity between the solute partition in a chromatographic system, and a solute partition in a dual liquid phase environment.

High-performance liquid chromatography (HPLC) is a method used for the separation, identification, and determination of chemical components in complex mixtures. One way to increase selectivity and the peak capacity of HPLC is to incorporate more than one separation dimension to obtain multidimensional chromatography. This type of HPLC, both with single-dimensional and two-dimensional chromatography, is the main subject that Chapter 4 focuses on. What is more, HPLC is the most commonly used technique in the pharmaceutical industry, hence it requires to be validated according to Food and Drug Administration regulations (accuracy, sensitivity, specificity, etc.).

CSP – chiral stationery phase, derived from polysaccharides, is becoming widely used in separations. Chapter 6 provides updated information on polysaccharide CSP's mechanism and effect of various mobile phases on their performance. Finally, the last chapter (Chapter 8) provides an overview on chromatography of difficult and water-insoluble proteins. In this case, chromatography is usually performed with added agents such as detergents or chaotropes.

In conclusion, this book is a great source of material for biochemists and analytical, organic, polymer, and pharmaceutical chemists at all levels of technical skill.

John F. Kennedy*
Agnieszka Kaczmarek
Chembiotech Laboratories,
Institute of Research and Development,
University of Birmingham Research Park,
Birmingham B15 2SQ, UK

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* Corresponding author.
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