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BOOK REVIEWS

Ion-Pair Chromatography and Related Techniques. By Teresa Cecchi (Istituto Tecnico Industriale Statale Montani, Italy). From the Analytical Chemistry Series. Edited by Charles Lochmüller (Duke University, USA). CRC Press (an imprint of the Taylor & Francis Group): Boca Raton, FL. 2009. xiv + 202 pp. $129.95. ISBN 978-1-4398-0096-6.

In the introductory chapter of this book, the author writes that "...this book represents a trade-off between breadth and depth." Herein lies its major weakness. The theoretical model for the retention mechanism for ion pair chromatography (IPC) that has been proposed by Cecchi, and which forms the major theme of the book, is not supported by any analysis of experimental data. At the same time the model is too complicated for practical use. The book will therefore not satisfy the theoretically interested reader or the practicing chromatographer.

The book is generally well written and easy to follow. Furthermore, it is clear that the author's ambitions for the book are high. The key chapters provide a discussion of the retention mechanism and how it is affected by the composition of the mobile phase, type of analyte, the stationary phase, and type of Ion Pair Reagent (IPR). These chapters, together with chapters about organic modifiers, the role of pH, a historic review of the ion pair concept, and the influence of temperature, form a coherent part of the book.

Among chromatographers, IPC has the reputation of being complicated to use in practice. The reason is the great diversity of the composition of mobile phases, of analytes, of IPRs, and of stationary phases that are used. A physically complete theoretical model is therefore unattainable. In practice, the most useful models are those that are both physically meaningful and relatively simple. In the past, two different approaches have been taken for IPC: stoichiometric ion pair models and electrical double-layer models.

The model proposed by Cecchi is essentially a mixture of these two previous approaches. The result is a retention equation with six unknown constants; it will therefore fit numerically well to a large body of experimental retention data. An approach that mixes previous models may at a first glance seem like a good idea, and the author's conviction that this mixed model is superior to previous models forms one of the main threads of this book. However, the sweeping statements about the superiority of the model are not supported with hard facts—there is not a single set of experimental retention data that is analyzed with the model. So after having read the book, I still question whether the model is physically meaningful and a step forward toward a better understanding of IPC.

The rest of the book contains chapters on rather scattered topics, e.g., column technology, detection and hyphenation, application of IPC, and related techniques. Some of these chapters are very short (1−3 pages of text) and contain either standard textbook material or enumerate applications and give the corresponding reference. The main benefit of these chapters is that they give an overview of the diversity of fields in which IPC has been applied and provide extensive and timely lists of references.

To summarize, the book may be of use to those who want a brief review of the different fields in which IPC has been used. Those who are interested in retention theory or want practical guidance will find the book of limited or little value since there is no coupling between experimental data and theory.

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