

Book Review of Practical Aspects of Trapped Ion Mass Spectrometry, Vol. V: Applications of Ion Trapping Devices

Practical Aspects of Trapped Ion Mass Spectrometry, Vol. V: Applications of Ion Trapping Devices. Edited by Raymond E. March and John F. J. Todd. CRC Press (an imprint of Taylor & Francis Group). Boca Raton, FL. 2010. x + 534 pp. \$185.95. ISBN 978-1-4200-8373-6.

Since the inception of Paul and Penning ion traps, the chemistry of ion–molecule and ion–ion interactions has been at the forefront of this field of science. With developments in high resolution, novel front ends, and tandem techniques, ion-trap applications have become very broad reaching. Volume V continues to maintain the quality of the previous volumes and, combined with Volume IV on theory and instrumentation, should quickly bring readers up to date on the art and development in the field.

Comprising 16 chapters, this volume is divided into four broad sections: Ion Reactions, Ion Conformation and Structure, Ion Spectroscopy, and Practical Applications. The editors did a fantastic job of assembling experts and pioneers in the applications of trap mass spectrometry as contributors to this work.

The book opens with introductions and new applications to traditional areas of ion interactions and elucidation of structure. The eight chapters in Parts I and II cover ion/ion reactions, H/D exchange, and multistage ion processing, with an emphasis on analyzing biomolecules. Because much of the development in ion-trap applications over the past 10 years has focused on biomolecules, it is proper for this volume on applications to devote several chapters to this subject. Quadrupole ion traps, Fourier-transform ion cyclotron resonance, and ion mobility coupled to mass spectrometry (MS) are all covered in these first two sections. Section II concludes with a discussion of the structure of trapped ions and applications using traveling-wave ion-mobility MS, which add techniques for elucidating conformation to the already large arsenal of H/D exchange and ion/ion and ion/molecule interactions. The reader should come away with a good sense of the abilities of these applications to give not only good primary structural information about biomolecules, for which MS is known, but also applications for determining secondary and tertiary structure.

I was pleased to see Part III on ion spectroscopy. Although this application is nearly as old as ion traps themselves, the technique is rapidly evolving and producing a great number of useful applications. The three chapters in this section introduce methods that greatly expand our knowledge of the mechanics of trapped ions. Based on the high sensitivity that results, the authors illustrate inventive applications for these dissociative and excited-state ions.

The final section covers new practical applications. It could have been greatly expanded, but the editors managed to home in on five great applications with very diverse chemistries. The use of ion-trap mass spectrometry (ITMS) and tandem techniques,

such as ion-mobility and gas chromatography for the analysis of small organic molecules and biomolecules, are covered. This section also introduces the community to two front ends that are very popular with ITMS: matrix-assisted laser desorption ionization (MALDI) for tissue imaging and membrane-inlet mass spectrometry (MIMS) for identifying volatile organic chemicals. With this diverse array of practical applications, Part IV offers the reader a broad stroke of potential applications, illustrating the power of ITMS.

In conclusion, this volume brings the reader quickly up to date on current applications and future directions in the field of ITMS. It presents applications for small molecules as well as biomolecules, making it a great reference not only for specific uses but also for the general ITMS community. The authors have thoroughly referenced each application described, thereby providing a resource on prior developments in the field to readers who are less familiar with it. I highly recommend this text for both academic and personal libraries.

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10.1021/ja209417m

Published: October 12, 2011