

## Mass Spectrometry Desk Reference, Second Edition

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The first edition (2000) of this book was a well-received and valuable tool for our community. It also met a growing need to improve cross-discipline communications between mass spectrometrists and biologists, biochemists, geochemists, lawyers, etc. This need was less important in the early years of the American Society for Mass Spectrometry (ASMS), which were thoroughly dominated by petroleum applications. However, the latest ASMS Conference abstracts had only 27 citations for "petroleum" and 1266 for "protein". On a more short-term basis, the discipline is rapidly changing. Comparing the 2000 and 2007 ASMS Conference abstracts, citations containing either "MALDI" or "TOF" are up 10 times, and "forensic" is up 4 times. With changes in both applications and practitioners, it is critical to maintain clear communications. We are at the point where almost all journal articles, posters, monographs, sales literature, etc. will be full-text searchable in perpetuity. Searching and indexing will only be useful if there is both consistency and continuity in terms, acronyms, and syntax. Fretting about nomenclature is not necessarily exciting, but it will drastically increase the impact and longevity of mass spectrometric studies.

The cost of this edition has increased only \$10 from seven years ago, while the length has almost doubled. The author has put a great deal of effort into increasing the value of this project, keeping it up-to-date, and addressing earlier shortcomings. Five new chapters have been added: "Terms Associated with Biochemical MS," "Isomer Nomenclature," "Terms Associated with Transmission Quadrupoles and Quadrupole Ion Trap Mass Spectrometers", "Internet Citations in Published Works," and "Required Experimental Information for Publications." Sections on "Data," "Data Acquisition Techniques and Ionization," "Mass," "Instruments," "References," and "Bibliography" have been significantly expanded.

Many newer techniques such as linear quadrupole traps, the orbitrap, T-wave ion guides, ETD, ICAT, DESI, and DART are now covered. A new seven-page section on isomer nomenclature, with many illustra-

tions, is well-written. The discussions of resolving power, mass resolution, nominal mass, and mono-isotopic mass have been clarified. This will be an increasingly important issue (and source of confusion) as more data are produced for high molecular weight materials. One of the most useful sections is the 47-page annotated bibliography. This will be very helpful to those needing more information or review on specific topics. Some of the more valuable additions in the appendix are charts on amino acids, side-chain polarities, structures, and abbreviations. This is accompanied by a four-page tutorial on  $a_{iv}$ ,  $b_{iv}$ ,  $c_{iv}$ ,  $x_{iv}$ ,  $y_{iv}$ , and  $z_{iv}$  fragments from polypeptides.

Much more of this edition is devoted to assisting with the preparation of reports and publications. The section on "Required Experimental Information for Publications" should be required reading for all ASMS members! At times, terminology recommendations diverge. Sparkman offers explanations of these areas, and cites useful references to IUPAC, ASMS, ACS, and specific journal "Guides for Authors".

The "Formulas and Equations" section deals only with syntax and layout, and not actual formulae. While getting deeply into the physics underlying mass spectrometry would be beyond the scope of this reference, a few relationships dealing with ion paths in TOF instruments, pumping speeds, relative isotope intensities, and collected conversion factors would have been helpful. This would have been a good place to put in items such as: ppm mass error at peak<sub>m/z</sub> = (Da error \* 1E6)/(m/z) to clarify a topic mentioned more than once in the book and often at ASMS meetings, but rarely defined for the novice.

A point of potential confusion is the statement that "there are three types of MS/MS analyses", followed by Figure 8B that clearly shows the four types. "Selected reaction monitoring" is then discussed, but could be clarified. This technique does come up in discussions of environmental or forensic methods with non-spectrometrists. The definition of "precision" should be expanded, and needs a new example. Sparkman's "chromatography/MS" background is probably responsible for the omission of some items. "Shotgun proteomics" is mentioned, but not "MudPIT." A section giving more of an overview of proteomics and how MS data are generated, shipped to protein databases, and how "information" is returned might have been useful to non-biologists. "GLP" and "GALP" are discussed, but not "GMP". The paragraph on the "nitrogen rule" might have noted that deuterium labeling (e.g., H/D exchange experiments) alters the rule. The practice of "de-isotoping" to improve comparisons of relative mass peak intensities over a broad mass range could have been included with the discussions of "mono-isotopic mass." The "picograms" (typo) in the appendix are

interesting, but not particularly useful. A more serious limitation involves including only six chlorines and four bromines in the Isotope Peak Ratios table. This would be a problem for readers looking at PCB or flame retardant spectra.

As with most Global View books, this volume is well produced, and reasonably priced. The only notable production shortcoming is in the index. Given that many of the users of this book will have limited mass spectrometric backgrounds, more detailed indexing

would assist with locating material embedded in the broad chapter headings.

Although many successive book editions are more marketing than content, Sparkman's latest work represents a refreshing change. I would encourage owners of the earlier edition to purchase this one. Recent entrants to the field of mass spectrometry should definitely have this volume at their desk. More experienced spectrometrists can be assured of interesting reading on topics not found in their own daily work.

Atmospheric Pressure Secondary Ion Mass Spectrometry 1.14.1 Desorption electrospray ionization 1.14.2 Direct analysis in real time.  
Inorganic Ionization Sources 1.15.1 Thermal ionization source 1.15.2 Spark source 1.15.3 Glow discharge source 1.15.4 Inductively  
coupled plasma source 1.15.5 Practical considerations. Numerous references are given for those who wish to go deeper into some  
subjects. Important Internet addresses are also provided. We hope that this new edition will prove useful to students, teachers and  
researchers.