In brief, ICP-MS is a technique in which a small sample of generally liquid material is introduced into a heated plasma formed by the interaction of an intense magnetic field on a tangential flow of (generally argon) gas. In the related inductively coupled plasma optical emission spectrometry (ICP-OES), the sample introduced to the vertically oriented ionized gas releases photons that are detected and analyzed. In ICP-MS, the sample is introduced to a horizontally oriented plasma to generate positively charged ions, which are then introduced to a mass spectrometer for subsequent analysis.

According to the author, although ICP-MS “can broadly determine the same suite of elements as other atomic spectroscopy techniques such as flame atomic absorption (FAA), electrothermal atomization (ETA), and ICP-OES, ICP-MS has clear advantages in its multielement characteristics, speed of analysis, detection limits, and isotopic capability.” It has detection limits in the sub-parts-per-trillion range and allows quantification in the high parts-per-million level. Today, there are roughly 5000 systems in use throughout the world.

Robert Thomas, former scientist, now a full-time writer, was involved in the original product development of ICP, and this gives both a personal and authoritative tone to the writing. Thomas has based this book on a series of tutorial articles he wrote for Spectroscopy magazine, and most of the figures and diagrams were taken from these writings. Although this compilation process, in many cases, would make for a less than integrated final book, it is not a significant problem here. The chapters can be seen as both stand-alone and sequential treatments of separate slices of the technology. For example, chapters cover such different topics as sample introduction, the plasma source, the interface, ion focusing, and the variety of forms of mass analyzers, including quadrupole, double-focusing magnetic sector technology, time-of-flight, and collision reaction cell technology.

Despite its treatment of widely different topics, this book can be considered a valuable introduction to the subject for anyone interested in ICP-MS.

According to the preface, written by Ramon M. Barnes, director of the University Research Institute for Analytical Chemistry, Amherst, MA, “This is not a handbook describing how to prepare a sample for trace element analysis, perform an ICP-MS measurement, or troubleshoot practical ICP systems. … [Instead,] this book is intended to get readers started with ICP-MS. It highlights everything from basic component descriptions and features to guidelines describing where and when using ICP-MS is most appropriately employed.”

One noticeable problem in the book’s presentation is the graphics. Black and white is fine for diagrams, but it is a significant problem when the captions specifically refer to color differentials that provide added interpretation. In addition, the quality of the images is often lacking—obvious use of PowerPoint-like diagrams and grainy images blown up larger than their optimal size. This is not a fatal flaw in an otherwise highly informative book for those interested in ICP-MS, and seems to signify more of a lack of quality control of the artwork on the part of the publisher than the author.

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Practical Guide to ICP-MS
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