BOOK REVIEWS

Plasma Source Mass Spectrometry

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This book represents the proceedings of the Third Surrey Conference on Plasma Source Mass Spectrometry, which was held at the University of Surrey in July 1989. The 13 chapters deal either directly with inductively coupled plasma mass spectrometry (ICP-MS) or with sample-introduction methodology pertinent to the ICP or other atmospheric pressure plasmas. A good subject index is provided. All but one of the chapters are in the same typeface, which is appreciated.

The first two chapters cover sample-introduction methodology. L. Moenke-Blankenburg and K. Dittrich (and their co-workers) describe their experience at interfacing the ICP with laser ablation and electrothermal vaporization, respectively. Professor Moenke-Blankenburg deals in considerable detail with interactions between the laser and solid and with transport of ablated particulates to the ICP. Professor Dittrich's chapter is very short and merely compares ICP atomic emission spectrometry with several different furnace designs to furnace atomization nonthermal emission spectrometry. Unfortunately, neither of the chapters includes any ICP-MS measurements, although this is understandable when the poverty of what was then East Germany is considered.

D. Beauchemin reports improvements in detection limits and reductions in mass bias by adding small doses of N_2 or H_2 as a sheath gas around the usual nebulizer flow. R. Hutton et al. then describe analog detection with ICP-MS. Compared with the more common pulse-counting mode, analog detection can extend the lifetime of the electron multiplier and improve linearity at high analyte concentrations (≥ 1 ppm). Overlap corrections for abundant polyatomic ions can also be made with better precision during analog detection.

The remaining chapters deal primarily with applications of ICP-MS, and a reasonable sample of the main scientific uses of ICP-MS is presented. In general the analytical data are of very high quality, in keeping with tradition at British ICP-MS conferences. Space does not permit a complete discussion in this review. The informed reader will recognize many of the important applications and areas of research in ICP-MS

from the following synopsis: correction for overlap interferences by multivariate calibration in the determination of Ti, Cu, and Zn in geologic materials (M. Ketterer et al.); certification of a human serum reference material (C. Vandecasteele et al.); special dissolution procedures for plants (E. McCurdy) and for the retention of volatile elements in solution (T. Cho et al.); geochronology by Re-Os isotopic measurements (R. McNutt et al.); determination of actinides in environmental samples (R. Hall et al. and J. Toole et al.); and the analysis of iron materials (J. Moore et al.). Both successes and problem areas are covered. Although the conference was held some 3 years ago, the work presented is still more or less representative of the present capabilities of ICP-MS with the usual quadrupole instruments. For example, Hall and co-workers show detection limits of $\sim 10^6$ atoms for U and Pu with electrothermal vaporization, which is still one of the better figures achievable for these devices.

In summary, this book contains a great deal of useful information for the ICP-MS practitioner. Subsequent work in some of these areas has since been published elsewhere, but this collection is still quite valuable. It is highly recommended for those involved in either research or analysis by ICP-MS.

Applications of Plasma Source Mass Spectrometry

Edited by Grenville Holland and Andrew N. Eaton
The Royal Society of Chemistry, Cambridge, UK
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Book review by R. D. Satzger,
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Since the first reports of atmospheric pressure plasma source mass spectrometry in the mid-1970s and the introduction of the first commercial inductively coupled plasma source instrument in the early 1980s, the area has experienced sustained growth. Outstanding sensitivity and wide linear range, combined with broad elemental coverage enabling excellent qualitative information, have contributed to the maturation of the technique from a curiosity to an important analytical tool for elemental analysis. This book presents, with the typical weaknesses of a book of conference proceedings, a broad spectrum of inductively coupled plasma mass spectrometry (ICP-MS) applications along with some fundamental studies that help to better characterize the capabilities or limitations of the technique. Contributed chapters were presented at the Second Durham International Conference on Plasma Source Mass Spectrometry.