

Book Review

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**Handbook of element speciation
techniques and methodology**

John Wiley & Sons, Chichester, ISBN:
0-471-49214-0
634 + xii pp; price £125.

This book is the first of its kind to cover a field of analytical chemistry that seems to have reached maturity. After the instrumental development of the past 20 years, certain methods and techniques have emerged as being suitable for the determination of metal and metalloid compounds in environmental and biological samples. In this handbook, a brilliant overview is given of the different aspects involved in element (this also includes some non-metals) speciation analysis. The choice of internationally reputable scientists guarantees that the individual chapters cover not only the background information of certain methods but also, more importantly, that state-of-the-art methods are fully described. All chapters have information listed in tables and have extracts of the most important studies illustrated in figures, which are fully referenced so that the reader can use this book as reference book for the next 5 to 10 years.

Nine chapters cover every issue important to element speciation analysis. One chapter is devoted to sampling, and in four individual essays covers the sampling of environmental and clinical samples, with particular focus on food and

samples occurring in occupational health. This chapter is completed by essays covering the sample preparation of biological and geological/environmental samples. This is followed by descriptions of the most suitable separation techniques, such as liquid and gas chromatography, most often coupled to element-specific detectors, and the electrophoretic methods (capillary electrophoresis and gel electrophoresis). Chapter 5 is dedicated to the different detection systems used for the identification and quantification of element species. The chapter starts with essays about atomic absorption and emission spectrometry and continues with plasma-source mass spectrometry (MS). The information given about special inductively coupled plasma (ICP) MS, i.e. high-resolution ICP-MS and multi-collector ICP-MS, is fully justified due to their diversity and applicability for metal and metalloid speciation analysis. Promising new techniques such as tunable plasmas are also introduced, as well as the use of biosensors and specially chosen electrochemical methods. The number of essays concerning direct speciation analysis in solids is a bit lacking, which I think is a thriving field in which an enormous increase in activity is expected; in particular, X-ray absorption spectroscopic methods (XANES, EXAFS). In the final chapters, the most important aspects of accurate and precise analysis are covered in chapters about calibration, screening methods and available reference material. The legislative aspects, especially

important for this relatively new field of analytical chemistry, are also covered. But the small contribution of only six pages fully reflects the hesitant position of legislators to incorporate metal species in law.

This book should be a reference book for all analytical chemists, but it is more than useful for scientists and physicians interested in nutrition and toxicology of metals, for environmental scientists, and for chemists interested in organometallic and bioinorganic synthesis and application. I will certainly use this book as a reference for my postgraduate courses in metal speciation and spectrometry.

Overall, the emphasis of the excellent book is on instrumental analytical methods, and for my taste it is a bit thin on the sampling and sample preparation aspects. However, the editors promise a second volume of the *Handbook of Element Speciation* in which the applications of the four key areas of food, environment, occupational and clinical health, and presumably sample preparation procedures, will be discussed in more detail. After the excellent compilation of essays for Volume 1, 'the techniques and methodology', we are all waiting for Volume 2.

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