

CONTENTS

Chapter 1: Chromatography-Element Selective Detection: Interfacing of gas-chromatography with microwave induced plasma emission detection (GC-MIP)	1
1.1 Introduction	1
1.2 Atomic emission spectroscopic detection (AESD) in chromatography	3
1.3 MIP detection for HPLC and SFC	8
1.4 GC-MIP detection of metals	10
1.5 Future directions for chromatographic plasma emission detection	19
Chapter 2: Determination of organometallic compounds in environmental samples with element-specific detectors	21
2.1 Introduction	21
2.2 The term “speciation”	24
2.3 Advantages of element specific detectors	24
2.4 Determination of volatile trace element compounds	29
2.5 Determination of trace elements and trace element compounds that are convertible to volatile derivatives	32
2.6 Determination of trace element compounds not reducible to volatile derivatives	38
2.7 Conclusions	45
Chapter 3: Chromatographic sample introduction for plasma mass spectrometry	49
3.1 Introduction	49
3.2 Chromatographic detection using ICP-MS	50
3.3 Chromatographic detection using MIP-MS	63
3.4 Conclusions and future developments	69
Chapter 4: The future of intelligent spectrometers in speciation by atomic emission spectrometry	75
4.1 Introduction	75
4.2 Multichannel array detectors	84
4.3 Charge transfer detectors	84
4.4 Array detection of chromatographic eluents	95
4.5 Conclusions	97

Chapter 5: Inductively coupled plasma-mass spectrometry for element-selective detection in liquid Chromatography	101
5.1 Introduction	101
5.2 Instrumentation	102
5.3 Elemental speciation by LC-ICP-MS	107
5.4 Chromatographic procedures for alleviating interferences	113
5.5 Other separation methods with ICP-MS	115
5.6 Conclusions	119
Chapter 6: The use of complexing eluents for the high performance liquid chromatographic determination of metal species	123
6.1 Introduction	123
6.2 Complexing eluents	126
6.3 Ion-exchange separations	151
6.4 Conclusions	164
Chapter 7: Instrumentation and procedures for the long term monitoring of metal ions in Industrial effluents by liquid chromatography with electrochemical detection	167
7.1 Introduction	167
7.2 Chromatography and electrochemistry of metal complexes	170
7.3 The off-line determination of copper as a dithiocarbamate complex by reversed-phase liquid chromatography with electrochemical detection	173
7.4 Automated on-line determination using oxidation processes for metal dithiocarbamate complexes prepared in the in-situ mode	184
7.5 Instrumentation for the 7-day continuous monitoring of metals using ex-situ complex formation	194
7.6 Long-term monitoring of metal concentration via complexes formed by exchange processes with a water soluble zinc dithiocarbamate complex	202
Chapter 8: Ion chromatographic speciation of trace metals	213
8.1 Introduction	213
8.2 Analytical tools	214
8.3 Speciation of metals	217
8.4 Conclusion	234
Chapter 9: Interfacing of GC/HPLC with direct current plasma (DCP) emission spectroscopic detection for trace metal analysis and speciation	239
9.1 Introduction	239
9.2 Background to interfacing of chromatography with DCP	241
9.3 GC/DCP for trace metal speciation	244
9.4 HPLC/DCP for trace metal speciation	260
9.5 Future advances in chromatography/DCP interfacing and applications	277
9.6 Conclusions	281