

Contents

LIST OF CONTRIBUTORS	xi
PREFACE	xiii
ACKNOWLEDGMENTS	xv
CONTENTS OF OTHER VOLUMES	xvii

Chapter 30 Atomic-Absorption and Atomic-Fluorescence Flame Photometry

Juan Ramírez-Muñoz

Introduction	2
1 Fundamentals	6
2 The Flame	14
3 Instrumentation	21
4 Interferences	26
5 Analytical Characteristics	29
6 Analytical Methodology	44
7 Applications	48
References	51

Chapter 31 Ion Microprobe

T. A. Whatley and E. Davidson

1 Ion Sputtering as an Analytical Tool	53
2 Ion Microprobe Instrumentation	55
3 Experimental Procedures	62
4 Quantitative Analysis	78
References	88

Chapter 32 Mass Spectrometry

Ronald F. Skinner and Elaine Heron

Introduction	92
1 Ion Sources	92

2	Mass Analyzers	106
3	Detectors	114
4	Inlet Systems	116
5	Computers	123
	Bibliography	130

Chapter 33 Molecular Weight Determinations

R. V. Peterson

	Introduction	133
1	Theory	135
2	Molecular Weight Distribution	135
3	Methods for Determining Molecular Weight	137
	References	151

Chapter 34 Neutron Diffractometry

Melvin H. Mueller

	Introduction	154
1	Theory and Comparison with Other Diffraction Techniques	155
2	Instrumentation	162
3	Applications	165
4	Other Types of Investigations	178
5	Future of Neutron Scattering	180
	References	181

Chapter 35 Particulate Characterization

Shepard Kinsznan

	Introduction	183
1	Particle Size Analysis	184
2	Surface Area Analysis	197
3	Powder Density	200
	References	201

Chapter 36 Polarimetry

J. H. Richardson

	Introduction	205
1	Theory	206

2	Instrumentation	215
3	Applications	218
	References	223

Chapter 37 Polarography and Related Methods

Petr Zuman

	Introduction to Electrochemical Methods of Analysis	225
1	Theory of Polarography and Related Methods	230
2	Applications and Limitations	248
3	Data Form	264
	References	265

Chapter 38 Methods for the Detection of Noncentrosymmetry in Solids

S. K. Kurtz and J. P. Dougherty

	Introduction	269
1	Symmetry Elements and Methods for Their Determination	271
2	Second Harmonic Generation in Crystals and Powders	292
3	Design and Operation of a Second Harmonic Analyzer	315
4	Application to Specific Problems	327
	References	337

Chapter 39 Dynamic Thermal Analysis

E. M. Barrall, II, and R. J. Critter

	Introduction	344
1	Thermogravimetry	345
2	Differential Thermal Analysis and Differential Scanning Calorimetry	359
3	Thermomechanical Analysis	390
4	Conclusion	400
	References	401

Chapter 40 Transmission Electron Microscopy

Jatnes C. Williams and Neil Paton

	Introduction	408
1	A Description of the Electron Microscope and Its Capabilities	408

2	Replica Techniques	417
3	Preparation of Thin Foils	434
4	Image Contrast in Thin Foils	440
5	Applications of Thin Foil Techniques	454
	References	474
	AUTHOR INDEX	477
	SUBJECT INDEX	488