Contents

Contributors vii

Preface xi

1 Introduction 1
- **1.1** Considering the Role of X-ray Spectrometry in Chemical Analysis and Outlining the Volume 1

2 X-Ray Sources 13
- **2.1** Micro X-ray Sources 13
- **2.2** New Synchrotron Radiation Sources 29
- **2.3** Laser-driven X-ray Sources 49

3 X-Ray Optics 63
- **3.1** Multilayers for Soft and Hard X-rays 63
- **3.2** Single Capillaries X-ray Optics . . 79
- **3.3** Polycapillary X-ray Optics 89
- **3.4** Parabolic Compound Refractive X-ray Lenses 111

4 X-Ray Detectors 133
- **4.1** Semiconductor Detectors for (Imaging) X-ray Spectroscopy . . . 133
- **4.2** Gas Proportional Scintillation Counters for X-ray Spectrometry 195
- **4.3** Superconducting Tunnel Junctions 217
- **4.4** Cryogenic Microcalorimeters 229
- **4.5** Position Sensitive Semiconductor Strip Detectors 247

5 Special Configurations 277
- **5.1** Grazing-incidence X-ray Spectrometry 277
- **5.2** Grazing-exit X-ray Spectrometry . 293
- **5.3** Portable Equipment for X-ray Fluorescence Analysis 307
- **5.4** Synchrotron Radiation for Microscopic X-ray Fluorescence Analysis 343
- **5.5** High-energy X-ray Fluorescence . . 355
- **5.6** Low-energy Electron Probe Microanalysis and Scanning Electron Microscopy 373
- **5.7** Energy Dispersive X-ray Microanalysis in Scanning and Conventional Transmission Electron Microscopy 387
- **5.8** X-Ray Absorption Techniques . . . 405

6 New Computerisation Methods 435
- **6.1** Monte Carlo Simulation for X-ray Fluorescence Spectroscopy 435
- **6.2** Spectrum Evaluation 463

7 New Applications 487
- **7.1** X-Ray Fluorescence Analysis in Medical Sciences 487
- **7.2** Total Reflection X-ray Fluorescence for Semiconductors and Thin Films 517
- **7.3** X-Ray Spectrometry in Archaeometry 533
- **7.4** X-Ray Spectrometry in Forensic Research 553
- **7.5** Speciation and Surface Analysis of Single Particles Using Electron-excited X-ray Emission Spectrometry 569

Index 593

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Preface

During the last decade, remarkable and often spectacular progress has been made in the methodological but even more in the instrumental aspects of X-ray spectrometry. This progress includes, for example, considerable improvements in the design and production technology of detectors and considerable advances in X-ray optics, special configurations and computing approaches. All this has resulted in improved analytical performance and new applications, but even more in the perspective of further dramatic enhancements of the potential of X-ray based analysis techniques in the very near future. Although there exist many books on X-ray spectrometry and its analytical applications, the idea emerged to produce a special book that would cover only the most advanced and high-tech aspects of the chemical analysis techniques based on X-rays that would be as up-to-date as possible. In principle, all references were supposed to be less than five years old. Due to rapid changes and immense progress in the field, the timescale for the book was set to be very short. A big effort was made to cover as many sub-areas as possible, and certainly those in which progress has been the fastest. By its nature, this book cannot cover the fundamental, well-known and more routine aspects of the technique; for this, reference is made to several existing handbooks and textbooks.

This book is a multi-authored effort. We believe that having scientists who are actively engaged in a particular technique to cover those areas for which they are particularly qualified, outweighs any advantages of uniformity and homogeneity that characterize a single-author book. In the specific case of this book, it would have been truly impossible for any single person to cover a significant fraction of all the fundamental and applied sub-fields of X-ray spectrometry in which there are so many advances nowadays. The Editors were fortunate enough to have the cooperation of truly eminent specialists in each of the sub-fields. Many chapters are written by Japanese scientists, and this is a bonus because much of their intensive and innovating research on X-ray methods is too little known outside Japan. The Editors wish to thank all the distinguished contributors for their considerable and timely efforts. It was, of course, necessary to have this book, on so many advanced and hot topics in X-ray spectrometry, produced within an unusually short time, before it would become obsolete; still the resulting heavy time-pressure put on the authors may have been unpleasant at times.

We hope that even experienced workers in the field of X-ray analysis will find this book useful and instructive, and particularly up-to-date when it appears, and will benefit from the large amount of readily accessible information available in this compact form, some of it presented for the first time. We believe there is hardly any overlap with existing published books, because of the highly advanced nature and actuality of most chapters. Being sure that the expert authors have covered their subjects with sufficient depth, we hope that we have chosen the topics of the different chapters to be wide-ranging enough

to cover all the important and emerging fields sufficiently well.

We do hope this book will help analytical chemists and other users of X-ray spectrometry to fully exploit the capabilities of this set of powerful analytical tools and to further expand its applications in such fields as material and environmental sciences, medicine, toxicology, forensics, archaeometry and many others.

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