

CONTENTS

PART I

Analysis of Light Elements

| | |
|--|----|
| Change in Shape of the K Emission Spectra of the Light Elements with Chemical Combination <i>J. E. Holliday</i> | 3 |
| Progress in the Analysis of Light Elements <i>I. R. M. Wardell and V. E. Cosslett</i> | 23 |
| Microprobe Analysis of the Elements Fluorine Through Boron <i>Poen Sing Ong</i> | 43 |
| Electron Probe Microanalysis of Thin Layers and Small Particles with Emphasis on Light Element Determinations <i>Christian A. Andersen</i> | 58 |
| Specimen Contamination in the Electron Microprobe <i>A. J. Campbell and R. Gibbons</i> | 75 |
| Electron Probe Microanalysis of the Low Atomic Number Ele- ments with NPL X-Ray Gratings <i>A. Franks and K. Lindsey</i> | 83 |

PART II

Quantitative Analysis

| | |
|---|-----|
| The Applicability of Theoretically Calculated Intensity Cor- rections in Microprobe Analysis <i>J. W. Colby</i> | 95 |
| A Computer Program for Quantitative Electron Probe Microanalysis <i>J. D. Brown</i> | 189 |

CONTENTS

| | |
|--|-----|
| Distribution of Secondary Fluorescence with Depth Using Monte Carlo Calculations <i>L. S. Birks, D. J. Ellis, B. K. Grant, A. S. Frisch and R. B. Hickman</i> | 199 |
| Intensity Formulae for Computer Solution of Multicomponent Electron Probe Specimens <i>J. W. Criss and L. S. Birks</i> | 217 |
| A Study of Electron Diffusion in Microanalyzer Specimens <i>Ryuichi Shimizu and Gunji Shinoda</i> | 237 |
| Penetration and Energy Loss of Electrons in Solid Targets <i>V. E. Cosslett and R. N. Thomas</i> | 248 |
| Correction of Atomic Number Effects in Microprobe Analysis <i>D. M. Poole and P. M. Thomas</i> | 269 |
| Effect of Critical Excitation Potential on the Absorption Correction <i>P. Duncumb and P. K. Shields</i> | 284 |
| X-Ray Absorption Uncertainty <i>Kurt F. J. Heinrich</i> | 296 |
| Correlations of Empirical Calibrations for Electron Microanalysis <i>T. O. Ziebold and R. E. Ogilvie</i> | 378 |
| Thickness Determination of Thin Films by Electron Probe Microanalysis <i>Gudrun A. Hutchins</i> | 390 |
| Nonproportional Behavior of the Flow Proportional Detector <i>S. L. Bender and E. J. Rapperport</i> | 405 |

PART III

New Techniques and Instrumentation

| | |
|--|-----|
| Precision of Cubic Lattice Parameter Measurements by the Kossel Technique <i>Harvey Yakowitz</i> | 417 |
| The Specification and Performance of the A.E.I. Scanning Microprobe Type SEM2 <i>I. K. Openshaw</i> | 439 |

CONTENTS

xv

| | |
|--|-----|
| Programmed Analysis with a New Electron Microprobe <i>E. Davidson, W. E. Fowler, H. Neuhaus and W. G. Shequen</i> | 454 |
| A Compact Vacuum-Path 2θ Scanner <i>R. K. Hart and D. G. Pilney</i> | 472 |
| Stereoscopic Observation in Scanning Microscopy Using Multiple Detectors <i>S. Kimoto and H. Hashimoto</i> | 480 |
| Precipitation Studies with Emma—A Combined Electron Microscope and X-Ray Microanalyzer <i>P. Duncumb</i> | 490 |

PART IV

Applications

| | |
|---|-----|
| A Diffusion Study in the Titanium-Silver System <i>Gunji Shinoda and Hideaki Kawabe</i> | 503 |
| Phase Equilibria in the Nb-Sn System <i>H. S. Rosenbaum and H. W. Schadler</i> | 512 |
| Diffusivity and Solubility Limit of Copper in Alpha and Gamma Iron <i>G. R. Speich, J. A. Gula and R. M. Fisher</i> | 525 |
| Diffusion in a Ternary Substitutional System— Application to the Cobalt-Nickel-Chromium System <i>A. G. Guy and V. Leroy</i> | 543 |
| Microanalysis of Oxidized Molten Iron Alloys <i>C. D. Desforges and J. A. Charles</i> | 562 |
| A Study of the Compatibility of Selected Refractory Metals with Various Ceramic Insulation Materials <i>D. E. Fornwalt, B. R. Gourley, and A. V. Manzione</i> | 581 |
| Microconstituents in High Speed Steels <i>P. K. Koh</i> | 604 |
| Microanalysis of Sulfide Inclusions in the Region of an Inverted 'V' Segregate of a Steel Ingot <i>Kaichi Matsubara</i> | 632 |
| Grain Boundary Migration in Hot-Pressed Tantalum Carbide <i>M. Klerk and E. Roeder</i> | 642 |

| | |
|---|------|
| Electron Probe Microanalysis of Submicroscopic Precipitates in Stainless Steel <i>B. R. Banerjee and W. D. Bingle</i> | 653 |
| Certain Semiconductor Applications of the Scanning Electron Microscope <i>T. E. Everhart</i> | 665 |
| Application of the Electron Probe to Electronic Materials <i>P. Lublin and W. J. Sutkowski</i> | 677 |
| Cathodoluminescence in Gallium Arsenide <i>David F. Kyser and David B. Wittry</i> | 691 |
| Electron Microprobe Applications to Advanced Electronic Components <i>J. N. Ramsey and P. Weinstein</i> | 715 |
| Planar Silicon Device Analyses with the Electron Probe Microanalyzer <i>C. C. Nealey, C. W. Laakso, and P. J. Hagon</i> | 748 |
| Quantitative Electron Microprobe Analysis of Ilmenite Ores <i>A. K. Temple, K. F. J. Heinrich and J. F. Ficca, Jr.</i> | 784 |
| Quantitative Microprobe Analysis of Microcrystalline Powders <i>E. W. White, P. J. Denny and S. M. Irving</i> | 791 |
| Some Applications of Microprobe Analysis in Biology and Medicine <i>T. A. Hall, A. J. Hale and V. R. Switsur</i> | 805 |
| Quantitative Analysis of Ca/P Molar Ratios In Bone Tissue with the Electron Probe <i>Robert C. Mellors, Kenneth G. Carroll and Todd Solberg</i> | 834 |
| Bibliography | 841 |
| Index to Bibliography | 979 |
| Supplement to the Bibliography | 999 |
| Author Index | 1031 |
| Subject Index | 1033 |