

needs of our students, whose backgrounds span a huge range of the physical and biological sciences and diverse technologies. The course evolution reached the point that the instructors felt that a completely rewritten book was necessary. In this book, we have incorporated information about the new capabilities listed above and we have added much new material, including specimen preparation for polymers, the use of the focused ion beam instrument (FIB) for preparing specific areas of specimens for imaging and analysis, and eliminating charging on nonconducting specimens. We have retained the key features of the first and second editions, with separate discussions of the principles of SEM imaging and x-ray spectrometry and analysis. New chapters (Chapters 5 and 10) contain specialized material on SEM imaging and x-ray microanalysis for practical specimens. Moreover, we have decided to move some of the detailed and equation-dense discussions to an accompanying CD, a feature that was not even technically possible in 1992! In this way, we believe that the true introductory student will be able to grasp the basic principles of SEM and x-ray microanalysis in a more readable form. For the advanced student, detailed x-ray microanalysis formulations can be found on the CD which accompanies the book. The capacity of the CD has allowed us to gather all of the data that formed the last chapter of the 1992 edition as well as new databases to create a readily available computer-compatible resource for the reader. The CD also contains numerous color image examples (e.g., stereomicroscopy, compositional mapping) that could not be reproduced in the printed volume without greatly increasing the cost.

The authors wish to thank their many colleagues who contributed to this volume by allowing us to use material from their research, by their criticism of drafts of the chapters, and by their general support. Although we are grateful for the vital contributions of the new members of the teaching/author team, 10 years has not softened the loss of Charles Fiori, one of the most creative individuals in the history of our field, who died a few months after the publication of the 1992 edition. One of the authors (JIG) wishes to acknowledge to continuing support of the NASA Cosmochemistry Program. Another author (JRM) wishes to acknowledge the support of the United States Department of Energy through the Sandia Corporation, a Lockheed Martin Company operated for the United States Department of Energy. Special thanks go to Jane Martel for her help with the preparation of the manuscript and to Sharon Coe and Dr. David Williams of Lehigh University for continuing support as the book was developed.

Finally, the authors hope that the book not only will communicate the critical information necessary to successfully apply scanning electron microscopy and x-ray microanalysis to the reader's particular challenges, but will also convey the excitement that this field offers to those who are privileged to work in it.

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Contents

1. Introduction	1
1.1. Imaging Capabilities	2
1.2. Structure Analysis	10
1.3. Elemental Analysis	10
1.4. Summary and Outline of This Book	17
Appendix A. Overview of Scanning Electron Microscopy	18
Appendix B. Overview of Electron Probe X-Ray Microanalysis	19
References	20
 2. The SEM and Its Modes of Operation	 21
2.1. How the SEM Works	21
2.1.1. Functions of the SEM Subsystems	21
2.1.1.1. Electron Gun and Lenses Produce a Small Electron Beam	22
2.1.1.2. Deflection System Controls Magnification	22
2.1.1.3. Electron Detector Collects the Signal	24
2.1.1.4. Camera or Computer Records the Image	25
2.1.1.5. Operator Controls	25
2.1.2. SEM Imaging Modes	25
2.1.2.1. Resolution Mode	27
2.1.2.2. High-Current Mode	27
2.1.2.3. Depth-of-Focus Mode	28
2.1.2.4. Low-Voltage Mode	29
2.1.3. Why Learn about Electron Optics?	29
2.2. Electron Guns	29
2.2.1. Tungsten Hairpin Electron Guns	30
2.2.1.1. Filament	30
2.2.1.2. Grid Cap	31
2.2.1.3. Anode	31
2.2.1.4. Emission Current and Beam Current	32
2.2.1.5. Operator Control of the Electron Gun	32

2.2.2.	Electron Gun Characteristics	33
2.2.2.1.	Electron Emission Current	33
2.2.2.2.	Brightness	33
2.2.2.3.	Lifetime	34
2.2.2.4.	Source Size, Energy Spread, Beam Stability	34
2.2.2.5.	Improved Electron Gun Characteristics	34
2.2.3.	Lanthanum Hexaboride (LaB ₆) Electron Guns	35
2.2.3.1.	Introduction	35
2.2.3.2.	Operation of the LaB ₆ Source	36
2.2.4.	Field Emission Electron Guns	37
2.3.	Electron Lenses	40
2.3.1.	Making the Beam Smaller	40
2.3.1.1.	Electron Focusing	40
2.3.1.2.	Demagnification of the Beam	41
2.3.2.	Lenses in SEMs	42
2.3.2.1.	Condenser Lenses	42
2.3.2.2.	Objective Lenses	42
2.3.2.3.	Real and Virtual Objective Apertures	44
2.3.3.	Operator Control of SEM Lenses	44
2.3.3.1.	Effect of Aperture Size	45
2.3.3.2.	Effect of Working Distance	45
2.3.3.3.	Effect of Condenser Lens Strength	46
2.3.4.	Gaussian Probe Diameter	47
2.3.5.	Lens Aberrations	48
2.3.5.1.	Spherical Aberration	48
2.3.5.2.	Aperture Diffraction	49
2.3.5.3.	Chromatic Aberration	50
2.3.5.4.	Astigmatism	51
2.3.5.5.	Aberrations in the Objective Lens	53
2.4.	Electron Probe Diameter versus Electron Probe Current	54
2.4.1.	Calculation of d_{\min} and i_{\max}	54
2.4.1.1.	Minimum Probe Size	54
2.4.1.2.	Minimum Probe Size at 10–30 kV	54
2.4.1.3.	Maximum Probe Current at 10–30 kV	55
2.4.1.4.	Low-Voltage Operation	55
2.4.1.5.	Graphical Summary	56
2.4.2.	Performance in the SEM Modes	56
2.4.2.1.	Resolution Mode	56
2.4.2.2.	High-Current Mode	58
2.4.2.3.	Depth-of-Focus Mode	59
2.4.2.4.	Low-Voltage SEM	59
2.4.2.5.	Environmental Barriers to High-Resolution Imaging	59
References	. . . . .	60
3.	Electron Beam–Specimen Interactions	61
3.1.	The Story So Far	61
3.2.	The Beam Enters the Specimen	61
3.3.	The Interaction Volume	65
3.3.1.	Visualizing the Interaction Volume	65
3.3.2.	Simulating the Interaction Volume	67

3.3.3.	Influence of Beam and Specimen Parameters on the Interaction Volume	68
3.3.3.1.	Influence of Beam Energy on the Interaction Volume	68
3.3.3.2.	Influence of Atomic Number on the Interaction Volume	69
3.3.3.3.	Influence of Specimen Surface Tilt on the Interaction Volume	71
3.3.4.	Electron Range: A Simple Measure of the Interaction Volume	72
3.3.4.1.	Introduction	72
3.3.4.2.	The Electron Range at Low Beam Energy	73
3.4.	Imaging Signals from the Interaction Volume	75
3.4.1.	Backscattered Electrons	75
3.4.1.1.	Atomic Number Dependence of BSE	75
3.4.1.2.	Beam Energy Dependence of BSE	77
3.4.1.3.	Tilt Dependence of BSE	79
3.4.1.4.	Angular Distribution of BSE	80
3.4.1.5.	Energy Distribution of BSE	82
3.4.1.6.	Lateral Spatial Distribution of BSE	84
3.4.1.7.	Sampling Depth of BSE	86
3.4.2.	Secondary Electrons	88
3.4.2.1.	Definition and Origin of SE	88
3.4.2.2.	SE Yield with Primary Beam Energy	89
3.4.2.3.	SE Energy Distribution	91
3.4.2.4.	Range and Escape Depth of SE	91
3.4.2.5.	Relative Contributions of SE ₁ and SE ₂	93
3.4.2.6.	Specimen Composition Dependence of SE	95
3.4.2.7.	Specimen Tilt Dependence of SE	96
3.4.2.8.	Angular Distribution of SE	97
References	. . . . .	97
4.	Image Formation and Interpretation	99
4.1.	The Story So Far	99
4.2.	The Basic SEM Imaging Process	99
4.2.1.	Scanning Action	101
4.2.2.	Image Construction (Mapping)	103
4.2.2.1.	Line Scans	103
4.2.2.2.	Image (Area) Scanning	104
4.2.2.3.	Digital Imaging: Collection and Display	107
4.2.3.	Magnification	108
4.2.4.	Picture Element (Pixel) Size	110
4.2.5.	Low-Magnification Operation	114
4.2.6.	Depth of Field (Focus)	114
4.2.7.	Image Distortion	118
4.2.7.1.	Projection Distortion: Gnomonic Projection	118
4.2.7.2.	Projection Distortion: Image Foreshortening	119
4.2.7.3.	Scan Distortion: Pathological Defects	123
4.2.7.4.	Moiré Effects	125
4.3.	Detectors	125
4.3.1.	Introduction	125

4.3.2.	Electron Detectors	127
4.3.2.1.	Everhart-Thornley Detector	128
4.3.2.2.	"Through-the-Lens" (TTL) Detector	132
4.3.2.3.	Dedicated Backscattered Electron Detectors	133
4.4.	The Roles of the Specimen and Detector in Contrast Formation	139
4.4.1.	Contrast	139
4.4.2.	Compositional (Atomic Number) Contrast	141
4.4.2.1.	Introduction	141
4.4.2.2.	Compositional Contrast with Backscattered Electrons	141
4.4.3.	Topographic Contrast	145
4.4.3.1.	Origins of Topographic Contrast	146
4.4.3.2.	Topographic Contrast with the Everhart-Thornley Detector	147
4.4.3.3.	Light-Optical Analogy	151
4.4.3.4.	Interpreting Topographic Contrast with Other Detectors	158
4.5.	Image Quality	173
4.6.	Image Processing for the Display of Contrast Information	178
4.6.1.	The Signal Chain	178
4.6.2.	The Visibility Problem	180
4.6.3.	Analog and Digital Image Processing	182
4.6.4.	Basic Digital Image Processing	184
4.6.4.1.	Digital Image Enhancement	187
4.6.4.2.	Digital Image Measurements	192
References	. . . . .	192
5.	Special Topics in Scanning Electron Microscopy	195
5.1.	High-Resolution Imaging	195
5.1.1.	The Resolution Problem	195
5.1.2.	Achieving High Resolution at High Beam Energy	197
5.1.3.	High-Resolution Imaging at Low Voltage	201
5.2.	STEM-in-SEM: High Resolution for the Special Case of Thin Specimens	203
5.3.	Surface Imaging at Low Voltage	207
5.4.	Making Dimensional Measurements in the SEM	209
5.5.	Recovering the Third Dimension: Stereomicroscopy	212
5.5.1.	Qualitative Stereo Imaging and Presentation	212
5.5.2.	Quantitative Stereo Microscopy	217
5.6.	Variable-Pressure and Environmental SEM	220
5.6.1.	Current Instruments	221
5.6.2.	Gas in the Specimen Chamber	222
5.6.2.1.	Units of Gas Pressure	222
5.6.2.2.	The Vacuum System	222
5.6.3.	Electron Interactions with Gases	225
5.6.4.	The Effect of the Gas on Charging	231
5.6.5.	Imaging in the ESEM and the VPSEM	236
5.6.6.	X-Ray Microanalysis in the Presence of a Gas	241
5.7.	Special Contrast Mechanisms	242
5.7.1.	Electric Fields	243
5.7.2.	Magnetic Fields	245

5.7.2.1.	Type 1 Magnetic Contrast	245
5.7.2.2.	Type 2 Magnetic Contrast	247
5.7.3.	Crystallographic Contrast	247
5.8.	Electron Backscatter Patterns	256
5.8.1.	Origin of EBSD Patterns	260
5.8.2.	Hardware for EBSD	262
5.8.3.	Resolution of EBSD	264
5.8.3.1.	Lateral Spatial Resolution	264
5.8.3.2.	Depth Resolution	266
5.8.4.	Applications	267
5.8.4.1.	Orientation Mapping	267
5.8.4.2.	Phase Identification	267
References	. . . . .	269
6.	Generation of X-Rays in the SEM Specimen	271
6.1.	Continuum X-Ray Production (Bremsstrahlung)	271
6.2.	Characteristic X-Ray Production	274
6.2.1.	Origin	274
6.2.2.	Fluorescence Yield	275
6.2.3.	Electron Shells	276
6.2.4.	Energy-Level Diagram	277
6.2.5.	Electron Transitions	277
6.2.6.	Critical Ionization Energy	278
6.2.7.	Moseley's Law	279
6.2.8.	Families of Characteristic Lines	279
6.2.9.	Natural Width of Characteristic X-Ray Lines	281
6.2.10.	Weights of Lines	282
6.2.11.	Cross Section for Inner Shell Ionization	283
6.2.12.	X-Ray Production in Thin Foils	284
6.2.13.	X-Ray Production in Thick Targets	284
6.2.14.	X-Ray Peak-to-Background Ratio	285
6.3.	Depth of X-Ray Production (X-Ray Range)	286
6.3.1.	Anderson-Hasler X-Ray Range	286
6.3.2.	X-Ray Spatial Resolution	286
6.3.3.	Sampling Volume and Specimen Homogeneity	288
6.3.4.	Depth Distribution of X-Ray Production, $\phi(\rho z)$	288
6.4.	X-Ray Absorption	289
6.4.1.	Mass Absorption Coefficient for an Element	290
6.4.2.	Effect of Absorption Edge on Spectrum	291
6.4.3.	Absorption Coefficient for Mixed-Element Absorbers	291
6.5.	X-Ray Fluorescence	292
6.5.1.	Characteristic Fluorescence	293
6.5.2.	Continuum Fluorescence	294
6.5.3.	Range of Fluorescence Radiation	295
References	. . . . .	295
7.	X-Ray Spectral Measurement: EDS and WDS	297
7.1.	Introduction	297
7.2.	Energy-Dispersive X-Ray Spectrometer	297
7.2.1.	Operating Principles	297

7.2.2.	The Detection Process	301
7.2.3.	Charge-to-Voltage Conversion	302
7.2.4.	Pulse-Shaping Linear Amplifier and Pileup Rejection Circuitry	303
7.2.5.	The Computer X-Ray Analyzer	308
7.2.6.	Digital Pulse Processing	311
7.2.7.	Spectral Modification Resulting from the Detection Process	312
7.2.7.1.	Peak Broadening	312
7.2.7.2.	Peak Distortion	316
7.2.7.3.	Silicon X-Ray Escape Peaks	317
7.2.7.4.	Absorption Edges	318
7.2.7.5.	Silicon Internal Fluorescence Peak	320
7.2.8.	Artifacts from the Detector Environment	321
7.2.9.	Summary of EDS Operation and Artifacts	322
7.3.	Wavelength-Dispersive Spectrometer	323
7.3.1.	Introduction	323
7.3.2.	Basic Description	324
7.3.3.	Diffraction Conditions	325
7.3.4.	Diffraction Crystals	327
7.3.5.	The X-Ray Proportional Counter	330
7.3.6.	Detector Electronics	333
7.4.	Comparison of Wavelength-Dispersive Spectrometers with Conventional Energy-Dispersive Spectrometers	340
7.4.1.	Geometric Collection Efficiency	340
7.4.2.	Quantum Efficiency	341
7.4.3.	Resolution	342
7.4.4.	Spectral Acceptance Range	344
7.4.5.	Maximum Count Rate	344
7.4.6.	Minimum Probe Size	344
7.4.7.	Speed of Analysis	346
7.4.8.	Spectral Artifacts	346
7.5.	Emerging Detector Technologies	347
7.5.1.	X-Ray Microcalorimetry	347
7.5.2.	Silicon Drift Detectors	349
7.5.3.	Parallel Optic Diffraction-Based Spectrometers	350
References	. . . . .	353
8. Qualitative X-Ray Analysis	. . . . .	355
8.1.	Introduction	355
8.2.	EDS Qualitative Analysis	357
8.2.1.	X-Ray Peaks	357
8.2.2.	Guidelines for EDS Qualitative Analysis	366
8.2.2.1.	General Guidelines for EDS Qualitative Analysis	368
8.2.2.2.	Specific Guidelines for EDS Qualitative Analysis	369
8.2.3.	Examples of Manual EDS Qualitative Analysis	372
8.2.4.	Pathological Overlaps in EDS Qualitative Analysis	374

8.2.5.	Advanced Qualitative Analysis: Peak Stripping	379
8.2.6.	Automatic Qualitative EDS Analysis	381
8.3.	WDS Qualitative Analysis	382
8.3.1.	Wavelength-Dispersive Spectrometry of X-Ray Peaks	382
8.3.2.	Guidelines for WDS Qualitative Analysis	388
References	. . . . .	390
9. Quantitative X-Ray Analysis: The Basics	. . . . .	391
9.1.	Introduction	391
9.2.	Advantages of Conventional Quantitative X-Ray Microanalysis in the SEM	392
9.3.	Quantitative Analysis Procedures: Flat-Polished Samples	393
9.4.	The Approach to X-Ray Quantitation: The Need for Matrix Corrections	402
9.5.	The Physical Origin of Matrix Effects	403
9.6.	ZAF Factors in Microanalysis	404
9.6.1.	Atomic number effect, Z	404
9.6.1.1.	Effect of Backscattering (R) and Energy Loss (S)	404
9.6.1.2.	X-Ray Generation with Depth, $\phi(\rho z)$	406
9.6.2.	X-Ray Absorption Effect, A	411
9.6.3.	X-Ray Fluorescence, F	415
9.7.	Calculation of ZAF Factors	416
9.7.1.	Atomic Number Effect, Z	417
9.7.2.	Absorption correction, A	417
9.7.3.	Characteristic Fluorescence Correction, F	418
9.7.4.	Calculation of ZAF	418
9.7.5.	The Analytical Total	420
9.8.	Practical Analysis	421
9.8.1.	Examples of Quantitative Analysis	421
9.8.1.1.	Al-Cu Alloys	421
9.8.1.2.	Ni-10 wt% Fe Alloy	423
9.8.1.3.	Ni-38.5 wt% Cr-3.0 wt% Al Alloy	423
9.8.1.4.	Pyroxene: 53.5 wt% SiO ₂ , 1.11 wt% Al ₂ O ₃ , 0.62 wt% Cr ₂ O ₃ , 9.5 wt% FeO, 14.1 wt% MgO, and 21.2 wt% CaO	425
9.8.2.	Standardless Analysis	427
9.8.2.1.	First-Principles Standardless Analysis	429
9.8.2.2.	"Fitted-Standards" Standardless Analysis	433
9.8.3.	Special Procedures for Geological Analysis	436
9.8.3.1.	Introduction	436
9.8.3.2.	Formulation of the Bence-Albee Procedure	437
9.8.3.3.	Application of the Bence-Albee Procedure	438
9.8.3.4.	Specimen Conductivity	439
9.8.4.	Precision and Sensitivity in X-Ray Analysis	440
9.8.4.1.	Statistical Basis for Calculating Precision and Sensitivity	440
9.8.4.2.	Precision of Composition	442
9.8.4.3.	Sample Homogeneity	444
9.8.4.4.	Analytical Sensitivity	445

9.8.4.5. Trace Element Analysis	446
9.8.4.6. Trace Element Analysis Geochronologic Applications	448
9.8.4.7. Biological and Organic Specimens	449
References	449

10. Special Topics in Electron Beam X-Ray Microanalysis 453

10.1. Introduction	453
10.2. Thin Film on a Substrate	454
10.3. Particle Analysis	462
10.3.1. Particle Mass Effect	463
10.3.2. Particle Absorption Effect	463
10.3.3. Particle Fluorescence Effect	464
10.3.4. Particle Geometric Effects	465
10.3.5. Corrections for Particle Geometric Effects	466
10.3.5.1. The Consequences of Ignoring Particle Effects	466
10.3.5.2. Normalization	466
10.3.5.3. Critical Measurement Issues for Particles	468
10.3.5.4. Advanced Quantitative Methods for Particles	470
10.4. Rough Surfaces	476
10.4.1. Introduction	476
10.4.2. Rough Specimen Analysis Strategy	479
10.4.2.1. Reorientation	479
10.4.2.2. Normalization	479
10.4.2.3. Peak-to-Background Method	479
10.5. Beam-Sensitive Specimens (Biological, Polymeric)	480
10.5.1. Thin-Section Analysis	480
10.5.2. Bulk Biological and Organic Specimens	483
10.6. X-Ray Mapping	485
10.6.1. Relative Merits of WDS and EDS for Mapping	486
10.6.2. Digital Dot Mapping	487
10.6.3. Gray-Scale Mapping	488
10.6.3.1. The Need for Scaling in Gray-Scale Mapping	489
10.6.3.2. Artifacts in X-Ray Mapping	491
10.6.4. Compositional Mapping	492
10.6.4.1. Principles of Compositional Mapping	492
10.6.4.2. Advanced Spectrum Collection Strategies for Compositional Mapping	494
10.6.5. The Use of Color in Analyzing and Presenting X-Ray Maps	497
10.6.5.1. Primary Color Superposition	497
10.6.5.2. Pseudocolor Scales	497
10.7. Light Element Analysis	499
10.7.1. Optimization of Light Element X-Ray Generation	499
10.7.2. X-Ray Spectrometry of the Light Elements	503
10.7.2.1. Si EDS	503
10.7.2.2. WDS	507
10.7.3. Special Measurement Problems for the Light Elements	511
10.7.3.1. Contamination	511

10.7.3.2. Overvoltage Effects	512
10.7.3.3. Absorption Effects	514
10.7.4. Light Element Quantification	515
10.8. Low-Voltage Microanalysis	518
10.8.1. "Low-Voltage" versus "Conventional" Microanalysis	518
10.8.2. X-Ray Production Range	519
10.8.2.1. Contribution of the Beam Size to the X-Ray Analytical Resolution	520
10.8.2.2. A Consequence of the X-Ray Range under Low-Voltage Conditions	523
10.8.3. X-Ray Spectrometry in Low-Voltage Microanalysis	525
10.8.3.1. The Oxygen and Carbon Problem	526
10.8.3.2. Quantitative X-Ray Microanalysis at Low Voltage	528
10.9. Report of Analysis	531
References	535
11. Specimen Preparation of Hard Materials: Metals, Ceramics, Rocks, Minerals, Microelectronic and Packaged Devices, Particles, and Fibers	537
11.1. Metals	537
11.1.1. Specimen Preparation for Surface Topography	537
11.1.2. Specimen Preparation for Microstructural and Microchemical Analysis	538
11.1.2.1. Initial Sample Selection and Specimen Preparation Steps	538
11.1.2.2. Final Polishing Steps	539
11.1.2.3. Preparation for Microanalysis	540
11.2. Ceramics and Geological Samples	541
11.2.1. Initial Specimen Preparation: Topography and Microstructure	542
11.2.2. Mounting and Polishing for Microstructural and Microchemical Analysis	542
11.2.3. Final Specimen Preparation for Microstructural and Microchemical Analysis	542
11.3. Microelectronics and Packages	543
11.3.1. Initial Specimen Preparation	543
11.3.2. Polishing	544
11.3.3. Final Preparation	545
11.4. Imaging of Semiconductors	545
11.4.1. Voltage Contrast	546
11.4.2. Charge Collection	546
11.5. Preparation for Electron Diffraction in the SEM	547
11.5.1. Channeling Patterns and Channeling Contrast	547
11.5.2. Electron Backscatter Diffraction	547
11.6. Special Techniques	551
11.6.1. Plasma Cleaning	551
11.6.2. Focused-Ion-Beam Sample Preparation for SEM	553
11.6.2.1. Application of FIB for Semiconductors	554
11.6.2.2. Applications of FIB in Materials Science	555

11.7. Particles and Fibers	557
11.7.1. Particle Substrates and Supports	559
11.7.1.1. Bulk Particle Substrates	559
11.7.1.2. Thin Particle Supports	560
11.7.2. Particle Mounting Techniques	560
11.7.3. Particles Collected on Filters	562
11.7.4. Particles in a Solid Matrix	563
11.7.5. Transfer of Individual Particles	563
References	564
12. Specimen Preparation of Polymer Materials	565
12.1. Introduction	565
12.2. Microscopy of Polymers	565
12.2.1. Radiation Effects	566
12.2.2. Imaging Compromises	567
12.2.3. Metal Coating Polymers for Imaging	567
12.2.4. X-Ray Microanalysis of Polymers	570
12.3. Specimen Preparation Methods for Polymers	570
12.3.1. Simple Preparation Methods	571
12.3.2. Polishing of Polymers	571
12.3.3. Microtomy of Polymers	572
12.3.4. Fracture of Polymer Materials	573
12.3.5. Staining of Polymers	576
12.3.5.1. Osmium Tetroxide and Ruthenium Tetroxide	578
12.3.5.2. Ebonite	578
12.3.5.3. Chlorosulfonic Acid and Phosphotungstic Acid	578
12.3.6. Etching of Polymers	579
12.3.7. Replication of Polymers	580
12.3.8. Rapid Cooling and Drying Methods for Polymers	580
12.3.8.1. Simple Cooling Methods	580
12.3.8.2. Freeze-Drying	581
12.3.8.3. Critical-Point Drying	581
12.4. Choosing Specimen Preparation Methods	581
12.4.1. Fibers	582
12.4.2. Films and Membranes	582
12.4.3. Engineering Resins and Plastics	583
12.4.4. Emulsions and Adhesives	587
12.5. Problem-Solving Protocol	588
12.6. Image Interpretation and Artifacts	589
References	590
13. Ambient-Temperature Specimen Preparation of Biological Material	591
13.1. Introduction	591
13.2. Preparative Procedures for the Structural SEM of Single Cells, Biological Particles, and Fibers	592
13.2.1. Particulate, Cellular, and Fibrous Organic Material	592
13.2.2. Dry Organic Particles and Fibers	593

13.2.2.1. Organic Particles and Fibers on a Filter	594
13.2.2.2. Organic Particles and Fibers Entrained within a Filter	594
13.2.2.3. Organic Particulate Matter Suspended in a Liquid	594
13.2.2.4. Manipulating Individual Organic Particles	595
13.3. Preparative Procedures for the Structural Observation of Large Soft Biological Specimens	596
13.3.1. Introduction	596
13.3.2. Sample Handling before Fixation	596
13.3.3. Fixation	596
13.3.4. Microwave Fixation	597
13.3.5. Conductive Infiltration	597
13.3.6. Dehydration	597
13.3.7. Embedding	602
13.3.8. Exposing the Internal Contents of Bulk Specimens	602
13.3.8.1. Mechanical Dissection	602
13.3.8.2. High-Energy-Beam Surface Erosion	602
13.3.8.3. Chemical Dissection	603
13.3.8.4. Surface Replicas and Corrosion Casts	604
13.3.9. Specimen Supports and Methods of Sample Attachment	605
13.3.10. Artifacts	607
13.4. Preparative Procedures for the <i>in Situ</i> Chemical Analysis of Biological Specimens in the SEM	607
13.4.1. Introduction	607
13.4.2. Preparative Procedures for Elemental Analysis Using X-Ray Microanalysis	608
13.4.2.1. The Nature and Extent of the Problem	608
13.4.2.2. Types of Sample That May be Analyzed	609
13.4.2.3. The General Strategy for Sample Preparation	609
13.4.2.4. Criteria for Judging Satisfactory Sample Preparation	610
13.4.2.5. Fixation and Stabilization	610
13.4.2.6. Precipitation Techniques	611
13.4.2.7. Procedures for Sample Dehydration, Embedding, and Staining	611
13.4.2.8. Specimen Supports	611
13.4.3. Preparative Procedures for Localizing Molecules Using Histochemistry	612
13.4.3.1. Staining and Histochemical Methods	612
13.4.3.2. Atomic Number Contrast with Backscattered Electrons	613
13.4.4. Preparative Procedures for Localizing Macromolecules Using Immunocytochemistry	614
13.4.4.1. Introduction	614
13.4.4.2. The Antibody-Antigen Reaction	614
13.4.4.3. General Features of Specimen Preparation for Immunocytochemistry	615
13.4.4.4. Imaging Procedures in the SEM	616
References	618

14. Low-Temperature Specimen Preparation	621
14.1. Introduction	621
14.2. The Properties of Liquid Water and Ice	622
14.3. Conversion of Liquid Water to Ice	623
14.4. Specimen Pretreatment before Rapid (Quench) Cooling	624
14.4.1. Minimizing Sample Size and Specimen Holders	624
14.4.2. Maximizing Undercooling	626
14.4.3. Altering the Nucleation Process	626
14.4.4. Artificially Depressing the Sample Freezing Point	626
14.4.5. Chemical Fixation	626
14.5. Quench Cooling	627
14.5.1. Liquid Cryogens	627
14.5.2. Solid Cryogens	628
14.5.3. Methods for Quench Cooling	629
14.5.4. Comparison of Quench Cooling Rates	630
14.6. Low-Temperature Storage and Sample Transfer	631
14.7. Manipulation of Frozen Specimens: Cryosectioning, Cryofracturing, and Cryoplaning	631
14.7.1. Cryosectioning	631
14.7.2. Cryofracturing	633
14.7.3. Cryopolishing or Cryoplaning	634
14.8. Ways to Handle Frozen Liquids within the Specimen	635
14.8.1. Frozen-Hydrated and Frozen Samples	636
14.8.2. Freeze-Drying	637
14.8.2.1. Physical Principles Involved in Freeze-Drying	637
14.8.2.2. Equipment Needed for Freeze-Drying	638
14.8.2.3. Artifacts Associated with Freeze-Drying	639
14.8.3. Freeze Substitution and Low-Temperature Embedding	639
14.8.3.1. Physical Principles Involved in Freeze Substitution and Low-Temperature Embedding	639
14.8.3.2. Equipment Needed for Freeze Substitution and Low-Temperature Embedding	640
14.9. Procedures for Hydrated Organic Systems	640
14.10. Procedures for Hydrated Inorganic Systems	641
14.11. Procedures for Nonaqueous Liquids	642
14.12. Imaging and Analyzing Samples at Low Temperatures	643
References	644
15. Procedures for Elimination of Charging in Nonconducting Specimens	647
15.1. Introduction	647
15.2. Recognizing Charging Phenomena	650
15.3. Procedures for Overcoming the Problems of Charging	656
15.4. Vacuum Evaporation Coating	657
15.4.1. High-Vacuum Evaporation Methods	658
15.4.2. Low-Vacuum Evaporation Methods	661

15.5. Sputter Coating	661
15.5.1. Plasma Magnetron Sputter Coating	662
15.5.2. Ion Beam and Penning Sputtering	664
15.6. High-Resolution Coating Methods	667
15.7. Coating for Analytical Studies	669
15.8. Coating Procedures for Samples Maintained at Low Temperatures	669
15.9. Coating Thickness	670
15.10. Damage and Artifacts on Coated Samples	672
15.11. Summary of Coating Guidelines	673
References	673

Index	675
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Enhancements CD