

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 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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