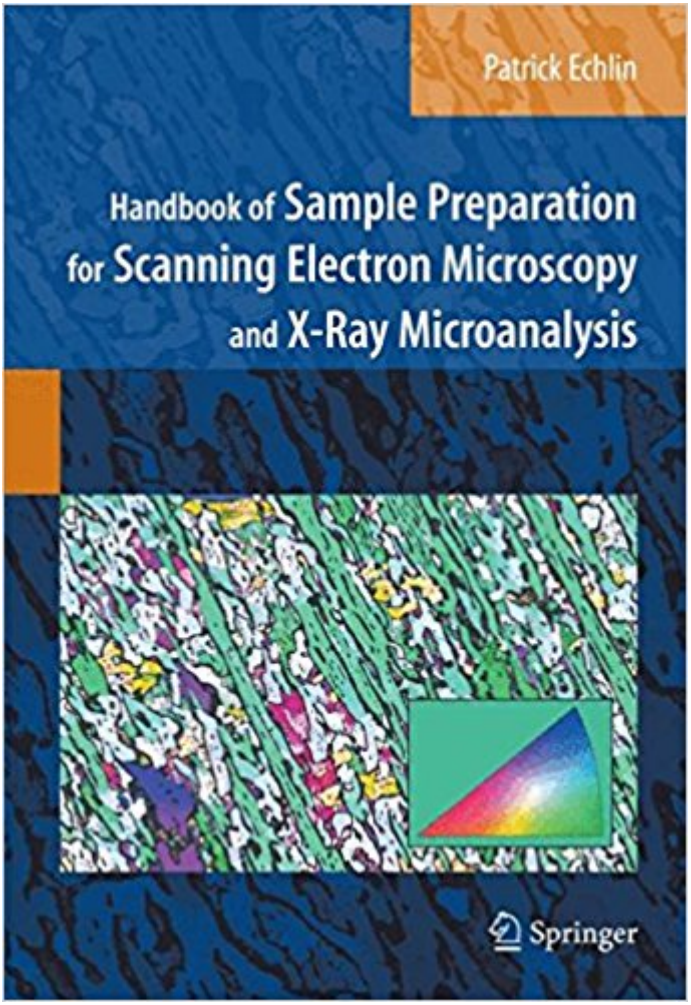
Handbook Of Sample Preparation For Scanning Electron Microscopy And X-Ray Microanalysis



Synopsis

Scanning electr on microscopy (SEM) and x-ray microanalysis can produce magnified images and in situ chemical information from virtually any type of specimen. The two instruments generally operate in a high vacuum and a very dry environment in order to produce the high energy beam of electrons needed for imaging and analysis. With a few notable exceptions, most specimens destined for study in the SEM are poor conductors and composed of beam sensitive light elements containing variable amounts of water. In the SEM, the imaging system depends on the specimen being sufficiently electrically conductive to ensure that the bulk of the incoming electrons go to ground. The formation of the image depends on collecting the different signals that are scattered as a consequence of the high energy beam interacting with the sample. Backscattered electrons and secondary electrons are generated within the primary beam-sample interactive volume and are the two principal signals used to form images. The backscattered electron coefficient (?) increases with increasing atomic number of the specimen, whereas the secondary electron coefficient (?) is relatively insensitive to atomic number. This fundamental diff- ence in the two signals can have an important effect on the way samples may need to be prepared. The analytical system depends on collecting the x-ray photons that are generated within the sample as a consequence of interaction with the same high energy beam of primary electrons used to produce images.

Book Information

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Customer Reviews

This handbook should find its way to the reference bookshelf of all imaging laboratories. It should

also become required reading for anyone being trained for SEM work, or anyone who might need to have their samples examined by using such techniques. In that way, it will be less likely that deficient results will be published and that the full potential of the SEM be realized. -- Iolo ap Gwynn, Microscopy and Microanalysis (2010)

This Handbook is a complete guide to preparing a wide variety of specimens for the scanning electron microscope and x-ray microanalyzers. Specimens range from inorganic, organic, biological, and geological samples to materials such as metals, polymers, and semiconductors which can exist as solids, liquids and gases. While the Handbook complements the best-selling textbook, Scanning Electron Microscopy and X-Ray Microanalysis, Third Edition, by Goldstein, et al., it is entirely self-contained and describes what is needed up to the point the sample is put into the instrument. Photomicrographs of each specimen complementÂ the manyÂ sample preparationÂ "recipes." Additional chapters describe the general features of specimen preparation in relation to the different needs of scanning electron microscopes and x-ray microanalyzers, and an appendix covers chemicals and equipment applicable to any of the recipes. ThisÂ practical Handbook is an essential reference for anyone who uses these instruments. It assumesÂ only an elementary knowledge of preparation techniques butÂ also serves as an authoritativeÂ guideÂ for more experienced microscopists.

fast delivery, just as advertised

The volume covers current sample preparation for SEM and X-ray analysis. The range of topics covered is extensive, from the standard procedures to rather esoteric methods (see index in sample pages provided on). The various topics are quite extensively referenced, and this review of the previously published literature is the second main benefit of the volume. The writing is mostly clear and to the point, as would be expected from a scientific volume. This book is useful to have in the EM laboratory as a reference to explore preparation of new sample types, or to point new investigators to familiarize themselves with some options of sample preparation. It makes a good companion volume to Goldstein and the VP volume by Stokes (highly recommended).The author in parts is scientifically Ã ber-politically correct, to the point of being a hindrance. He likes to indicate temperature in Kelvin. Preparations to be carried out at 277K then actually refer to 4C, which would be the much more sensible way to talk about laboratory procedures. On the other hand, pressures are both indicated in Pascal as well as in non-SI Torr. Irritating, but can be dealt with by any

scientist.The sources for equipment and supplies is quite useful, though the provider index in Microscopy and Analysis will be more current. I did miss Fine Science Tools in the tools section.The production of the volume can only be termed sloppy, and not fit for a Springer Verlag label. There are numerous instances where micro meters are not shown as mu-m but as mm (millimeters) or u-m. While such typos are immediately apparent to the seasoned microscopist, students could easily be confused. Mid-line hyphens, missing periods and alike should also have been taken care of. Many of the illustrations seem to be lifted from low resolution web-site images, with pixellation showing in print.