

EPMA REFERENCES

References: Several reference books are on reserve in the Geology Library. Campus bookstores may also have copies of the first.

Scanning Electron Microscopy and X-Ray Microanalysis, Third Edition by J. Goldstein, D.E. Newbury, D.C. Joy, C. E. Lyman, P. Echlin, E. Lifshin, L. C. Sawyer, and J.R. Michael. Plenum Press. 2003. Good reference; covers SEM in detail as well as EPMA. (hardback, \$75)

Electron Microprobe Analysis and Scanning Electron Microscopy in Geology by S. J. B. Reed. Cambridge Univ Press. 1996. A compact version of Reed (1993); less theory and more applications. (paperback available, ~\$30)

Electron Microprobe Analysis by S. J. B. Reed. Cambridge Univ Press. Second edition, 1993. basically the same as 1st edition, some revisions and updates.

Microprobe Analysis by C.A. Anderson. Wiley. 1973. Has several contributions on the application of empa to geology and materials science.

SEM Petrology Atlas by Joann E. Welton. American Assoc. of Petroleum Geologists. 1984 Has a nice and short explanation of SEM and EDS. Shows SEM images and EDS spectra for a few dozen common minerals. (A few copies available for purchase in Probe Lab, \$15)

A Guide to Scanning Microscope Observation by JEOL . A relatively short pamphlet with lots of good pictures demonstrating 'good' vs 'poor' SEM conditions

X-ray Tables

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Historical

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Also see articles from 2001 NIST-MAS conference, in NIST's Journal of Research, vol. 107, no. 6 on the web at <http://nvl.nist.gov/pub/nistpubs/jres/107/6/cnt107-6.htm>

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(also see thin films)

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Other Difficult Conditions: non-conductivity, contamination, porosity

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(also see Sweatman, below)

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Geological: Minerals

In the mid-late 60's EPMA began to be used in the earth sciences. A couple of groups of articles were published: one by J.V. Smith and others, mainly in the *J. of Geology*; Klaus Keil (now at Univ. of Hawaii) also published an article which reappeared in a variety of publications:

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Geochronology by EPMA (monazites, zircons)

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Hydrous/"Fragile" Minerals (see glass also)

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- Mikrochimica Acta (Chemistry Library)
- Microscopy and Microanalysis (Joint publication of many societies)
- Microbeam Analysis (Journal of the Microbeam Analysis Society, 1992-95; see J.F.)
- Yearly abstracts from MAS meetings, published as Microbeam Analysis; although in years where MAS meets together with Microscopy Society of America, the probe abstracts are merged in the meeting volume of Microscopy and Microanalysis.

Note: student membership in MAS is a bargain, \$2.50/year)

Please supply me with relevant EMPA references which you may find in the course of your research.

Tips for searching for articles:

- 1) Try all variations: epma, empa, electron microprobe, electron probe, electron microanalysis
- 2) Much of the more technical literature is indexed in Chem Abstracts and Physics Abstracts. But also some cross-over/applied material here, as some of the more probe-oriented abstract volumes are not indexed by Mat Sci and Geology databases.
- 3) The more traditional, applied, bibliographic databases (e.g. Georef).

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