The Preparation of Thin Sections of Rocks, Minerals & Ceramics

By **D.W. Humphries**, ISBN 0-19-856431-7; Oxford University Press, Royal Microscopical Society, 1992; 83 pages, $19.95.

Review by **Christopher G. Kendall**

This slim volume describes in considerable detail how the earth scientist can go about making a thin section. The book consists of some 12 chapters, 3 appendices, a glossary and a short bibliography. The text is clearly written and is aimed at the novitiate who needs to make thin sections of rocks. It's not the sort of text that the geophysicists would rush out to buy, unless for some reason they were studying the petrofabric of a particular group of rocks. However, for the graduate student and the professional who needs to know something about making thin sections, this book is a great source.

In the first chapter, there's a short section describing how Henry Clifton Sorby, who made the first thin sections of rock, chanced to meet with a Mr. Williamson, a practicing surgeon, who showed Sorby how to make thin sections of fossil wood teeth, scales, etc. Sorby applied Williamson's techniques to making thin sections of rocks. The technology that Sorby initiated has essentially remained unchanged, since Victorian times. However, instead of using slurries of diamond dust, we now use high speed diamond-encrusted blades. And, instead of reducing the thickness of the sliver of rock on an abrasive rock surface, we now use lap wheels and glass plates with different sizes of emory abrasive.

The book explains how to collect and prepare specimens for making thin sections, how to go about the initial grinding of the rock and how to select plates on which to grind the thin section, the nature of grinding machines, how one goes about hand grinding and machine grinding, how one mounts the thin section in the various media used for attaching the rock to the glass, including Canada Balsam, Lakeside 70c cement and various epoxy resins, superglues, etc.

There's some discussion on how one handles the mounting media and general safety. There's a chapter on final grinding, which explains how one begins with initially coarse grits and works straight on through to very fine grits. There's a discussion on how to cover thin sections and then, a chapter on special methods for handling fragile material, embedding specimens, sectioning hard minerals in a soft matrix, water sensitive materials, dry grinding and the making of pseudo-sections of clays and shells. There's a discussion of oriented minerals, a chapter on polishing for reflected light microscopy and polished thin sections, and ultrathin sections, the chapter on staining, etching, and peels. Then, a chapter on etching the extraction of heavy minerals from sand and their treatment. The appendices are on the petrological microscope, the derivation of equations for determining refractive indexes of mounting media, a list of supplies, and thin section makers. Finally, there is a glossary, bibliography, and index.

I enjoyed reading through this book. It was clearly written and well illustrated with photographs and line drawings. I liked the emphasis on Henry Clifton Sorby and his influence on this whole technology. I recommend this book to you if you have the need for understanding how to make thin sections. It will undoubtedly end up on the shelves of all those who are involved in this technology.

The Preparation of Thin Sections of Rocks, Minerals, and Ceramics, Oxford University Press, Oxford.Google Scholar. Isabell, T. C., P. E. Fischione, C. Oâ€™Keefe, M. U. Guruz, and V. P. Dravid (1999). Microsc.Â Goldstein J.I. et al. (2003) Specimen Preparation of Hard Materials: Metals, Ceramics, Rocks, Minerals, Microelectronic and Packaged Devices, Particles, and Fibers. In: Scanning Electron Microscopy and X-ray Microanalysis. Springer, Boston, MA. Sorby applied Williamson's techniques to making thin sections of rocks. The technology that Sorby initiated has essentially remained unchanged, since Victorian times. However, instead of using slurries of diamond dust, we now use high speed diamond-encrusted blades. And, instead of reducing the thickness of the sliver of rock on an abrasive rock surface, we now use lap wheels and glass plates with different sizes of emory abrasive.Â There's a discussion of oriented minerals, a chapter on polishing for reflected light microscopy and polished thin sections, and ultrathin sections, the chapter on staining, etching, and peels. Then, a chapter on etching the extraction of heavy minerals from sand and their treatment. Request PDF on ResearchGate | Specimen Preparation of Hard Materials: Metals, Ceramics, Rocks, Minerals, Microelectronic and Packaged Devices, Particles, and Fibers | This chapter outlines a variety of sample preparation procedures for imaging and x-ray analysis of hard materials in the SEM. Several special and relatively new techniques, such as the use of focused ion beams for preparation of cross sections of various materials, are also

Ceramics, rocks, minerals. Brittle, delicate and poorly consolidated materials (good surface finish but slower in cutting). Very brittle and very delicate materials such as silicon wafers (very slow cutting).Â Thin-Section Preparation The preparation sequence for making transparent thin sections is as follows: sectioning, vacuum impregnation, grinding, cementing, re-sectioning, grinding and polishing. The preparation of thin.Â Semi-Automatic Preparation of Thin Sections Thin sections provide more comprehensive microstructural information than bulk specimens, however, they are much more difficult and time consuming to prepare. Preparing thin sections by hand requires a great deal of expertise and time, neither of which are widely available to most laboratories. Rock Thin Sections (Petrographic Thin Section Preparation). In optical mineralogy and petrography, a thin section is a laboratory preparation of a rock, mineral, soil, pottery, bones, even metal sample for use with a polarizing petrographic microscope, electron microscope and electron microprobe. A thin sliver of rock is cut from the sample with a diamond saw and ground optically flat. It is then mounted on a glass slide and then ground smooth using progressively finer abrasive grit until the sample is only 30 Î¼m thick. The method involved using the Michel-LÃ©vy interference colour chart. Typic

Mineralogy and Thin Sectioning. How to prepare rocks, minerals, ceramics and biological specimens for materialographic analysis. Transmission Electron Microscopy. All you need to know about preparing ultra-thin specimens for transmission electron microscopy analysis.Â About Mineralogy and Thin Sections. The purpose of preparation of rocks, minerals, ceramic, and biological specimens is most often: Classification of rocks. Identification and mapping of minerals: dating or exploration, for example. Analysis: major and trace elements, textural studies, or isotopic composition, for example.Â Grinding or lapping of a thin section to a final thickness of section + resin 30 Âµm, for example. Polishing of thin sections removing approximately 10 Âµm. Sampling. Sorby applied Williamson's techniques to making thin sections of rocks. The technology that Sorby initiated has essentially remained unchanged, since Victorian times. However, instead of using slurries of diamond dust, we now use high speed diamond-encrusted blades. And, instead of reducing the thickness of the sliver of rock on an abrasive rock surface, we now use lap wheels and glass plates with different sizes of emory abrasive.Â There's a discussion of oriented minerals, a chapter on polishing for reflected light microscopy and polished thin sections, and ultrathin sections, the chapter on staining, etching, and peels. Then, a chapter on etching the extraction of heavy minerals from sand and their treatment. Minerals and ceramics. A. Mineral and ceramic engineering materials. Slide Number 4. B. Glass.Â A. Mineral and ceramic engineering materials. A mineral is a natural, inorganic material (one that is not living) which is found in the ground, often within rocks. Minerals are quite pure. Rocks, on the other hand, can be mixtures of several minerals, and may also contain previously organic material.Â â€” 'Sheets of glass, which are obviously flat and thin, are called float glass.This refers to the manufacturing technique where molten glass is floated on molten tin, to produce flat sheets. Usually, after float glass has been formed, it's annealed - it's left to cool slowly. But if it's left in this state, and the glass later gets broken, it breaks into dangerous, sharp pieces.