The authors wish to thank Dr. E. D. Jackson, U.S.G.S., Menlo Park, California, for providing analyzed chromites, and Dr. C. O. Hutton, Department of Geology, Stanford University, for the analyzed titanoan magnetite. Two of us (K. G. S. and T. E. B.) were supported by National Academy of Sciences-National Research Council Postdoctoral Resident Research Associateships.

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THE AMERICAN MINERALOGIST, VOL. 53, SEPTEMBER–OCTOBER, 1968

PREPARATION OF THIN FILM SECTIONS

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A new technique has been developed for the preparation of petrographic (rock, mineral, and coal) thin film sections. In this technique the section is freed from the glass slide and coated with soluble transparent plastic, to give a coherent, flexible specimen which may be handled without risk of breakage.

Uses of such specially prepared thin film sections include: specimens for chemical analysis of small portions of a rock or of a single mineral grain (for example, where compositional zoning is suspected) material for heating-stage studies; starting material for preparation of ultrathin sections for electron microscopy by chemical thinning; and for mounting to make slides for projection.

The procedure is as follows: from the hand specimen a slice of material is cut and ground as for a normal thin section, by polishing with increasingly finer grades of carborundum (*i.e.* 220-, 400-, 600-, and 800-grit) on the wheel-lap and glass plates, until the surface is flat and scratch-free. Between changes in grit size the surface must be thoroughly cleaned, preferably using an ultrasonic cleaning bath containing detergent.

Normally the rock slice would be mounted on the microscope glass slide with Canada balsam, Lakeside 70, or some epoxy resin with hardener. In the present method, however, it is essential to use a readily soluble mounting compound such as polyvinyl acetate[1] as this permits the finished thin section (5–20 μm for coal, about 30 μm for rocks) to be easily removed from the slide without disintegrating or tearing.

The glass slide and rock slice, smeared with Mowilith, are warmed to 35°C, at which temperature softening of the solid Mowilith occurs. Slide and rock are then cemented together; the rate of hardening of the cement can be increased by immersing the slide in cold running water. Excess rock can be removed by means of the diamond saw. The thin section is then finished in the usual manner until it is ready for the cover slip. However, instead of the normal glass cover slip, a few layers of 5 percent polyvinyl alcohol (in water) are spread on the rock surface, to hold the thin section together. The whole preparation is now immersed in acetone for a few hours, after which the glass slide can be lifted free from the section. Curling at this stage is prevented by placing the specimen face down on a wire gauze support during immersion. A layer of amyl acetate is next applied to the freshly exposed surface to protect it from mechanical damage and prevent it from rolling up. The unattached thin section can now be stored indefinitely, without fear of damage, between sheets of plastic about 1/16″ thick.

Coherent thin film sections (up to 6″×2″) have been prepared by this technique without great difficulty. Parts of such sections can be cut out with dissecting scissors or a razor blade, and if necessary the plastic film may be removed with the appropriate solvent.

[1] The author uses "Mowilith" 20, made by Farbwerke Hoechst, Frankfurt a.M., Germany.