NOTES AND NEWS

A HIGH-INDEX MEDIUM FOR RAPID IMPREGNATION OF FRIABLE MATERIALS

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The need for bonding friable sediments in order to prepare thin sections has long been apparent, and various materials and methods have been proposed for this purpose. Of the impregnating media suggested, balsam has been perhaps most widely employed, and methods for using it have been reviewed by Johannsen,[1] and described by Sayles,[2] Clements,[3] Von Huene,[4] and Waldo and Yuster.[5] Kollolith[6] has about the same index as balsam and is used in much the same way. Bakelite varnish[7] has certain advantages over either of the other two media, and has a higher index (1.60–1.64). All of the above media have a comparatively high viscosity, and it is this factor which hinders their application. Generally, they must be used in some solvent, which necessitates added time to effect thorough impregnation, and special precautions to minimize the formation of bubbles within the specimen when the solvent is evaporated. Good results may be obtained, but the procedure is commonly tedious, and in some cases special equipment is required.

In using aroclor 4465 (index 1.66+)[8] for making heavy mineral mounts the comparatively low viscosity of this material was noted, and the possibility of using it as an impregnating medium suggested itself. Experiments with chalk and with friable sandstone confirmed expectations, and showed that impregnation of materials not too impervious may be effected quickly and effectively by capillary action, without the use of any solvent. In addition to the advantages of speed and simplicity, the high index of the medium provides stronger relief for the common rock

[1] Johannsen, A., *Manual of Petrographic Methods*, McGraw-Hill, New York, 599–602 (1918).

[2] Sayles, R. W., Microscopic sections of till and stratified clay: *Bull. Geol. Soc. Am.*, **32,** 59–62 (1921).

[3] Clements, T., Thin sections of weathered rocks: *Eng. Min. Jour.*, **134,** 99 (1933).

[4] Von Huene, R., A fast and thorough method for impregnating rocks: *Econ. Geol.*, **32,** 387–388 (1937).

[5] Waldo, A. W., and Yuster, S. T., Method of impregnating porous materials to facilitate pore studies: *Bull. Am. Assoc. Petrol. Geol.*, **21,** 259–267 (1937).

[6] Ross, C. S., Methods of preparation of sedimentary materials for study: *Econ. Geol.*, **21,** 454–468 (1926).

[7] Ross, C. S., *op. cit.;* Leggette, M., The preparation of thin sections of friable rock: *Jour. Geol.*, **36,** 549–557 (1928).

[8] Described by Keller, W. D., *Am. Mineral.*, **19,** 384 (1934); obtainable from Monsanto Chemical Co., St. Louis, Mo.

minerals, and is thus particularly suitable for the study of textures. The procedure is briefly described below.

The first step consists in cutting a smooth face on the specimen. This may be done with a diamond disc saw, or with a hack saw, or simply with sand paper, depending on the nature of the material being treated. The resulting face should be as smooth and flat as possible, and any dust or loose grains should be carefully removed. If the material is strong enough, it is desirable to cut a second face parallel to the first, making a slice a few millimeters thick.

A small quantity of aroclor 4465 is next placed in a metal pan or evaporating dish, or simply on a glass slide, and is heated until relatively fluid, which occurs at a temperature somewhat above 120°C. If it is desired to accentuate pore spaces, the red or blue dye used by Waldo and Yuster[9] may be stirred into the molten material. The specimen, previously well dried by heating, is now placed in the liquid aroclor, flat face down, and a constant temperature is maintained until the fluid has been drawn by capillarity into the entire specimen, or into a zone thick enough to permit the grinding of a thin section. During this procedure, the upper surface of the specimen should not be allowed to become immersed in the fluid, as this would retard the escape of air displaced by the fluid, and thus inhibit impregnation.

The process of impregnation appears to be facilitated by wetting with xylol. The specimen may be saturated with xylol before being placed in the melt, or xylol may be added to the free surface of the specimen in the melt before it becomes so hot as to evaporate the liquid more rapidly than it can penetrate downward.

When impregnation is completed, the specimen is removed from the melt and allowed to cool. A thin section may then be prepared by the usual method, except that uncolored aroclor is used to mount the specimen on the glass slide. One step requiring particular care, however, is the mounting of the cover glass. The procedure found best is to place sufficient aroclor for mounting on the cover glass, and to melt it on a hot plate. The slide with its thin section is next warmed by placing it momentarily on the hot plate. The cover glass is then turned over quickly on to the slide with a pair of forceps, and allowed to settle in place. The completed slide is now removed from the hot plate and allowed to cool. No pressure should be exerted on the cover glass, as this may cause the section to break apart. An alternative method of mounting the cover glass is to use balsam in the usual way. This requires less care but takes longer.

[9] *Op. cit.*, pp. 261–262.