THE AMERICAN MINERALOGIST, VOL. 45, SEPTEMBER-OCTOBER, 1960

PREPARATION AND USE OF A GELATIN MOUNTING MEDIUM FOR REPEATED OIL IMMERSION OF MINERALS

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Presently there is very little information in geologic literature about an inexpensive, easily prepared, isotropic mounting medium that will withstand solvents necessary to wash identifying index oils from microscope slides, thereby allowing the same mineral grains to be repeatedly used until identified. Only two references on the subject were found in the geologic literature. These were papers by Herbert (1942), who used gum tragacanth and Canada balsam to mount detrital mineral grains for demonstration purposes; and by Fairbairn (1943), who refined the original use of gelatin coated lantern slides for refractive index immersion work (Vedeneeva and Melancholin, 1932) by having gelatin coated petrographic slides prepared commercially.

A very satisfactory solution to the problem, both from the standpoint of expense and ease of preparation and use, was found in an article by Marshall and Jeffries (1945). These agronomists modified Fairbairn's mount by decreasing the gelatin concentration. This was necessary to prevent the very small mineral grains of the soil separates, with which they were working, from being engulfed and blanketing the optical effects produced by changing index oils. Their prime contribution to oil immersion technique is publication of the formula of the mount. These "home-made" slides have proven to be every bit as good as the commercial variety, and may easily be made at a fraction of the cost.

MATERIALS USED

The required materials are household gelatin, formalin, acetone and distilled water. Marshall and Jeffries' formula, with the exception of an increase in gelatin concentration, is:

Solution A—Gelatin	1%
Solution B—Distilled water	10 cc.
Acetone	5 cc.
2% Formalin	2 cc.

Marshall and Jeffries used but 0.1%, but the writer found that a concentration of 1% gelatin was preferable for heavy mineral study.

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Preparation of Solutions

Solution A: Mix the gelatin to a 1% concentration. This is one-fourth gram of gelatin dissolved in 50 cc. of distilled water. The concentration may be altered to accord with the size of the mineral fragments being identified. 1%, however, appears to be satisfactory for most work.

Solution B: Mix 10 cc. distilled water, 5 cc. acetone and 2 cc. of 2% formalin. This is the softening solution that allows the grains to embed themselves in the gelatin. The containing bottle should be well-corked to prevent evaporation.

When these solutions show signs of clouding, they should be replaced by fresh preparations. It was found that small bottles, used by petrology classes several days a week, remained potent about three weeks.

Technique of Mounting, Using, and Washing Slides

1. Spread a generous amount of Solution A on a clean glass slide. An eye dropper works well in applying the liquids. Dry on a hot plate at 75°–80° C. (167°–176° F.). Remove the slide. Besides being better able to control the spreading-on of the grains during the following steps, removal will keep the hot plate clean.

2. Apply two or more drops of Solution B on the dry gelatin and spread lightly. This is easily done with a paper clip. When this evaporates sufficiently so that the gelatin is tacky, sprinkle on the grains. Some semi-soluble minerals may be mounted by allowing the gelatin to become very tacky before applying the grains. Again dry the slide on the hot plate. Remove, cool, apply a suitable refractive index oil and cap with a cover glass. The slide is now ready for petrographic examination. The entire procedure requires about five minutes.

3. Use acetone or carbon tetrachloride to wash oils from the slides. Xylene has too slow an evaporation rate to be used. It is convenient to hold the slide in an inclined position in a small beaker and pour the solvent over it by means of a wash bottle.

Performance

That the mount has good holding qualities is demonstrated by the fact that only four grains were detached when an experimental slide, containing approximately 500 grains, was successively subjected to a wide range of index oils in current use and then washed with both acetone and carbon tetrachloride. This mount, however, is generally unsatisfactory for permanent slides. Very careful handling and storage is required, for the grains will rub off if sufficient pressure is exerted.

The main use for this mount is in the rapid identification of mineral

fragments. Where great effort and time was formerly consumed in getting a platy mineral particle to stand edge-wise by means of broken pieces of cover glass—only to have the index oil float the particle away—the mineral may now be crushed and sprinkled over the tacky mount. A quick examination of the slide will usually reveal the orientation desired.

The gelatin is neutral to all the immersion oils in current use. However, the mount cannot be used with crystals easily soluble in water or with an immersion media having water as a component. The thin coating allows a ready determination of the Becke line and oblique illumination tests. The mount may be used to good advantage with the universal stage.

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THE AMERICAN MINERALOGIST, VOL. 45, SEPTEMBER-OCTOBER, 1960

DEHYDRATION STUDIES BY INFRARED SPECTROSCOPY

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While studying the orientation of OH bond axes in layer silicates (Serratosa & Bradley, 1958) by their absorption in the O-H stretching frequency range (≈ 3700 cm.$^{-1}$) some concern was felt because no flexion frequency was certainly correlated with the stretching feature which was utilized. The proper allocation of a band to this expected mode is now arrived at by following the course of dehydration of a montmorillonite from Tidinit, Morocco, and a nontronite from Utah, each previously characterized by x-ray diffraction.

Samples of each were dispersed, and $<1\ \mu$ fractions were permitted to evaporate on plastic slides. Dried films were then peeled off for examination.

[1] Experimental work conducted while on leave at the Illinois State Geological Survey, Urbana, Illinois.