mined by grinding the material of the pseudomorphs to −100–+200 mesh, separating the micas from the kyanite by a sink-float method employing acetylene tetrabromide (G. 3.00), weighing both the sink (mainly kyanite) and the float (mainly mica) fractions, and counting under a petrographic microscope grains of muscovite and paragonite of the float fraction.

Determinations of sodium and potassium by flame photometer were made in the laboratories of the VPI Agronomy Department by J. E. Akers. *X*-ray and differential thermal analyses were made in the laboratories of the VPI Physics and Agronomy departments which are, respectively, under the direction of Webster Richardson and C. I. Rich. J. J. Glass of the U. S. G. S. checked part of the optical data. B. W. Nelson of the VPI Department of Geological Sciences discussed certain aspects of the investigation with the writer. All these contributions to the investigation are acknowledged gratefully.

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A MODIFIED SAMPLE HOLDER FOR THE NORELCO ROTATING SPECIMEN DEVICE

J. L. McAtee, Jr., *Baroid Division, National Lead Company, P. O. Box 1675, Houston, Texas.*

Many powdered materials tend to become oriented when mounting them in the various *x*-ray sample holders. Among the more easily oriented materials are the clay minerals. It has been found necessary therefore to be extremely careful in the preparation of the powdered clay sample for *x*-ray diffraction examination. To minimize orientation, the sample must not be pressed into the specimen holder from the side that will be exposed to the *x*-ray beam. In order to obtain satisfactory conditions for clay samples with the Norelco low angle rotation specimen holder it was necessary to modify the holder so that orientation effects were minimized.

This modified holder also simplifies the placement of the sample in the geometrical center of the goniometer.

Drawings of the modified specimen holder, holder base, and mounting adaptor plate are shown in Fig. 1. The specimen holder is simply a wafer thin ring with a shoulder to hold it in place.

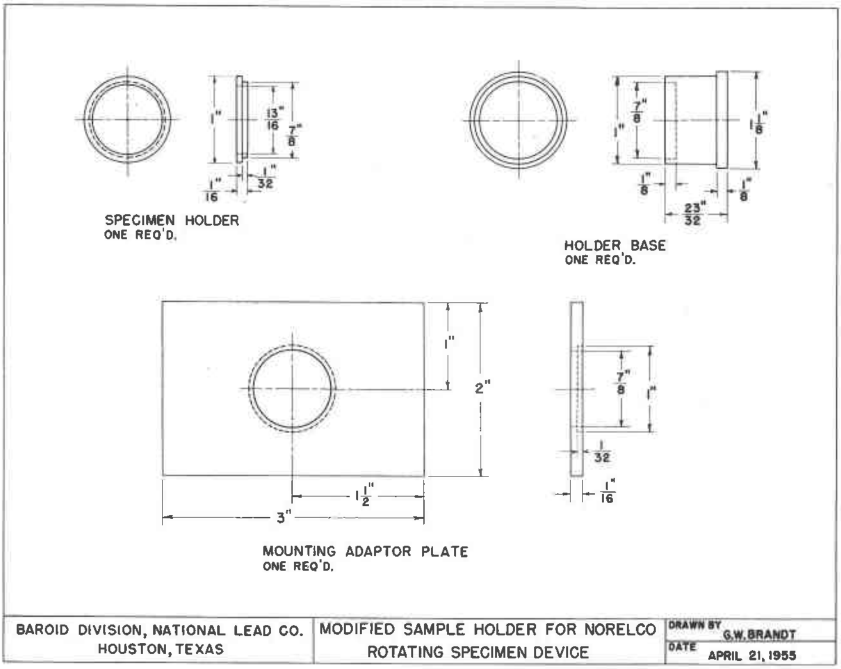

FIG. 1. Modified sample holder for Norelco rotating specimen device.

The following steps are taken in mounting a sample:

(1) The specimen ring is inserted into the mounting adaptor plate.
(2) The plate is placed on a polished flat surface and held down tightly with one hand.
(3) The powder sample is packed into the ring from the back side (front side is exposed to incident x-ray beam).

By packing the sample from the rear the effect of orientation is minimized. After filling, the specimen ring is inserted into the holder base and this in turn inserted into the low angle rotating specimen device.

The amount of sample required for analysis can be reduced by decreasing the thickness of the ring, but the length of the holder base must also be modified to allow for the decreased thickness of the ring. An important feature of the holder base is that the length of the body with the specimen ring in place is machined so that when it is slipped into the rotating device the sample surface comes into the exact center of the goniometer. This fulfills the basic requirement that the center of the sample must coincide with the axis of the goniometer.

This modified holder has been very successfully used in the investigation of clay minerals such as montmorillonites, kaolinites, and illites.

NOTES ON A SIX-RAYED DIFFRACTION STAR PRODUCED BY MAGNETITE ENCLOSED IN MUSCOVITE

B. M. Shaub, *Department of Geology, Smith College,*

AND

Dorothy Wrinch, *Department of Physics, Smith College, Northampton, Mass.*

Description of the magnetite by B. M. Shaub

During the autumn of 1954, Frank L. Leggett of Meredith, New Hampshire, brought to the writer's attention a small rectangular piece of asteriated magnetite $7\frac{1}{2}\times9\frac{1}{2}$ mm. in size enclosed in a clear amber-colored piece of good quality muscovite 4×6 in. in size. The thickness of the piece of enclosed magnetite was not determined, however, it is probably very thin although it is distinctly opaque. The specimen came from a quarry operated in 1944 by Leslie Smith of Campton, New Hampshire, and Percy Leggett of Gorham, New Hampshire, on property owned by Mr. Carr of Thornton, New Hampshire. The mine was operated for mica and located in a pegmatite about $\frac{3}{4}$ of a mile from Mr. Carr's farm. The writer wishes to extend his thanks and appreciation to Mr. Frank L. Leggett for supplying the material and data for this paper.

A microscopic examination of the magnetite showed it to be divided into numerous small pieces bounded by a series of very fine open linear spaces which are located at 120° to each other. These microscopic spaces are seldom of any linear extent but are soon offset by joining one or both of the lines in the other two 120° directions. The shapes and sizes of the separate pieces are extremely variable although they form a perfect mosaic of closely fitting units separated from each other by the extremely narrow slits or cracks, Fig. 1. When a point of light is viewed through the trigonal network of minute cracks a distinct six-rayed star is clearly visible, Fig. 2.

The orientation of the rays of this star is such that the rays are normal to the system of three slits or cracks in the magnetite. The relationship is shown in Figs. 1 and 2, respectively. The vertical ray is normal to the