SHORTER COMMUNICATIONS

AN IMPROVED TECHNIQUE FOR STAINING POTASH FELDSPARS

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In the last few years the more frequent measurement of modal analyses by officers of the Geological Survey of Canada has resulted in a greater demand for the staining of potash feldspars both in thin sections and on rock slices. This demand has grown from less than 100 thin sections to several hundred thin sections and cut surfaces per annum. The method formerly in use, a modification of one described by Chayes[1] (1952) was satisfactory for small numbers of specimens but left much to be desired when the volume increased.

The equipment formerly used consisted of a 4-inch hot plate, an 8-inch porcelain evaporating dish, a polyethylene butter dish, and sundry glassware. The slides which were stained in pairs, were etched in HF fumes in the butter dish. Laboratory tongs which were used to move the etched thin sections to the petri dish stain bath were also used to agitate the sections in the sodium cobaltinitrite solution. The stained sections were washed in a small beaker under the nearby tap. The apparatus was inconvenient to use, the temperature range of the HF was difficult to maintain, only two thin sections could be treated at one time and these had to be protected with Scotch Tape.

The new equipment included a moderately priced water bath equipped with a thermostatic control and a laboratory magnetic stirrer (see Fig. 1). The water bath which takes approximately 15 minutes to reach etch temperature (40° C.) will, because of the thermostatic control, hold the temperature within 1 degree. Thus the periodic temperature measurement and re-adjustment are no longer necessary. The stirrer, which is a standard piece of laboratory equipment, has replaced the manual agitation of the slides in the stain bath. The latter step in the older procedure required considerable manual dexterity with the tongs to maintain a firm grasp on the edges of the thin sections. These pieces of equipment were further modified by locally constructed accessory parts.

The HF bath (see Fig. 2) was constructed of $\frac{1}{4}$-inch sheet perspex[2]

[1]Chayes, F. (1952): Notes on the staining of potash feldspar with sodium cobaltinitrite in thin section; *Am. Mineral.*, **37**, 337–340.

[2]It should be noted that the perspex will sag and lose its shape when exposed for extended periods to temperatures as low as 40 degrees centigrade. The perspex pieces were either bolted or cemented together with carbon tetrachloride.

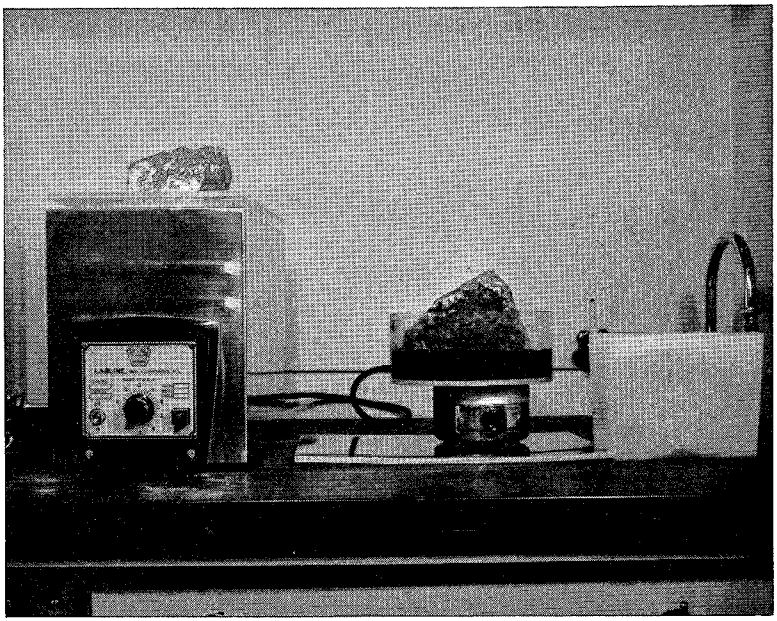

FIG. 1

and a $\frac{1}{2}$-gallon polyethylene box. A window the size of the box was cut at the centre of a sheet the size of the water bath. The box was split at the four corners and the resulting tabs were bolted to the perspex sheet. A smaller sheet of perspex serves as a lid for the bath.

The thin section rack was made from $\frac{1}{4}$-inch perspex sheet. It consists of a base plate with a window and two triangular end pieces joined above by a length of $\frac{1}{2}$-inch diameter perspex rod (see Fig. 3). The window

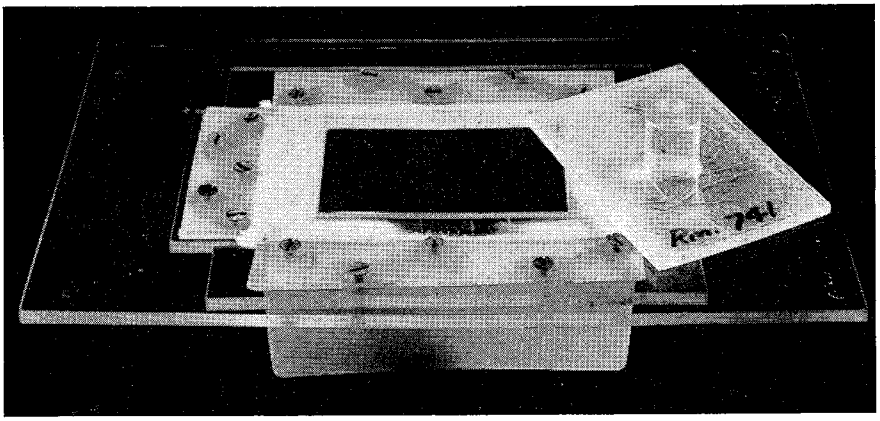

FIG. 2

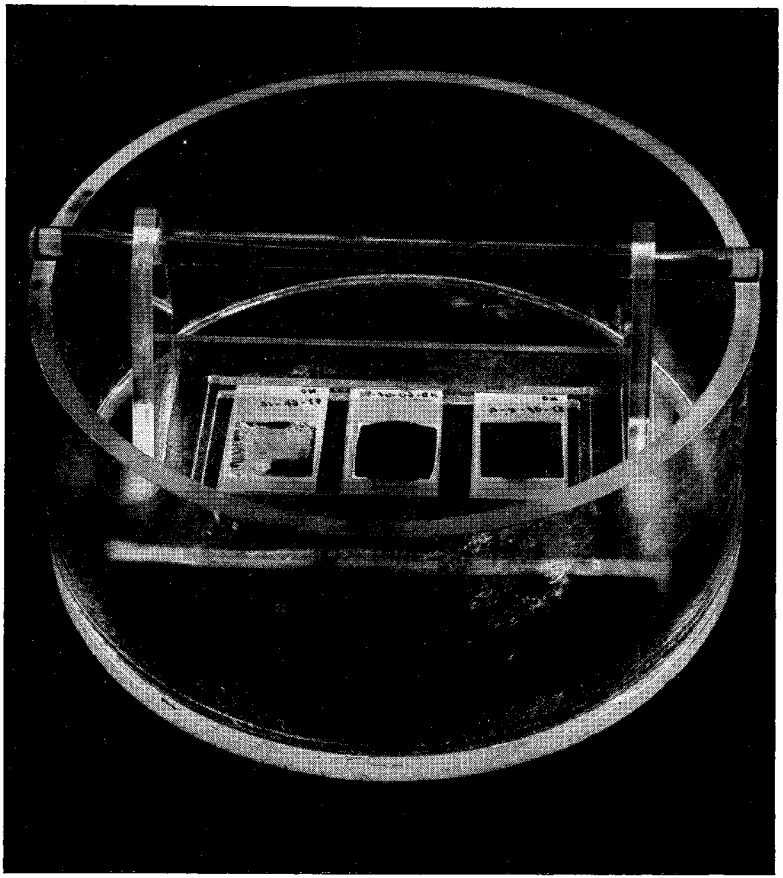

FIG. 3

which was recessed around its edge the depth of the glass slide, holds 4 thin sections firmly in place. The thin sections are placed face down in the window with a piece of sheet lead as a weight upon them. The thin sections are left in this position on the rack until they are removed from the wash water at the end of the procedure. Consequently, the rack replaces the hand tongs formerly used.

The stain bath which has a circular plan and a flat bottom is made from $\frac{1}{4}$-inch perspex sheet and a 3-inch high section cut from 8-inch diameter perspex tubing. The bath is placed on the magnetic stirrer so the stain solution will be mechanically agitated. The thin section rack is designed to suspend the sections far enough off the bottom so the movement of the stirring rod is not impeded.

The window in the thin section rack can be cut the size of four small thin sections or three large thin sections. Stain procedure is as follows:

1. Chill the thin sections to 0° C. and lift off the cover glass with a razor blade.
2. Clean the surface of the thin section with acetone or alcohol. Do not cover the back of the section with Scotch Tape.
3. Prepare 400 ml. of stain solution (50 g. of sodium cobaltinitrite to 100 ml. of distilled water) and warm to hasten solution.
4. Cover the bottom of the polyethylene box with hydrofluoric acid.
5. Adjust the temperature of the water bath to 40° C.
6. Place the thin sections face down on the rack with the lead weight in position. Place the rack over the HF for 15 to 30 seconds.
7. Move the loaded rack from the HF fumes and suspend it in the stain solution for 30 seconds.
8. Move the loaded rack from the stain solution and suspend it in flowing tap water until the water runs clear.
9. Unload the rack and air dry the thin sections on paper towels. Coverglasses can be placed on the stained thin sections using permount.

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STUDIES ON SOLID SOLUTION BETWEEN SODALITE, NOSEAN AND HAUYNE

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Introduction

It is reported in the literature that solid solution exists between sodalite, nosean and hauyne (Pauling, 1930; Barth, 1932b). Borgstrom (1930) stated that chemically analysed natural sodalite sometimes contains some sulphate but admitted that this may have been due to mechanical mixing with nosean. Barth (1932a) considered nosean and hauyne to be a chemically mixed crystal, writing the formula as nosean $Na_8Al_6Si_6O_{24}.SO_4$ and hauyne $(NaCa)_{4-8}Al_6Si_6O_{24}.(SO_4)_{1-2}$, although he considered sodalite as a separate species. Pauling (1930) claimed that sodalite and nosean are isomorphous, because sodalite may be converted into nosean by heating it in fused sodium sulphate, and he further showed that hauyne may be converted to sodalite by heating the former in fused sodium chloride. No details of temperatures of these reactions were given. Solid solution has never been demonstrated by analysis of natural minerals coupled with x-ray or optical studies. Lacking the natural specimens it was decided to attack the problem by means of a number of hydrothermal syntheses.