SHORT COMMUNICATIONS

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Staining of feldspars on rock-slab surfaces for modal analysis

THE advantages of staining larger rock surfaces for modal analysis of the major minerals of granitic rocks are gradually becoming apparent to the geologist. The cost of preparing rock slabs for staining is minimal compared to the cost of thin-section preparation. Modal analyses on stained slabs cover much larger areas than thin sections and will yield more representative modes. In addition, larger-scale features commonly manifested on stained rock slabs are lost in the microanalysis of thin sections.

The chief difficulty in two-feldspar staining of rock slabs is obtaining a distinct colour difference between the plagioclase and the potash feldspar. Sodium cobaltinitrite has long been used successfully for the staining of potash feldspar (Gabriel and Cox, 1929). Stains for plagioclase, to be used in conjunction with this K-feldspar stain, have been described by Reeder and McAllister (1957), Bailey and Stevens (1960), and Laniz, Stevens, and Norman (1964). Plagioclase stains may have a destructive effect on the K-feldspar stain, they sometimes fail to stain soda-rich albite, and they usually require additional preparation and treatment of the rock surface to obtain good results.

The granites that were collected by ordinary hand sampling and stained by the writer using the two-feldspar staining procedure of Bailey and Stevens (1960) were generally too weathered to get good results without special cumbersome preparation of the surface. The red plagioclase stain was difficult to obtain and the K-feldspar stain came out a dirty yellow. The writer and his assistant, Mr. T. Kizner, experimented with a modification of this procedure and obtained good results by adding a HF bath step and eliminating the plagioclase staining procedure.

Procedure. The sample is cut with a rock saw and the saw marks are removed with coarse grit. The rock surface is immersed in a bath of hydrofluoric acid (52 % conc.) for about 45 seconds.[1] The rock is then rinsed with tap water and dried, preferably in an oven at about 80 °C, until the surface has a very light gray powdery appearance. The surface is then fumed over hydrofluoric acid (52 % conc.) for about 3 minutes and later the surface is immersed in a saturated solution of sodium cobaltinitrite for about 1 minute. The plagioclase is rendered light gray, the alkali feldspar appears bright yellow, and the quartz looks medium gray and glassy. The dark minerals usually appear corroded and can be detected by inspection.

[1] The optimum time for any granite can be determined by simple experimentation with time as the variable factor. Badly weathered rocks will require a longer bath time and fresh rocks may require less time.

Discussion. The HF bath treatment apparently has a cleansing action on the weathered surface and prepares it for the K-feldspar stain. Occasionally the plagioclase is rendered a very pale yellow probably indicating a small amount of K-feldspar in solid solution or, perhaps, an alteration to sericite.

The chief limitation of this method is the destructive effect on the dark minerals (particularly biotite), which may be eliminated entirely if the HF bath time is too great. However, good results have been obtained using the procedure suggested here.

Granites stained over two years ago still have a vivid stain. More permanent preservation can be obtained by spraying the surface with clear lacquer.

The writer uses a dot pattern of 45 points per cm^2, a zoom-lens microscope, and a multi-tally counter for modal analysis. The counting precision for the major minerals compares favourably with the precision for stained thin sections as determined by Chayes and Fairbairn (1951).

Conclusions. The staining procedure described here is suitable for granitic and other rocks containing K-feldspar. It works well with weathered rocks, the procedure is simple and requires no special preparation for plagioclase, and it is extremely economical.

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Ferrocarpholite associated with lawsonite–albite facies rocks near Sangineto, Calabria, Italy

FERROCARPHOLITE, the ferrous iron analogue of carpholite proper, was described in 1951 as a new mineral from the island of Celebes or Sulawesi, Indonesia (W. P. de Roever, 1951). It was found as a constituent of sericite-quartzites in a glaucophane-, lawsonite-, and jadeite-bearing area.