MONTICELLITE FROM CRESTMORE, CALIFORNIA

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INTRODUCTION

The optical properties and chemical analysis of monticellite from Crestmore, California, are here given. This supplements the data given by Beliankin and Ivanov on "The System of Monticellite"(1).

Monticellite was supected in rocks from Crestmore during the examination of specimens in which tilleyite was recently found and described by Larsen and Dunham (2). Concentration of the minute quantity of suspected monticellite from these specimens was undertaken by means of heavy liquids, but considerable difficulty was experienced in eliminating gehlenite, which corresponded very closely in density and index of refraction with the monticellite.

Finally, additional samples from Crestmore were obtained from the National Museum through the courtesy of Dr. W. F. Foshag, who had collected them. In these samples monticellite made up 75 per cent of the rock. Chemical analysis showed the mineral to be unquestionably monticellite with a composition close to the pure end member.

OPTICAL PROPERTIES

The Crestmore monticellite differs from previously described specimens in having lower birefringence. The crystal form would also seem to be somewhat more distinct; there is a tendency for elongation parallel to the cleavage.

The optical properties of the Crestmore mineral are listed below, with those reported in Winchell's tables in the adjacent column for comparison. Sodium light was used in determining the indices. The optic angle was measured on the Fedorov stage.

	Crestmore	Winchell
Indices	$\alpha=1.646$	1.651
	$\beta=1.653$	1.662
	$\gamma=1.659$	1.668
Birefringence	.013	.017
2V (−)	78°	75°
Dispersion	$r>v$ distinct	—
Orientation	X=*b*	X=*b*
Cleavage	{010} poor	{010} poor

Physical Properties

The mineral is colorless, with greasy lustre. Specific gravity was determined as 3.083 by the quartz pycnometer; this was corroborated by measurement of specific gravities of the heavy liquids used in concentrating the mineral. Hardness of 5.5 and fusibility of 5.5 agree with data given by Dana. One direction of poor cleavage exists; this is not apparent in the hand specimen but in thin section is distinctly visible.

Chemical Properties

The mineral gelatinizes readily in hydrochloric acid. The analysis, by F. A. Gonyer, is given below, showing the mineral to be very close to the end member, $CaO \cdot MgO \cdot SiO_2$.

	Weight per cent	Mol ratios
SiO_2	37.46	624
FeO	3.98	55
MnO	0.52	7
MgO	22.78	569
CaO	35.20	628
H_2O	0.15	8
	100.09	

The properties of the Crestmore monticellite fit the graphs of Beliankin and Ivanov, filling a gap close to the pure, artificial mineral examined by Ferguson and Merwin (3).

Association

In the specimens in which tilleyite was found, monticellite was present in minor amount, associated with spurrite, merwinite, wollastonite, gehlenite, tilleyite, garnet, and vesuvianite (4). In the specimens obtained from the National Museum, small garnet crystals are present in the monticellite and diopside is interstitial, moulding around the monticellite grains.

Eakle recorded monticellite in association with the brittle mica, waluewite, at Crestmore (5).

References

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HEAVY MINERALS IN THE SYENITES OF PLEASANT MOUNTAIN, MAINE

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In the course of petrographic work on material collected in 1931 on Pleasant Mountain, Maine, a qualitative study of the heavy minerals was made. The mountain, situated between Bridgeton and Fryeburg in the western part of the state, is held up by an oval-shaped stock of syenites, including nordmarkite, augite syenite, analcite syenite, and numerous porphyritic varieties of each of these.[1]

Observations were made with the following objectives in mind: (1) to determine what minerals are characteristic of each rock type, and hence get a broad idea of the variations within the stock as a whole; (2) to determine the degree of constancy of the heavy mineral suite within a given rock type; (3) to determine just how useful a qualitative mineralogical analysis of heavy minerals within a small stock such as that at Pleasant Mountain would be in correlation and identification of rocks whose relationship is in doubt.

Method. Of each sample selected for analysis a piece about a quarter the size of a hand specimen was ground to pass an eighty mesh screen. In addition two smaller meshes were used, the 160 and 250. Material which passed the 250 mesh screen was discarded, most of it consisting of feldspar particles. The two coarser grades were then passed separately through bromoform of a density approximating 2.9. After washing and drying the heavy residue a further separation was made with an electromagnet, the result being fairly clean concentrations of the various minerals. In general the magnetite was removed with a weak magnet, pyroxene, hornblende, biotite, and titanite with increasingly strong magnets. Apatite and zircon were non-magnetic.

[1] A paper by the writer on the petrography of the Pleasant Mountain intrusives will be published shortly in the *American Journal of Science*.