

infrared spectrum of teepelite and theoretical Heath-Linnett values (Edwards, Morrison, Ross and Schultz, 1955). For this purpose large crystals of teepelite were prepared by evaporation of a solution containing equal volumes of sodium borate and sodium chloride. Nuclear magnetic resonance analysis of synthetic teepelite using a field of 5,250 gauss and a Pound-Watkins recording spectrometer yielded a quadrupolar coupling constant, $eqQ = 0.094 \pm 0.001$ Mcps, corresponding to the resonance of tetrahedrally-coordinated B^{11} with an approximately isometric charge distribution.

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REFERENCES

- CHRIST, C. L. AND CLARK, J. R. (1957), Nature of the polyions in some borate Minerals: Abstr., G.S.A. 38th Ann. Meet., *Bull. Geol. Soc. Amer.*, **68**, 1708.
- COLLIN, R. L. (1951), The crystal structure of bandylite, $CuCl_2 \cdot CuB_2O_4 \cdot 4H_2O$: *Acta Cryst.*, **4**, 204.
- EDWARDS, J. O., MORRISON, G. C., ROSS, V. F. AND SCHULTZ, J. (1955), The structure of the aqueous borate ion: *J. Am. Chem. Soc.*, **77**, 266.
- FORNASERI, M. (1949), La struttura cristallina della teepelite: *Period. Min.*, **18**, 103.
- (1950), La struttura cristallina della bandylite: *Period. Min.*, **19**, 159.
- (1951), Struttura di metaborati tetragonali e loro relazione cristallografiche: *La Ricerca Scientifica*, **21**, 3.
- GALE, A., FOSHAG, W. F. AND VONSEN, M. (1939), Teepelite, a new mineral from Borax Lake, California: *Am. Mineral.*, **24**, 48.
- PALACHE, C. AND FOSHAG, W. F. (1938), Antofagastite and bandylite, two new copper minerals from Chile: *Am. Mineral.*, **23**, 85.
- PAULING, L. (1945), The Nature of the Chemical Bond: Cornell University Press, 382.

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NOTES ON A SECOND OCCURRENCE OF GROUTITE

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The talc mines at Talcville, about 8 miles southeast of Gouverneur, New York have long attracted the attention of amateur mineral collectors and others. The prime reason for this interest is the lilac colored variety of tremolite (called hexagonite in some of the older textbooks)

which is found there in abundance. The color has been shown by chemical tests to be due to the presence of divalent manganese. Some parts of the talc itself are similarly colored, presumably for the same reason. The occurrence of groutite at this locality appears to be associated with the availability of soluble manganese.

While collecting at this locality, and specifically at the dumps of the No. Two and One Half Mine, I noticed a few vugs in the talc in which there were small calcites covered with brilliant black acicular crystals. In the sunlight and against the background of the light colored talc, the appearance of these crystals was quite striking. They ranged in size from 1 to 5 mm., forming slender striated prisms. They showed 110 and 010 faces, together with the basal pinacoids. A few were found with dome faces. Many of the crystals were twinned. A few appeared to have been deposited in a radiating pattern but for the most part they were scattered over the surface of the calcite.

This occurrence suggests that the calcite provided the alkaline environment which caused the formation of the groutite. It seems logical that acid waters dissolved some of the Mn from the host rocks—the talc or the hexagonite—and that these solutions were neutralized by contact with the calcite. Conditions were right for the formation of groutite. This theory appears consistent with the general behavior of divalent Mn. Its various lilac colored compounds are generally soluble and MnCO_3 is easily precipitated by the alkali carbonates. On long continued boiling the precipitate converts to H_2MnO_3 . While this is not groutite, the chemical procedures are not carried out under the same conditions as the geological process. Hence, this has only been offered as a possible analogy.

On account of their small size and, because of the striations, the crystal data obtained on a two circle goniometer (made available thru the courtesy of Dr. Brian Mason of the Museum of Natural History of New York) can not be considered exact. However, approximately the same axial ratios were obtained as those published by Gruner (1). In this connection it may be of interest to compare the axial ratios of the principal members of the goethite group of minerals.

Montroseite	H VO ₂	<i>a:b:c</i>	.509 :1: .301
Diaspore	H AlO ₂	<i>a:b:c</i>	.4689:1: .3019
Goethite	H FeO ₂	<i>a:b:c</i>	.4593:1: .3034
Groutite	H MnO ₂	<i>a:b:c</i>	.4262:1: .2663

The identification of the groutite specimens from Talcville, N. Y. was confirmed by *x*-ray powder photographs compared with those of the type material made available by Dr. John Gruner.

REFERENCE

- (1) GRUNER, J. W. (1945), Groutite, HMnO_2 , a new mineral of the diaspore-goethite group: *Am. Mineral.*, 30, 169.