Groutite has been identified as thin rectangular plates up to 0.5 mm on edge lining an open veinlet in andradite and franklinite ore from Franklin, New Jersey. Electron microprobe analysis surprisingly revealed the presence of Sb. Quantitative determinations gave Sb $5.7 \pm 0.5$ percent and Mn $56.3 \pm 1$ percent, corresponding to $\text{Sb}_6\text{O}_5$ 7.6 percent and $\text{Mn}_6\text{O}_3$ 80.9 percent. Fe, Al, Zn and Si were not detected. If the remainder, 11.5 percent, is taken as water the analysis corresponds to $(\text{Mn}_{0.89}\text{Sb}_{0.01})\text{O} (\text{OH})_{1.11}$. The unit cell dimensions obtained by least squares refinement (Burnham, 1962) of selected lines in the X-ray powder diffraction pattern (Table 1) are: $a 4.558 \pm 0.005 \, \text{Å}$, $b 10.727 \pm 0.034$, $c 2.894 \pm 0.004 \, \text{Å}$. The calculated density based on the electron probe analysis and the measured unit cell dimensions is 4.16. Collin and Lipscomb (1949) obtained $a 4.58 \, \text{Å}$, $b 10.76$, $c 2.89$ on the type groutite of Gruner (1947) from the Cuyuna Iron Range, Minnesota. The calculated density of this material is 4.17 and the value measured by Gruner is 4.144.

The crystals were found by X-ray single-crystal study to be flattened on (010) and elongated [001]. There is an almost micaceous cleavage on (010) and an indistinct cleavage on (100) or (110). Very thin cleavage flakes tend to undulate or warp. The color is black. In very strong illumination the mineral is translucent and deep reddish brown in color. Optically positive, with the axial plane (010) and $X$ parallel to [001]. Extinction parallel; 2V medium. Strongly pleochroic, with $\alpha 2.1-2.2$ (yellowish brown), $\gamma 2.1-2.2$ (dark brown to purplish black). The optical orientation is identical with that of diaspore. Optical data are lacking for groutite from Minnesota and for montroseite, both of which are virtually opaque.

The presence of Sb in groutite is of interest in connection with the puzzling silicoantimonides of manganese catoptrite and yeatmanite (the latter known only from Franklin). These complex minerals are structurally related to pyrochroite (and groutite) and may be stuffed derivatives thereof (Moore, 1966). If the Sb is present as $\text{Sb}^{5+}$ in the Franklin
MINERALOGICAL NOTES

Table 1. X-Ray Powder Data for Antimonian Groutite

<table>
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<th>hkl</th>
<th>d, meas.</th>
<th>hkl</th>
<th>d, meas.</th>
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</table>

* Used in unit cell refinement.

b = broad, bb = very broad, f = faint.

FeKα radiation, 1.93728 Å, Mn filter. Film recording (camera diameter 114.59 mm) corrected for shrinkage. Visual intensities.

Material, valence compensation may be effected by the omission of H from a hydrogen bond analogous to the series extending from montroseite, VO(OH), to paramontroseite, VO₂ (Evans and Mrose, 1955).

References


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THE MORPHOLOGY OF McKELVYITE


McKelvyite crystals from four subsurface occurrences in Sweetwater County, Wyoming, were described by Milton, Ingram, Clark and Dwornik (1965). The mineral is a hydrous sodium barium rare-earth uranium carbonate, and the crystals were reported to be trigonal with the space group $P_3$ with only a few reflections which violated $P_3m1$ symmetry. The cell dimensions were given as $a = 9.174, c = 19.154$ Å, and the following forms were noted: $c\{0001\}, m\{1\overline{1}0\}, -m\{01\overline{1}0\}, r\{10\overline{1}1\}, e\{100\}$. 

Table 1. Goniometric Measurements of McKelvyite Crystals

<table>
<thead>
<tr>
<th>Form</th>
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<th>Number of measurements</th>
<th>Measured range</th>
<th>Weighted Mean</th>
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<td>18</td>
<td>$\phi$</td>
<td>$\rho$</td>
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<td>$66^\circ 03'-68^\circ 08'$</td>
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<td>$e$ 10\overline{1}2</td>
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<td>$29^\circ 32'-30^\circ 12'$</td>
<td>$49^\circ 10'-50^\circ 27'$</td>
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<tr>
<td>$g$ 01\overline{1}2</td>
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<td>38</td>
<td>$29^\circ 28'-30^\circ 16'$</td>
<td>$49^\circ 00'-50^\circ 17'$</td>
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