MINERALOGICAL NOTES

HELVITE NEAR BEAVER, UTAH[1]

C. L. SAINSBURY, *U. S. Geological Survey, Menlo Park, Calif.*

INTRODUCTION

Helvite [$(Mn, Fe, Zn)_4Be_3Si_3O_{12}S$] from the Miller mine was identified in 1956 by John Miller, a prospector from Beaver. In 1957 the writer mapped the workings from which the helvite was obtained. Further work on the specimens was deferred until 1960, and as no description of the deposit has yet appeared, it seems worthwhile to record briefly the geologic setting of the deposit and the *x*-ray data on the helvite. Very few published *x*-ray data for helvite are available.

LOCATION AND REGIONAL GEOLOGY

The Miller mine is about 14 miles from Beaver, Utah, on the west side of the Mineral Range. The property originally had been prospected for silver, and two shafts were sunk. Beryllium mineralization was recognized in the old workings by John Miller, who leased the property to interests in Los Angeles. During the work that followed, one of the old shafts was deepened and relagged, and a few trenches were excavated in alluvium nearby.

The country rock at the property consists of marble and tactite, both of which are intruded by granite dikes. Granite of the Mineral Range crops out a short distance east and continues eastward to form the core of the central Mineral Range (Earll, 1957). The shafts are sunk near the footwall of a granite dike, and drifts from the shafts penetrate the dike and several thin tactite bands.

The freshest dike rock consists of about 50 per cent quartz, 30 to 35 per cent orthoclase, and 5 to 10 per cent oligoclase; the remainder is a highly-birefringent mica, pleochroic in shades of greenish gray, and minor chlorite. The minor accessory minerals include magnetite, fluorite, and allanite(?). The dike and enclosing rocks have been irregularly argillized.

GENERAL OCCURRENCE OF BERYLLIUM MINERALS

Helvite and beryl occur in close proximity both in altered dike rock and in sugary-textured marble. Neither has been identified by the writer in tactite, although three samples of tactite gave strong beryllium lines with the flame spectrometer. The largest helvite fragments were ob-

[1] Publication authorized by the Director, U. S. Geological Survey.

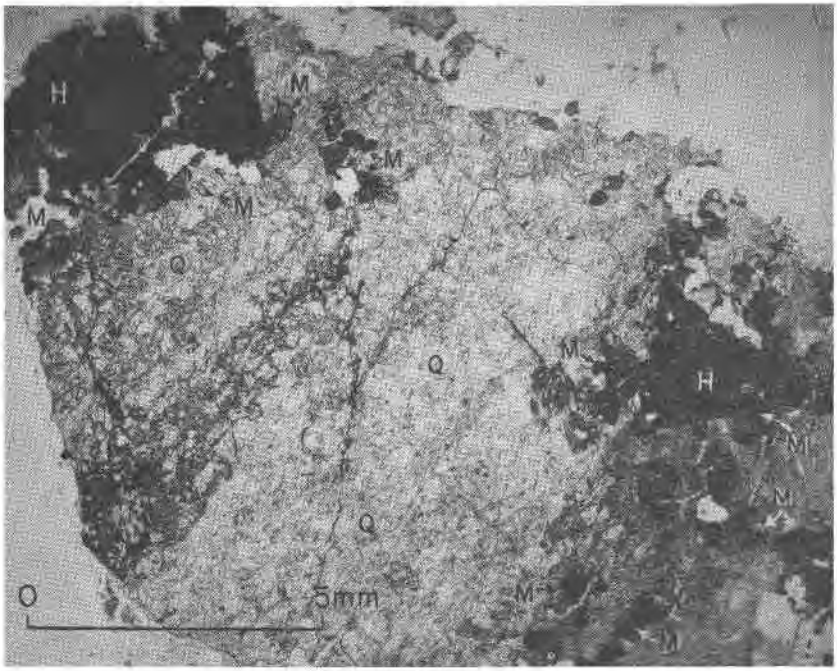

FIG. 1. Photomicrograph of helvite (H) in altered granite. Associated minerals are quartz (Q), and a highly birefringent green mica (M). Section also contains specks of galena, pyrite, magnetite, and fluorite, which are not marked.

tained from brecciated marble on the footwall of the dike, and beryl was found in close association. Helvite was obtained also from altered dike rock on the lowest level of the northerly shaft. The helvite is in parts of the dike that contain abnormal amounts of mica, a black uranium mineral, and such sulfide minerals as sphalerite, galena, and chalcopyrite.

Fluorite is common and at places constitutes several per cent of the rock. Topaz was identified in several thin sections, and magnetite locally is relatively abundant. Carbonate minerals are abundant throughout the altered dike. Secondary uranium minerals coat the fractures in the dike at several places. Argillic alteration is sporadic in both dike rock and limestone and has no readily apparent relation to the ore.

HELVITE

The helvite occurs as anhedral to subhedral masses as much as 1 inch long in both dike rock and in fractured marble. Vugs in the fractured marble contain minute grains of helvite. The helvite in altered dike rock exhibits a distinct preference for dark-green mica in replacement (Fig. 1).

TABLE 1. OPTICAL AND *X*-RAY DATA OF HELVITE FROM MILLER MINE

Optical properties: isotropic, n variable 1.72 to 1.75; absorption—none; pleochroism—none
x-ray diffractometer data (main lines)

d (Å)	I
9.935	4
3.678	4
3.363	100
2.60	12
2.20	15
1.94	30
1.68	3
1.455	4
1.415	2
1.373	3
1.272	4
1.124	3
Other lines too weak to be positively identified	

In one specimen of altered dike rock, helvite replaces carbonate formed from altered feldspar, and hence it appears that the helvite is later than the general alteration of the dike. The helvite is tawny-colored and the luster vitreous. It contains small grains of a black, opaque mineral, possibly magnetite, and locally small grains of glassy topaz.

OPTICAL AND *X*-RAY DATA

The pertinent optical and *x*-ray data of the helvite are shown in Table 1. The *x*-ray diffractometer pattern of this helvite is very similar to that shown by Neumann *et al.* (1957). The patterns of helvite from Iron Mountain, New Mexico (U. S. National Museum No. 104,724), and from Saxony were compared with that of the Utah helvite and found to be almost identical.

Several specimens of the Utah helvite were examined by *x*-ray fluorescence spectrometry; all gave strong peaks for iron, manganese, and zinc, indicating that it contains some of each of the three end members of the helvite group (Glass, *et al.* 1944).

CONCLUSIONS

The occurrence of helvite and beryl in a geologic environment similar to that of known deposits of beryllium minerals is of mineralogic and perhaps economic interest. Tactite and marble are extensively developed on the west side of the Mineral Range in this area, and beryl has been

found in small amounts in both granite and small pegmatite dikes in the granite at scattered localities. The area seems to have escaped investigation in recent comprehensive surveys of beryllium (Warner *et al.*, 1959) and might warrant detailed examination to assess its beryllium potential.

ACKNOWLEDGMENTS

The writer is indebted to John Miller for his courteous help during the examination of the property and for his permission to publish this paper. Jewell J. Glass kindly furnished a specimen of helvite from Iron Mountain for *x*-ray study, and Professor Paul F. Kerr and George Megrue of Columbia University furnished a diffractometer pattern of helvite from Saxony for comparison. Their courtesy and help are gratefully acknowledged.

REFERENCES

EARLL, FRED M., (1957), Geology of the Central Mineral Range, Beaver County, Utah. *Ph.D. thesis, Univ. Utah.*

GLASS, JEWELL J., RICHARD H. JAHNS AND ROLLIN E. STEVENS, (1944), Helvite and danalite from New Mexico and the helvite group. *Am. Mineral.*, **29**, 163–191.

NEUMANN, HENRICH, THOR SVERDRUP AND P. CHR. SEABO, (1957), *X*-ray powder patterns for mineral identification. *Akad. Oslo, l. Mat. Naturv. Klasse*, **6.**

WARNER, LAWRENCE A., WILLIAM T. HOLSER, VERL R. WILMARTH AND EUGENE N. CAMERON, (1959), Occurrence of non-pegmatitic beryllium in the United States. *U. S. Geol. Survey Prof. Paper* **318.**

THE AMERICAN MINERALOGIST, VOL. 47, MARCH-APRIL, 1962

JEŽEKITE IS MORINITE

D. JEROME FISHER, *Rosenwald Hall, University of Chicago.*

It is stated by Frondel (1947) that *x*-ray and optical study of morinite (presumably from Montebras, France) showed it to be identical with ježekite. This was confirmed by Fisher and Runner (1958), who however considered that the name ježekite should be dropped, since morinite has priority.

I have recently completed a detailed optical study of the two minerals, together with the Black Hills morinite, on the temperature-controlled spindle stage (Fisher, 1962); the results are given in Table 1. Precession *x*-ray pictures were also taken of the French morinite and of ježekite from the type locality, samples of both of which were supplied me by F. Čech of the Mineralogical Institute of Charles University (Prague)