in these working curves. This indicates that the characteristic responses of the equipment were not appreciably altered by such changes.

Although there is theoretical evidence that scanning at a slower rate than, say, 1 R.P.M., should produce more reliable values of recorded intensities, in practice no significant difference has been observed between scanning rates of $\frac{1}{2}$ R.P.M. and 1 R.P.M. in the reproducibility of results. In other words, a slower scanning rate itself does not allow a reduction in either the number of intensity recordings on the same sample or in the number of sample mounts necessary. However, for many analyses, particularly those in which the concentration of the mineral is above 10 per cent or so, very satisfactory results have been obtained at the 1 R.P.M. rate with only three determinations of line height on three different mounts, instead of the usual five. The time for an analysis is reduced thereby from about 45 to about 30 minutes. On the other hand, with proper care at all stages of the technique, results good to about plus or minus 5 per cent of the amount present, when the mineral concentration was above 10 per cent, have been achieved on "ideal" samples. Such "ideal" samples are those having strong and isolated diffraction lines, no preferred orientations, and forming readily reproduced mounted surfaces.

References

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A NEW OCCURRENCE OF HELVITE*

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Helvite has been found in a zinc replacement deposit in limestone at the Grandview mine in the Black Range, Grant County, New Mexico. So far as is known, this mineral has not previously been found in a deposit of this type. The various types of occurrence and associations and the properties of helvite and the helvite group are described in a paper by Glass, Jahns, and Stevens.[1]

While mapping one of the replacement zinc deposits in limestone at the Grandview mine in the Swartz district, Grant County, New Mexico, the author collected a specimen of fluorite from a vug in the ore body. Subsequently tiny tetrahedrons of yellow helvite were discovered in the

* Published by permission of the Director, U. S. Geological Survey.

[1] Glass, J. J., Jahns, R. H., and Stevens, R. E., Helvite and danalite from New Mexico, and the helvite group: *Am. Mineral.*, **29**, 163–191 (1944).

specimen, in part incrusting the surface of the fluorite and in part embedded in it. Sphalerite was also present. Some of the crystals of helvite are nearly a millimeter across, and smaller ones form clusters of interlocked crystals. The clusters are no more than 2 to 3 millimeters across, and along with the single crystals, are scattered sparsely on the specimens, most commonly being on the fluorite crystals. Several tetrahedrons occur as inclusions in the transparent, colorless crystals of fluorite; other crystals are partly enclosed, having only sharp corners exposed above the surface of the fluorite crystals.

The yellow mineral was tentatively identified as helvite by John W. Adams of U. S. Geological Survey. Robert L. Smith confirmed the identification in the Geological Survey's laboratory in Washington. Further confirmation was made by the usual tests, by *x*-ray powder photographs, and by the staining process developed by Gruner.[2] The index of refraction, measured by Jewell J. Glass, is slightly variable, *n* ranging from 1.730 to 1.733. The relatively low index indicates that the mineral is essentially the manganese member [$(Mn, Fe, Zn)_4Be_3Li_3O_{12}S$] of the helvite group.

At the Grandview mine the ore occurs as replacements in the Ordovician Montoya limestone in small lenses, pods, and pipelike bodies along minor faults and fractures and at fault intersections. The ore minerals are sphalerite and galena with local rare concentrations of chalcopyrite. Associated minerals are garnet, epidote, serpentine, magnetite, fluorite, pyrite, quartz, calcite, and chlorite.[3] Traces of scheelite are visible under the mineralight. The limestone has been recrystallized and locally contains considerable garnet. No igneous rocks are exposed in the mine workings, but a small quartz monzonite intrusion crops out a short distance west of the mine, and two drill holes put down by the U. S. Bureau of Mines penetrated altered igneous rock about 100 feet to the west of, and slightly below, the nearest workings.

On a subsequent trip to the Grandview mine a number of specimens of ore, gangue, and country rock were collected. Helvite was identified in three of them, but it does not form as well-developed crystals as in the original material. Like the original specimen, the later ones were from vugs, and the helvite in all of the specimens was associated with fluorite and sphalerite.

The helvite at the Grandview mine apparently is not of economic importance, but similar deposits should be examined carefully for helvite. It closely resembles garnet and might easily be overlooked.

[2] Gruner, John W., Simple tests for the detection of the beryllium mineral helvite: *Econ. Geology*, **39**, 444–447 (1944).

[3] Griggs, R. L., and Ellison, S. P., Geology and ore deposits of the Swartz district, Grant County, New Mexico: Unpublished manuscript, U. S. Geological Survey.