Bernalite from New Mexico

Patrick E. Haynes

44th New Mexico Mineral Symposium
November 1-3, 2024,Macey Center, Socorro, NM
pp.27-28

Downloaded from: https://geoinfo.nmt.edu/museum/nmms/abstracts/home.cfml?yr=2024

The annual New Mexico Mineral Symposium provides a forum for both professionals and amateurs interested in mineralogy. The meeting allows all to share their cumulative knowledge of mineral occurrences and provides stimulus for mineralogical studies and new mineral discoveries. In addition, the informal atmosphere encourages intimate discussions among all interested in mineralogy and associated fields.

The symposium is organized each year by the Mineral Museum at the New Mexico Bureau of Geology & Mineral Resources.

Abstracts from all prior symposiums are also available: https://geoinfo.nmt.edu/museum/nmms/abstracts

This page is intentionally left blank to maintain order of facing pages.

Bernalite from New Mexico

PATRICK E. HAYNES
901 Sean St., Socorro, NM 87801, patrickhaynes407@yahoo.com

The Victorio mining district lies within the Victorio Mountains, about 19 miles West of Deming, New Mexico, on the Gage Quadrangle, 7.5 minute series. Skarns are located within the "middle hills" in Township 24 S, Range 12 W, section 29, and are south of Interstate 10. The skarns, "tactites", or metamorphic alteration zones, lie within the Ordovician Montoya dolostones or limestones (Griswald). The alteration areas are approximately 35 million years old (Donahue).

Bernalite crystals, Ogre Bogle Claim, Victorio mining district, Luna Co., NM. FOV 0.5 mm. Pat Haynes specimen. Scott Brayley photo.

In 1984 I was chasing skarn minerals in the Victorio mining district. I was specifically looking for tetrahedrons of microscopic yellow to brown helvite. The Ogre Bogle claim had a lot of potential. Grossular and quartz were the most dominant minerals. However, calcite fills most of the vugs in the rocks, so acid baths are used to expose the microscopic minerals within the vugs. Other common species are helvite, beryl, scheelite, actinolite, tremolite, muscovite, and titanite. Mindat.org lists 22 species (December 2022) occurring at the Ogre Bogle claim. One of the acid baths had several rocks with a very tiny, green cubic-looking mineral. An initial electron microprobe analysis revealed only iron and oxygen. The green cubes were unique!

Around fourteen specimens of the green mineral were found. Perhaps, all of them originated from a single boulder or a very localized spot on a pit wall. I gave up all but three of the specimens for testing. After some time had passed, I inquired about the specimens. The researcher stated that he had lost the specimens!

This left me with just three existing specimens, and there was not enough material to perform a powder X-ray diffraction. Being frustrated about the status of the lost specimens, I pessimistically cataloged them into my collection as "unknown".

Decades passed, but in 2015, my curiosity finally prompted me to send one of the remaining three samples to Tony Kampf, who had equipment that could identify tiny crystals. Tony confirmed the green crystals to be bernalite, a rare mineral that had been found in Australia. Bernalite is $Fe(OH)_3 \cdot nH_2O$ (n = 0.0 to 0.25) (Birch). It is bottle-green, orthorhombic, and pseudo-cubic.

Bernalite had a slow start. In the early 1920's two specimens of it were found in the oxidized zone of the Proprietary Mine, Broken Hill Mine, NSW, Australia. The specimens have dark olive-green octahedral crystals up to 3 mm. The mineral was originally misidentified as scorodite. After sitting around for about 65 years, somebody questioned its identification. It was investigated and published as a new mineral in 1992.

In August 2024 Mindat.org lists 13 localities for bernalite, scattered over nine countries. It is rare, however many specimens of it have been found in the Clara Mine in Germany, with all of Mindat's bernalite images being specimens from that mine. The Clara Mine probably has some pretty good bernalite, but the New Mexican material is arguably better, probably world-class! It is unfortunate that the New Mexican material wasn't thoroughly investigated in the 1980's. New Mexico missed having a new type locality mineral.

Acknowledgments

I thank John Rakovan and Nancy Attaway for their helpful editing suggestions. I thank Tony Kampf for identifying the bernalite. I thank Scott Brayley for his photomicrography. One of his images is attached.

Bibliography

Birch, W.D., Pring, A., Reller, A., Schmalle, H. (1992) Bernalite: a new ferric hydroxide with perovskite structure: Naturwissenschaften, 79 (11). 509-511.

Griswald, George 1961. Mineral deposits of Luna County, New Mexico. Bulletin 72, New Mexico Bureau of Mines and Mineral Resources.

Donahue, Kelly M. 2002. Geochemistry, geology and geochronology of the Victorio Mining District, Luna County, New Mexico. New Mexico Bureau of Geology and Mineral Resources Open file report OF-471.