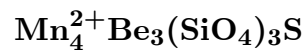


# Helvite



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**Crystal Data:** Cubic. *Point Group:*  $\bar{4}3m$ . As tetrahedra, dodecahedra, and pseudo-octahedral crystals, up to 12 cm; as rounded grains.

**Physical Properties:** *Cleavage:* Distinct on {111},  $\{1\bar{1}1\}$ . *Fracture:* Uneven to conchoidal. *Tenacity:* Brittle. Hardness = 6–6.5 VHN = 741–873 D(meas.) = 3.20–3.44 D(calc.) = [3.23] Pyroelectric.

**Optical Properties:** Translucent. *Color:* Yellow, brown, red, gray-yellow, yellow-green. *Streak:* White. *Luster:* Vitreous to resinous. *Optical Class:* Isotropic.  $n = 1.728\text{--}1.749$

**Cell Data:** *Space Group:*  $P\bar{4}3n$ .  $a = 8.24\text{--}8.29$   $Z = 2$

**X-ray Powder Pattern:** Butte, Montana, USA.  
3.382 (100), 1.955 (80), 2.215 (70), 2.618 (65), 1.692 (65), 1.510 (50), 1.466 (50)

| Chemistry:                     | (1)      | (2)     | (3)    |
|--------------------------------|----------|---------|--------|
| SiO <sub>2</sub>               | 31.06    | 29.62   | 32.47  |
| Al <sub>2</sub> O <sub>3</sub> | 0.30     | 0.03    |        |
| FeO                            | 0.18     | 13.25   |        |
| MnO                            | 52.48    | 24.34   | 51.12  |
| ZnO                            | 0.55     | 16.09   |        |
| BeO                            | [13.52]  | [13.21] | 13.52  |
| CaO                            |          | 0.07    |        |
| S                              | 5.51     | 5.91    | 5.78   |
| –O = S                         | [2.75]   | [2.95]  | 2.89   |
| Total                          | [100.85] | [99.57] | 100.00 |

(1) East Moultan mine, Butte, Montana, USA; by electron microprobe; BeO calculated assuming (Fe<sup>2+</sup>, Mn, Zn, Mg, Ca):Be = 4:3. (2) Pitkäranta, Finland; by electron microprobe, BeO calculated as in (1). (3) Mn<sub>4</sub>Be<sub>3</sub>(SiO<sub>4</sub>)<sub>3</sub>S.

**Polymorphism & Series:** Forms two series, with danalite, and with genthelvite.

**Occurrence:** May be locally abundant in granites, granite pegmatites, gneisses, and contact zones and skarns.

**Association:** Garnet, magnetite, fluorite, chlorite, diopside, vesuvianite.

**Distribution:** From Schwarzenberg and Breitenbrunn, Saxony, Germany. Exceptionally large crystals from Yxsjö, Örebro, Sweden. At Luppikko, Karelia. In Russia, near Miass, Ilmen Mountains, Southern Ural Mountains. From the Inyl'chek Mountains, Tien Shan, southeastern Kyrgyzstan. At Kara-Oba, Kazakhstan. From the Langesundsfjord, at Hørtekollen, and several other localities in Norway. In Finland, at Pitkäranta. In the USA, at Butte, Silver Bow Co., Montana; from Amelia, Amelia Co., Virginia; in the American Tunnel, Silverton, San Juan Co., Colorado; on the east fork of Benedict Creek, Sawtooth Mountains, Boise Co., Idaho; from the Clark vein, Rincon, San Diego Co., California; at Iron Mountain, Sierra Co., New Mexico. In the Hongo mine, Iwate Prefecture; the Oashi mine, Tochigi Prefecture; the Yagisawa mine, Nagano Prefecture; and several other places in Japan. A few additional localities are known.

**Name:** From the Greek for *sun*, in allusion to its yellow color.

**Type Material:** Mining Academy, Freiberg, Germany, 22941.

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