

Brandtite

$\text{Ca}_2(\text{Mn}^{2+}, \text{Mg})(\text{AsO}_4)_2 \cdot 2\text{H}_2\text{O}$

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Crystal Data: Monoclinic. *Point Group:* $2/m$. Stout to slender prismatic crystals, with prominent {100}, {110}, {120}, {010}, {122}, a number of minor forms, to 8 mm; in radiated groups and fibrous spherules. *Twinning:* On {100}, common.

Physical Properties: *Cleavage:* {010}, perfect; {001}, good. Hardness = 3.5
D(meas.) = 3.61–3.67 D(calc.) = 3.63–3.70

Optical Properties: Transparent to translucent. *Color:* Colorless to white; colorless in transmitted light. *Luster:* Vitreous.

Optical Class: Biaxial (+). *Orientation:* $X = b$; $Y \wedge c = 6^\circ$; $Z \wedge c = 84^\circ$. *Dispersion:* $r < v$, strong to very strong. $\alpha = 1.707\text{--}1.709$ $\beta = 1.711$ $\gamma = 1.722\text{--}1.727$ $2V(\text{meas.}) = 15^\circ\text{--}23^\circ$

Cell Data: *Space Group:* $P2_1/c$. $a = 5.897\text{--}5.899$ $b = 12.991\text{--}12.968$ $c = 5.964\text{--}5.684$
 $\beta = 108.01\text{--}108.05^\circ$ $Z = 2$

X-ray Powder Pattern: Harstigen mine, Sweden.

3.010 (100), 3.241 (70), 3.373 (55), 3.424 (30), 6.482 (25), 5.151 (20), 3.790 (20)

Chemistry:

	(1)	(2)	(3)
P_2O_5	0.05		
As_2O_5	50.48	49.95	51.19
FeO	0.05		
MnO	14.03	14.85	15.80
PbO	0.96		
MgO	0.90	0.46	
CaO	25.07	24.66	24.98
Cl	0.04		
H_2O	8.09	9.31	8.03
insol.	0.04		
Total	99.71	99.23	100.00

(1) Harstigen mine, Sweden. (2) Vrančice, Czech Republic; by electron microprobe, H_2O by TGA; corresponds to $\text{Ca}_{2.01}(\text{Mn}_{0.96}\text{Mg}_{0.05})_{\Sigma=1.01}(\text{AsO}_4)_{1.99} \cdot 2.32\text{H}_2\text{O}$. (3) $\text{Ca}_2\text{Mn}(\text{AsO}_4)_2 \cdot 2\text{H}_2\text{O}$.

Polymorphism & Series: Dimorphous with parabrandsite.

Mineral Group: Roselite group.

Occurrence: In metamorphosed Fe–Mn orebody (Harstigen mine and Långban, Sweden); in a metamorphosed stratiform zinc orebody (Sterling Hill, New Jersey, USA).

Association: Lead, sarkinite, flinkite, caryopilite, galena, barite, calcite (Harstigen mine, Sweden); sarkinite, rhodochrosite, sphalerite, franklinite, willemite, barite, calcite, chalcopryrite, löllingite (Sterling Hill, New Jersey, USA).

Distribution: Found in the Harstigen mine, near Persberg, and at Långban, Värmland, Sweden. From Sailauf, northeast of Aschaffenburg, Bavaria, Germany. In the Falotta mine, Oberhalbstein, Graubünden, Switzerland. At Vrančice, near Příbram, Czech Republic. In the Ushkatyn-III deposit, Atasu district, Kazakhstan. At Sterling Hill, Ogdensburg, Sussex Co., New Jersey, USA. In the Veta Negra mine, Pampa Larga district, Tierra Amarilla, southeast of Copiapó, Chile. From the Wessel's mine, near Kuruman, Cape Province, South Africa.

Name: To honor George Brandt (1694–1768), Swedish chemist.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 725–727. (2) Dahlman, B. (1952) The crystal structures of kröhnkite, $\text{CuNa}_2(\text{SO}_4)_2 \cdot 2\text{H}_2\text{O}$ and brandtite, $\text{MnCa}_2(\text{AsO}_4)_2 \cdot 2\text{H}_2\text{O}$. Arkiv. Mineral. Geol., 1(12), 339–366. (3) Hawthorne, F.C. and R.B. Ferguson (1977) The crystal structure of roselite. Can. Mineral., 15, 36–42. (4) Mrázek, Z. (1985) Brandtite and chervetite from Vrančice near Příbram (Bohemia). Časopis pro Mineralogii a Geologii, 30(3), 295–302. (5) Dunn, P.J. (1995) Franklin and Sterling Hill, New Jersey. No publisher, n.p., 659–660.

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