Hannebachite $2CaSO_3 \cdot H_2O$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. As thin bladed crystals, flattened on {001}, elongated along [010], to 1 mm, dominated by {101} and {021} with some faces curved; typically in spraylike aggregates.

Physical Properties: *Cleavage:* Perfect on {110}. Hardness = ∼3.5 D(meas.) = 2.52 D(calc.) = 2.54

Optical Properties: Transparent. *Color:* Colorless; changes to milky white on exposure to humid air. *Streak:* White. *Luster:* Vitreous.
Optical Class: Biaxial (+). *Orientation:* $X = a$; $Y = c$; $Z = b$. $\alpha = 1.596(2)$ $\beta = 1.600(2)$ $\gamma = 1.634(2)$ 2V(meas.) = 38(5)° 2V(calc.) = 38°

Cell Data: *Space Group: Pbna.* $a = 6.473(5)$ $b = 9.782(9)$ $c = 10.646(9)$ Z = 4

X-ray Powder Pattern: Hannebacher Ley volcano, Germany.
3.15 (100), 2.617 (90), 3.79 (80), 1.843 (50), 5.54 (40), 1.950 (40), 1.671 (40)

Chemistry:

	(1)	(2)
SO_2	49.5	49.60
CaO	43.1	43.42
H_2O	[7.4]	6.98
Total	[100.0]	100.00

(1) Hannebacher Ley volcano, Germany; average of 10 electron microprobe analyses, H_2O by TGA, presence of SO_3 confirmed by IR. (2) $2CaSO_3 \cdot H_2O$.

Occurrence: Lining cavities in blocks of melilite-nepheline-leucitite at the base of a volcano.

Association: Calcite, aragonite, gypsum, barite, celestine, thaumasite, chabazite, phillipsite, gismondine, whewellite, perovskite.

Distribution: From the Hannebacher Ley volcano, one km east-northeast of Hannebach, and at Kalem, near Birresborn, Eifel district, Germany.

Name: For the locality, Hannebacher Ley volcano, Germany, from which the first specimens were collected.

Type Material: Natural History Museum, Mainz, Germany, M1990/3093.

References: (1) Hentschel, G., E. Tillmanns, and W. Hofmeister (1985) Hannebachite, natural calciumsulfite hemihydrate, $CaSO_3 \cdot 1/2H_2O$. Neues Jahrb. Mineral., Monatsh., 241–250. (2) (1988) Amer. Mineral., 73, 928 (abs. ref. 1).