

Clinotobermorite



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Crystal Data: Monoclinic. *Point Group:* m or $2/m$. Crystals tabular \perp [001], or acicular \parallel [010], up to 5 mm, and as aggregates. *Twinning:* On {001} or along [100], well-developed polysynthetic on a microscopic scale.

Physical Properties: *Cleavage:* Perfect on {001}, poor on {100}. Hardness = 4.5
D(meas.) = 2.58 D(calc.) = 2.69

Optical Properties: Semitransparent. *Color:* Colorless to white; colorless in thin section.
Luster: Vitreous.
Optical Class: Biaxial. $\alpha = 1.575$ $\beta = 1.580$ $\gamma = 1.585$ $2V(\text{meas.}) = \text{n.d.}$ $2V(\text{calc.}) = 89.8^\circ$

Cell Data: *Space Group:* Cc or $C2/c$. $a = 11.331(9)$ $b = 7.353(7)$ $c = 22.67(2)$
 $\beta = 96.59(7)^\circ$ $Z = [4]$

X-ray Powder Pattern: Fuka, Japan.

11.25 (100), 3.034 (60), 2.794 (60), 3.304 (51), 3.068 (45), 2.811 (41), 3.012 (37)

Chemistry:

	(1)
SiO ₂	46.55
TiO ₂	0.01
B ₂ O ₃	0.23
Al ₂ O ₃	0.36
Fe ₂ O ₃	0.01
MnO	0.06
MgO	0.11
CaO	39.04
Na ₂ O	0.02
K ₂ O	0.10
F	0.18
H ₂ O	13.75
-O = F ₂	0.08
Total	100.34

(1) Fuka, Japan; by electron microprobe, wet chemical analysis for B, F, and H₂O; corresponds to $(\text{Ca}_{5.29}\text{Mg}_{0.02}\text{K}_{0.02})_{\Sigma=5.33}(\text{Si}_{5.90}\text{Al}_{0.05}\text{B}_{0.05})_{\Sigma=6.00}[\text{O}_{16.54}(\text{OH})_{1.39}\text{F}_{0.07}]_{\Sigma=18.00} \cdot 5.1\text{H}_2\text{O}$.

Polymorphism & Series: Dimorphous with tobermorite.

Occurrence: In gehlenite-spurrite-bearing skarns.

Association: Calcite, tobermorite, plombièrite, apophyllite.

Distribution: At Fuka, near Bicchu, Okayama Prefecture, Japan.

Name: For its monoclinic crystal system and chemical identity to *tobermorite*.

Type Material: National Science Museum, Tokyo, Japan.

References: (1) Henmi, C. and I. Kusachi (1989) Monoclinic tobermorite from Fuka, Bitchu-cho, Okayama Prefecture, Japan. *J. Japan. Assoc. Mineral. Petrol. Econ. Geol.*, 84, 374-379 (in Japanese with English abs.). (2) (1992) *Amer. Mineral.*, 77, 451 (abs. ref. 1). (3) Henmi, C. and I. Kusachi (1992) Clinotobermorite, $\text{Ca}_5\text{Si}_6(\text{O}, \text{OH})_{18} \cdot 5\text{H}_2\text{O}$, a new mineral from Fuka, Okayama Prefecture, Japan. *Mineral. Mag.*, 56, 353-358. (4) (1993) *Amer. Mineral.*, 78, 672 (abs. ref. 3).

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