

Chiavennite

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Crystal Data: Orthorhombic, pseudohexagonal. *Point Group:* $mm2$. Crystals are hemimorphic, spearhead-shaped, flattened on {010}, and display the pyramid {161}, to 1 cm. In aggregates and spherulites of such crystals; as grains and crusts.

Physical Properties: *Cleavage:* Good to perfect on {100}, {010}, and {001}.
Hardness = ~ 3 D(meas.) = 2.56–2.64 D(calc.) = 2.65

Optical Properties: Translucent. *Color:* Pale orange-yellow; in thin section, colorless to yellow or orange-yellow; color sharply zoned near crystal margins. *Streak:* White to pale ocher. *Luster:* Vitreous to pearly.
Optical Class: Biaxial (+). *Pleochroism:* Weak; X = colorless to pale yellow; Z = yellow-orange. *Orientation:* $X = a$; $Y = b$; $Z = c$. *Absorption:* $Z > X$. $\alpha = 1.594$ – 1.596 $\beta = 1.600$
 $\gamma = 1.613$ – 1.618 2V(meas.) = n.d. 2V(calc.) = 50°

Cell Data: *Space Group:* $P2_1ab$. $a = 8.866(7)$ $b = 31.34(2)$ $c = 4.787(3)$ $Z = 4$

X-ray Powder Pattern: Tanno, Italy.

15.7 (100bb), 2.903 (100), 3.28 (75), 4.15 (30), 3.93 (30b), 3.82 (30), 1.944 (30)

Chemistry:	(1)	(2)	(1)	(2)
SiO ₂	52.5	50.0	Na ₂ O	0.3
Al ₂ O ₃	3.6	6.76	K ₂ O	0.04
FeO		2.01	F	0.21
MnO	12.9	10.6	H ₂ O	11.3
BeO	9.3	8.72	CO ₂	0.83
MgO		0.14	–O = F ₂	0.09
CaO	10.2	9.69	Total	100.1
				99.99

(1) Tanno, Italy; by electron microprobe; Be determined spectrographically, H₂O by TGA; corresponds to $(\text{Ca}_{0.97}\text{Na}_{0.05})_{\Sigma=1.02}\text{Mn}_{0.97}(\text{Be}_{1.98}\text{Al}_{0.03})_{\Sigma=2.01}(\text{Si}_{4.65}\text{Al}_{0.35})_{\Sigma=5.00}\text{O}_{12.63}(\text{OH})_{2.37} \cdot 2.16\text{H}_2\text{O}$. (2) Langangen, Norway; by a variety of analytical methods; corresponds to $(\text{Ca}_{0.92}\text{Na}_{0.12})_{\Sigma=1.04}(\text{Mn}_{0.80}\text{Fe}_{0.15}\text{Mg}_{0.02})_{\Sigma=0.97}(\text{Be}_{1.86}\text{Al}_{0.14})_{\Sigma=2.00}(\text{Si}_{4.43}\text{Al}_{0.57})_{\Sigma=5.00}\text{O}_{12.45}(\text{OH})_{2.49}\text{F}_{0.06} \cdot 1.83\text{H}_2\text{O}$.

Occurrence: Coating beryl in late-stage pegmatites (Tanno, Italy); in vugs in syenite pegmatites (Norway).

Association: Beryl, bavenite (Tanno, Italy); analcime, aegirine, helvite, eudidymite, natrolite, feldspar (Norway).

Distribution: From Tanno, Chiavenna, Lombardy, Italy. In Norway, in the Heia and Vevja larvikite quarries, near Larvik, Tvedalen district; near Blåfjell, Langangen, and in the Saga larvikite quarry, Porsgrunn, Langesundsfjord; and at Bakkane, Brunlanes. Large crystals on Utö Island, Sweden.

Name: For the Italian locality at Tanno, Chiavenna.

Type Material: University of Rome, Rome, Italy, 24342; University of Oslo, Norway; National Museum of Natural History, Washington, D.C., USA, 159917.

References: (1) Bondi, M., W.L. Griffin, V. Mattioli, and A. Mottana (1983) Chiavennite, $\text{CaMnBe}_2\text{Si}_5\text{O}_{13}(\text{OH})_2 \cdot 2\text{H}_2\text{O}$, a new mineral from Chiavenna (Italy). *Amer. Mineral.*, 68, 623–627. (2) Raade, G., R. Åmli, M.H. Mladeck, V.K. Din, A.O. Larsen, and A. Åsheim (1983) Chiavennite from syenite pegmatites in the Oslo Region, Norway. *Amer. Mineral.*, 68, 628–633. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise without the prior written permission of Mineral Data Publishing.