

Armenite**BaCa₂Al₆Si₉O₃₀•2H₂O**

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Crystal Data: Orthorhombic, pseudohexagonal. *Point Group:* 2/m 2/m 2/m. Sheaves of prismatic crystals, with individuals to 2.5 cm. *Twining:* Complex, showing sectored triplets; may be lamellar.

Physical Properties: *Cleavage:* Perfect prismatic, one pinacoidal distinct; partings along sector boundaries. Hardness = 7–8 D(meas.) = 2.74–2.76 D(calc.) = 2.787

Optical Properties: Translucent. *Color:* Colorless, fawn, greyish green. *Luster:* Vitreous. *Optical Class:* Biaxial (–), with uniaxial (–) domains. *Orientation:* X = c; Z = b. $\alpha = 1.550\text{--}1.551$ $\beta = 1.557\text{--}1.559$ $\gamma = 1.559\text{--}1.562$ 2V(meas.) = 60°–65° 2V(calc.) = 57.8°

Cell Data: *Space Group:* Pnna. a = 13.874(2) b = 18.660(2) c = 10.698(1) Z = 4

X-ray Powder Pattern: Kongsberg, Norway. (ICDD 20-112). 3.86 (100), 3.41 (90), 2.91 (90), 6.94 (80), 2.78 (80), 4.25 (65), 9.31 (55)

Chemistry:	(1)	(2)	(3)
SiO ₂	46.18	47.6	47.10
Al ₂ O ₃	27.52	27.0	26.64
CaO	9.99	9.50	9.77
SrO	0.04	0.62	
BaO	12.37	12.05	13.35
Na ₂ O	0.16	0.36	
K ₂ O	0.13	0.15	
H ₂ O ⁺	3.41		
H ₂ O [–]	0.11		
H ₂ O		2.90	3.14
CO ₂		0.31	
Total	99.91	100.49	100.00

(1) Kongsberg, Norway. (2) Rémigny, Canada; by electron microprobe; average of 38 analyses on six samples; corresponds to (Ba_{0.89}Na_{0.10}K_{0.04})_{Σ=1.03}(Ca_{1.92}Sr_{0.07}Na_{0.03})_{Σ=2.02}Al_{3.02}(Al₃Si₉O₃₀)•2[(H₂O)_{0.91}(CO₂)_{0.04}]. (3) BaCa₂Al₆Si₉O₃₀•2H₂O.

Mineral Group: Milarite group (?).

Occurrence: In calcite veins (Kongsberg, Norway); in manganese-metasomatized diorite included in later granodiorite (Rémigny, Canada).

Association: Axinite, pyrrhotite, quartz (Kongsberg, Norway); albite, manganiferous zoisite, piemontite, prehnite, epidote, muscovite (Rémigny, Canada); celsian, bytownite (Broken Hill, Australia).

Distribution: From the Armen mine, near Kongsberg, Norway. In the Su Zurfuru mine, Fluminese, Sardinia, Italy. Large crystals from the Wasenalp, near Simplon, Valais, Switzerland. At Coire Loch Kander, 11 km south-southeast of Braemar, Scotland. From Chvaletice, Czech Republic. At Rémigny, Quebec, Canada. From 16 km northeast of North Bend, King Co., Washington, USA. At Broken Hill and Pernamoota, 30 km north of Broken Hill, New South Wales, Australia.

Name: For the Armen mine, Kongsberg, Norway.

Type Material: National School of Mines, Paris, France; The Natural History Museum, London, England, 1947,290.

References: (1) Neumann, H. (1939) Armenite, a new mineral. Preliminary note. Norsk. Geol. Tidsskr., 19, 312–313. (2) (1941) Amer. Mineral., 26, 235 (abs. ref. 1). (3) Puoliot, G., P. Trudel, G. Valiquette, and P. Samson (1984) Armenite-thulite-albite veins at Rémigny, Quebec: the second occurrence of armenite. Can. Mineral., 22, 453–464. (4) Armbruster, T. and M. Czank (1992) H₂O ordering and superstructures in armenite, BaCa₂Al₆Si₉O₃₀•2H₂O: a single-crystal X-ray and TEM study. Amer. Mineral., 77, 422–430.

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